

# THE ENGINEERING AND MINING JOURNAL



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

VOL. LI. MARCH 7. No. 10.

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BOSSITER W. RAYMOND Ph.D., M.E. Special Contributor.

Cable Address: "Rothwell, New York." Use A. B. C. Code, Fourth Edition. London: 76 Finsbury Pavement, London, E. C., Mr. Thomas B. Provis, Civil and Mining Engineer, Manager.

Mexico: Mr. R. E. Chisn, M. E., Callejon Espiritu Santo No. 4, City of Mexico. Peru, S. A.: Mr. John Newton, No. 2 Calle Constitucion, Calla.

Australasia: Messrs. Moffat, Judd & Co., 11 Bridge street, Sydney, N. S. W.; Mr. W. Forster, 56 Elizabeth street, Melbourne, Victoria; Messrs. J. T. Partridge & Co., 134 Manchester street, Christchurch, New Zealand.

SUBSCRIPTION PRICE, including postage: Weekly Edition (which includes the Export Edition), for the United States, Mexico and Canada, \$4 per annum; \$2.25 for six months; all other countries in the Postal Union, \$5.

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

THE SCIENTIFIC PUBLISHING CO., Publishers, SOPHIA BRAEUNLICH, Sec'y & Treas. R. P. ROTHWELL, Pres. and Gen'l Manager. P.O. Box 1833. 27 Park Place, New York.

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THE dividends declared by mining companies which publish their statements during the month of February, 1891, amounted to \$1,406,310; in January they paid \$1,331,300, the total for the two months thus being \$2,637,610. In the corresponding two months of last year the dividends paid amounted to \$2,441,476, the sum of \$1,408,106 being distributed in January, and \$1,033,370 in February. The list for the current year shows that 24 companies paid dividends during January, and 34 in February.

THE anti-free lead meeting which was advertised to be held in Denver on the 16th ult. did not materialize, on account of small attendance. There were few of the mining men of Denver present, and scarcely any from the mining districts in other parts of Colorado or adjoining states. It is not surprising that so much difficulty should be experienced in exciting enthusiasm regarding the lead tariff, in the face of the charges for smelting ore, which still continue high. They have indeed fallen somewhat from the point to which they had risen two months ago, the immense stocks of ore accumulated by the smelting companies, which were an important factor in producing the condition of the market at that time, having been, to a considerable extent, worked off. Nevertheless, treatment charges on silicious ores continue to be much higher than the average of six months or one year ago, and as we have already pointed out, while present conditions continue, there is little likelihood that prices will fall again to their former level.

### THE MULATOS MINE.

The history of the famous Mulatos gold mine of Sonora, Mexico, is well known to regular readers of the ENGINEERING AND MINING JOURNAL (see Vol. XLIX., pp. 131, 380, 393; Vol. LI., p. 126). The mine is located on the Mulatos River, which is the southernmost of the headwaters of the Yaqui, and was discovered by Indians who had been placer-washing in the bed of one of the tributary creeks in 1806. Since that time it has been worked continuously, and has borne the reputation of being rich, although, unfortunately, in late years, at least, no one seems to have been able to get very much out of it.

After passing through various hands the property finally came into possession of MANUEL AGUAYOS and brother, who were the defendants in the suit concerning it, recently decided in San Francisco.

Negotiations for the sale of the mine had been in progress for nearly fifteen years, when in September, 1889, it was finally purchased by the firm of Hayward & Hobart, well known on the Comstock lode as formerly, if not now, members of the Comstock mill ring. The mine was then turned over to the Oro Grande Company, limited, of London, which was organized for this purpose.

In March, 1890, action was brought in the Superior Court at San Francisco by the company against the vendors, Messrs. Aguayos Brothers, for a rescission of the contract of sale and refunding of the money already paid, on the ground that the mine had been salted. This suit was decided in favor of the plaintiffs in January last.

We understand that Messrs. WILLIAM IRELAN, Jr., State Mineralogist of California, and JOHN HAYS HAMMOND, M. E., have recently made an examination of the property for the company and ALVINZA HAYWARD, and it is said report that they are convinced that the mine was salted at the time of the examination of Messrs. BOURE and GILLETTE, upon whose reports it was purchased. Mr. GILLETTE discovered the deception that had been played upon him after the purchase, and was active in pressing the suit against the Aguayos Brothers (the sellers), from whom the company has now recovered nearly all of the money paid, amounting to about \$1,500,000.

### RECIPROCITY.

It will, of course, be many months before the real effects of the reciprocity treaty recently executed with the United States of Brazil, which goes into effect upon April 1st, become clearly apparent, but already it is reported that merchants of this country have entered upon considerably increased transactions for future delivery, and it is also rumored that a new steamship line is to be established between New York and Brazilian ports. There is little doubt but that this treaty will be of immense benefit to both countries, and especially to this, where it will give a new and decided impetus to manufacturing and agricultural interests. On the other hand, the people of Brazil gain important advantages by the free importation of their coffee and sugar.

Of greater importance to this country than the material advantages to be immediately derived from this treaty with Brazil, however, is the fact that it definitely commits the present administration to the policy of reciprocity. An auspicious beginning is made by the convention with the most populous and one of the most influential of the South American states, and it is likely to be followed, in due time, by similar treaties with the others. Thus has been taken one of the most important steps in the commercial history of the United States for many years. It effects the first removal of the barriers which have been restricting our commerce since the time of the civil war and constitutes the first move which will result in our assuming a commanding position with our manufactured products in the markets of the world.

From Brazil, we are now importing about \$60,000,000 of goods annually, while our shipments in return amount to but \$11,000,000. Europe sends thither cotton goods to the value of \$20,000,000, and the United States but \$500,000 worth. Here is a balance of trade against the United States amounting to \$49,000,000, which, under the new conditions, will undoubtedly adjust itself more equitably. As an illustration of the manner in which commerce is quick to follow any opening made for it, may be cited the reciprocal trade in iron and coal which has sprung up between the United States and Cuba.

Several years ago the Pennsylvania Steel Company and Bethlehem Iron Company acquired large iron mines in Cuba, from which they began the importation of ore into the United States, the former company erecting large works near Baltimore for its reduction. A whole fleet of ships and steamers was, of course, employed in its transport. At first these went back in ballast, but finally they began to carry coal instead, and the trade, thus inaugurated, rapidly grew to be one of considerable importance. Now it is stated that American coal has driven all others from the market in many ports of the West Indies. In 1889 we imported from Cuba 225,525 tons of iron ore valued at \$537,478, and exported 198,688 tons of coal valued at \$581,094. In 1890 the iron importations had increased to 287,322 tons, valued at \$566,416, and the exports of coal to 237,140 tons, valued at \$722,856.

## OVERRATED ALUMINUM.

If any one ought to know what aluminum is, and what it is good for, it should be one of the leading manufacturers of this metal; and if such leading manufacturer deliberately and publicly says that aluminum is not the extraordinarily good metal that it is popularly believed to be, then we have good reason to suspect that he is right and that popular belief in the matter is wrong. These remarks are suggested by a lecture delivered by ALFRED E. HUNT, president of the Pittsburg Reduction Company, before the Boston Society of Arts, on February 12th, on "The Properties, Uses and Processes of Production of Aluminum." He states that the two chief difficulties which his company has met with in selling aluminum and introducing it into the arts and manufactures of the country during the past two years, have been, first, the extravagant erroneous and, in many cases, mischievously misleading claims which have been made concerning the properties of the metal, and, second, the equally widespread, extravagant and misleading claims by inventors of processes for the manufacture of aluminum at remarkably low prices.

We have been so surfeited lately with statements to the effect that aluminum is going to revolutionize the world that it is interesting to learn from such a source that it has some bad qualities. Among them are the following:

For many purposes the pure metal cannot be so advantageously used as that containing three or four per cent. of impurity. The pure metal is very soft, and not so strong as the impure. The thin coat of oxide which it gains on exposure gives it a pewtery appearance, which makes it undesirable for table ware. It becomes pasty at a temperature as low as 1,000 degrees F., melts at 1,300 degrees F., and loses its tensile strength and much of its rigidity as low as 400 or 500 degrees. It is inferior to copper as a conductor of heat and electricity, in fact being only half as good. Its lack of rigidity and hardness is an obstacle to its use for many purposes, such as castings. In rolling it, not nearly as much draft can be given to the rolls as in the case of rolling steel.

In cold rolling it requires to be annealed oftener than steel. Alloys of the metal increase in brittleness more than they do in hardness. Its tensile strength per square inch is not greater than that of common cast iron, and only about one-third that of structural steel, while its compressive strength is less than one-sixth that of cast iron. Under transverse test, a one-inch square bar of cast iron, four feet six inches between supports, will sustain a load of 500 pounds with a deflection of two inches, while a similar bar of aluminum would deflect over two inches with a load of 250 pounds. The modulus of elasticity of cast aluminum is about 11,000,000, being only about one-half that of cast iron, and one-third that of steel. It combines with iron in all proportions, but none of its alloys with that metal are of value, except those with very small percentages of aluminum. Other elements than aluminum can be better employed to harden iron, and its presence in iron is to be regarded as deleterious, and to be avoided if possible. The addition of aluminum does not lower the melting point of steel, as has been claimed, nor does it increase its fluidity.

One of the most important statements made by Mr. HUNT concerning aluminum is that of its cost. It is not a cheap metal, as now manufactured in the works of the Pittsburg Reduction Company at the rate of 375 pounds per day and selling at about \$2 per pound, but he gives what may be called a theoretical estimate of its probable cost, when made in great quantities in the future as follows: Two pounds alumina ( $Al_2O_3$ ) contains 52.94 per cent. Al, 6 cents; one pound of carbon electrode, 2 cents; chemicals, carbon dust and pots, 1 cent; 22 electrical horse power exerted an hour, water power being used, 5 cents; labor and superintendence, 3 cents; general expense, interest and repairs, 2 cents; total cost of one pound of aluminum, 20 cents.

The above statements are made simply as an antidote to the extraordinary claims which have been made regarding the value of aluminum as a metal of construction, and are by no means intended to disparage the value of the metal for the uses to which it is well adapted. These uses are very numerous, and are constantly increasing, and there are great possibilities yet remaining for the metal, especially in the shape of its alloys with other metals, the properties of which alloys are now being made a subject of research. Mr. HUNT's paper treats largely of the uses of aluminum and of its good qualities which recommend it for these uses. He also tells us that the difficulty which has hitherto been found in soldering aluminum has at last been overcome, and that it can now be soldered by the use of the blowpipe with ordinary hard or soft solder, or with pure zinc, or with an alloy of zinc and aluminum as the soldering metal. The novelty, which has just been covered by letters patent, is in the soldering salt, which allows the solder to flow freely on the surfaces to be united. The difficulty of the softness of aluminum is also now overcome by the method of alloying pure aluminum with a few per cent. of hardening metal, and by cold rolling, hammering or drop forging.

## THE MINES OF LEADVILLE.

For more than a decade, or since the second year succeeding the discovery of the great lead carbonate ore deposits of Leadville, the State of Colorado has been the most important lead-producing section of the United States. In 1877 its output amounted to 897 tons only; in 1878, the year in which the Leadville mines first came into prominence, it increased to 6,369 tons, and in 1880 amounted to 35,674 tons, for the first time surpassing the soft-lead district, which includes the States of Missouri, Kansas, Illinois and Wisconsin. The maximum production was attained in 1883, when it was 70,557 tons, and in 1889 it very nearly reached the same figure. In 1890, however, the lead production of Colorado suffered a notable decrease, the total output being 62,000 tons, which was 8,000 tons less than in the previous year.

This falling off was mainly due to the approaching exhaustion of the lead-carbonate mines of Leadville, from which in every year since 1878 the great proportion of the lead produced in Colorado had come. Exact statistics of the amount of lead produced in the Leadville district are, unfortunately, not available. From the returns furnished by the various smelting companies which reduced these ores, however, it appears that the bullion product in 1890 amounted to about 31,000 tons. It is stated that the stocks of ore at smelters were considerably greater on December 31st, 1890, than at the same time in the preceding year, which would increase this quantity somewhat, but the total output for the year was certainly under 32,500 tons. In 1889 it was about 39,200 tons, and in 1888, 41,000 tons. Thus it will be seen that the decrease in the output of Colorado is almost entirely accounted for in this place.

As is well known, the lead-carbonate mines of Leadville are now very nearly exhausted, the only ones of importance that are still producing being the Henriett & Maid Consolidated Mining Company and the new mines that are being opened west of the Carbonate fault, on the eastern edge of the city. Aside from these mines the lead produced in the district is coming chiefly from the sulphide ore bodies of Iron hill, and as the various ore chutes which have been opened have now been pretty thoroughly worked out to the water level, it is entirely unlikely that any new lead-carbonate ore bodies of magnitude will be found.

The total output of the mines of Leadville in 1890, including gold, silver, lead and copper, is estimated to have been nearly \$11,800,000, and the total since 1879 almost \$160,000,000. The maximum was reached in 1882, when the production amounted to over \$17,100,000, and the minimum, \$11,600,000, in 1888. The tonnage of ore mined during the past year, estimated at 470,000 tons, was greater than in any preceding year, but the average grade was very much lower.

The nature of the Leadville ore deposit, lying nearly flat, is such that the life of any mine there is naturally limited. The extent of the ore-bearing zone, however, is large, and with the great amount of intelligent prospecting work that is continually in progress, hitherto new mines have taken the place of the old ones as rapidly as the latter became exhausted, and the yearly production has thus been maintained at a fairly constant average.

Exploration work in this district has been conducted in an unusually careful and thorough manner, owing largely to the data derived from Mr. EMMON'S masterly report upon its geology, and the results of the subsequent investigations of Messrs. BLOW, BUNSEN, NOBLE and others, and it is consequently improbable that any of the old region of Fryer and Carbonate hills, on which were located the famous producers of ten years ago, will again be the scene of important discoveries. Almost all new developments being made at the present time are upon the outer edges of the mineral-bearing territory on the continuations of the known ore chutes. It is a fact that the end of none of these chutes has yet been found, except at the places where the formation has been faulted or exposed by the scoring of an anticlinal fold, but beyond these, they extend in full strength for an undetermined distance.

It was at one time supposed that the North and South Iron chutes of Iron hill had failed, but it was subsequently found that they had simply pitched down to a lower level in the limestone, where their continuations were found. This constituted one of the most notable discoveries made in Leadville for a long time, as it led to an important change in the theory of these ore deposits.

The ore at first discovered lay at the contact between porphyry and carboniferous limestone, and this was considered as the vein. It is now known, however, that the true mineral zone is the entire stratum of limestone, at any plane of which the ore chute may be found.

Notwithstanding the known facts concerning the continuity of these chutes, exploration work has been gradually becoming more difficult for a number of years, on account of the greater depths at which they must be sought and the proportionately increased expense, so that, with the fewer discoveries now being made and the lower grade of the ore when found, the production of the district has gradually been falling off. Leadville will, undoubtedly, be an important mining town for many years to come, but it does not seem likely from the nature of things that the output will ever again attain, in one year, the figures that were reached in the years from 1880 to 1883.

## CORRESPONDENCE.

We invite correspondence upon matters of interest to the industries of mining and metallurgy. Communications should invariably be accompanied with the name and address of the writer. Initials only will be published when so requested. All letters should be addressed to the MANAGING EDITOR. We do not hold ourselves responsible for the opinions expressed by correspondents.

The Atlantic-Pacific Railway Tunnel Company.

EDITOR ENGINEERING AND MINING JOURNAL:

SIR: The attempts of the well-known promoter of this extraordinary enterprise to float its stock are exciting considerable comment among the miners of Georgetown, who are fully informed concerning it. I referred to their opinion of Eastern people who invest in it in a former communication. From one who is thoroughly informed regarding the tunnel, I learn that the eastern portion is not being continued in a straight line, nor at full size. In fact it is a mere zig-zag gopher hole.

The western end is reported to be driven at a greater elevation than the eastern, and several degrees from the course necessary to make connections between the two. Indeed, it does not seem, from the disregard of survey lines, that the managers of the company had any more faith in the railway-tunnel portion of their scheme than to use it as an ingenious fiction with which to attract unsuspecting investors in the East. I do not know of any ore being shipped by the company from Georgetown, and certainly none is being received by Denver smelting companies; this is the only place to which it would be likely to go. The company is a barefaced humbug, but the stories concerning it which are told to Eastern investors are so Munchausen-like that few should be deceived.

CASSANDRA.

DENVER, Colo., Feb. 26, 1891.

Direct Combination of Iron and Carbon.

EDITOR ENGINEERING AND MINING JOURNAL:

SIR: As Mr. Howe states in your last issue that he does not object to my discussion of his contributions, I now take hold of the technical part of his article in your issue of the 17th of January last. Mr. Howe says:

"The object of each experiment was to determine the effect of stirring graphite into molten steel. The steel was melted in a clay crucible, and the graphite was simply stirred in. In the first case the resulting steel contained the following:

"Combined carbon, 1.11%; graphite, 0%; manganese, 1.22%.

"In the second case the resulting steel contained combined carbon, 2.45%; graphite, 0.09%; manganese, 0.97%.

"In each case about twice as much graphite was added as was actually absorbed. The 2½-inch square ingots worked fairly, and were rolled down to bars 1½ inches in diameter."

From my standpoint, upholding the unity of chemical action in all reactions that take place between iron, oxygen and carbon, I see absolutely no reason why graphite should not dissolve in molten iron or steel. Graphite is either a chemical compound of iron and carbon, or it contains a considerable proportion of such compounds, viz., carbides of iron.

I have no doubt that even blast furnace graphite (FeC<sub>2</sub>)—itself the product of indirect combination of iron and carbon—will dissolve to a considerable extent in molten steel or iron; in fact, the change of gray iron to white—the process of "fining" previous to "puddling"—can only be explained rationally as the chemical reunion of segregated carbides with the pig iron.

But when it is claimed that diamonds, charcoal or even coke from soft coal can be combined chemically with iron and steel by direct union, then I object for the simple reason that such notions cannot be harmonized with modern chemical principles. Hence I reiterate that I do not believe that it is practicable to carburize steel, to any higher degree than I have outlined in previous papers, by filtering over coke or charcoal.

To put the proposition in another form: Carbides of iron can be dissolved in molten iron or steel, but carbides of iron as well as molten iron or steel can only be combined chemically with carbon—say from coke, charcoal or diamond—by indirect means.

A. D. ELBERS.

HOBOKEN, N. J., March 3, 1891.

Tin in Central Texas.

EDITOR ENGINEERING AND MINING JOURNAL:

SIR: Your correspondent G. A. F., of San Francisco, courteously suggests in your issue of February 21st that I have overlooked "two discoveries of tin in Texas." My former article, as he twice remarks, referred only to "Tin in Central Texas." Two instances reported by him are from South Texas, beyond the limits of my investigations, and both of them appear to have been heretofore unrecorded. The localities are both in the Tertiary area, from which the discovery only of drift or secondary deposits of little commercial value can ever be anticipated. As to the existence of metallic tin in such situations, the Texas Geological Survey has long been advised of the fact, and has made ample investigations through another working member who has the area immediately in charge. The occurrences are interesting, but, I am told, not commercially important.

There is no record of the Llano County discovery mentioned by G. A. F. in any journal which is accessible to those investigating the subject. I strongly suspect that the "old furnaces" are the same which I have mentioned in my former article. If in a different locality, and in Llano County, they almost certainly lie in the belt outlined by myself from a detailed study of the whole field.

G. A. F. is misinformed regarding the influence of the Texas mining law upon the elucidation of the mineral resources of the central mineral region, the writer's field of operations. There is comparatively little state land in that area, and the mineral rights have passed from the disposal of the Land Office in all former deeds, so that the mining law has no force there except in certain scattered sections yet unsold. Besides, the law is very much like that of the United States, and will probably be made even more favorable to prospectors by the Legislature now in session.

Your correspondent's statement, that "the soundness of the deductions of the State Geological Survey would soon be proved or disproved by prospectors" in the event of the securing of what he regards as suitable conditions, sounds a little peculiar. The reports regarding the ores of the district are in no sense deductions, but simple statements of facts observed by the writer, who has conducted an instrumental survey of

the whole region, and prepared a geological map, which will soon be published in the Second Annual Report of the State Geologist.

AUSTIN, Tex., Feb. 25, 1891.

THEO. B. COMSTOCK.

Transactions of Engineering Societies.

EDITOR ENGINEERING AND MINING JOURNAL:

SIR: In your issue of February 21st "A Member of the Institute" again makes some suggestions that would appear to need but little consideration to carry conviction. As engineers we are certainly derelict in our duty in failing to follow the excellent practice of the mechanical engineers in very much increasing the professional value of the meetings. The great advantage of having the papers printed and distributed to the members before the meetings is self-evident, if it is desired to bring out in the subsequent discussion (for which there will then be ample time) the varied experience and matured consideration of our large membership. Instead of advancing arguments why we should make this new departure, I think we should rather try to palliate our disgrace for being so negligent in introducing this admirable feature of the younger society.

But I have a more important, far more reaching matter to bring forward, which would still further enhance the value of the "Transactions." I allude to the preparation of a comprehensive, carefully prepared series of abstracts of all papers published throughout the world that pertain to our profession. If such abstracts were made by a thoroughly competent person—one able to condense without omitting the essence of a paper—they would be of inestimable value, as they would then give us the benefit of the work being done in the entire mining-engineering world in our own publications.

The British Iron and Steel Institute already publishes a valuable collection of abstracts of papers pertaining to their more narrow lines, while the North of England Institute of Mining Engineers and the Mining Institute of Scotland have been more or less perfectly supplying such abstracts to their members for several years. Is our institute, now that it has about attained the age of manhood, incapable of appreciating the value of the contributions of the brains of the whole world (not of the United States only), or is our conservatism, like our membership, so great as to forbid our emulating the above examples?

Of course the preparation of a digest worthy of our national society will call for the labor of an additional assistant to the secretary, and would necessitate a larger outlay in printing. Yet if we except the recent visit of our European brethren, the American Institute of Mining Engineers has been steadily accumulating a surplus for several years, as its income is considerably greater than its expenses. Now, a professional society like this, whose object is the professional advancement of members, has no right, in spirit at least, to become a money accumulator; and when such a valuable acquisition would be obtained in thus expending the surplus, it is not too much to expect the officers of the Institute to apply the funds to the purposes for which they are contributed. The Institute began life as a weak infant; it slowly grew into a vigorous youth, and under a wise, conservative administration it has attained the strength of manhood as far as numbers and finances are concerned, but its professional function still remains that of a boy. Let it now assert itself as a man in every respect. Let it throw off its boyish pride in refusing to take advantage of the experience of the American Society of Mechanical Engineers in having advance papers sent out before the meetings. Let it do a man's work in garnering the treasures of the whole mining world into its annual publications. And later, when the increased value of its meetings and publications has so swelled the membership from those who can no longer afford to remain without its ranks, and the treasury again becomes overloaded, let it use its means in carrying out and encouraging the original investigations that such an institution should always be undertaking.

St. Louis, Mo., Feb. 28, 1891.

ABSTRACT.

Mining Notes from the Transvaal.

EDITOR ENGINEERING AND MINING JOURNAL:

SIR: I send you the statistics of the production of the Witwatersrand mines in 1890, as furnished by the Chamber of Mines here. From them it will be seen that the grand total of gold bullion (10% silver) from these fields during the year was 494,823 ounces. With regard to the Chamber of Mines statements, except in the number of tons crushed, they are correct. That column is furnished by the managers of the mines, who keep it as low as possible; still it is not far out. The increasing output of the district is particularly noticeable, and is really remarkable when it is considered that most of the mines are in the transition stage, *i. e.*, they are now getting into pyrites. It is beyond all doubt that with the black sands of the oxidized ore, and the pyrites of the unoxidized, at least 40% of the gold contents goes on to the tailing heaps. Few mills use anything but blankets, which are of course no good. Frue vanners, however, are coming into use in some of the best mills. Of course there are a few mills which amalgamate properly, but they are the exception. We are now having a plague of processes to treat tailings and pyrites. They are all patented ones, and naturally claim everything. Our pyrites is very simple, being pure FeS<sub>2</sub>, and most remarkably rich; the lowest runs \$100 per ton, the richest \$800, and I think the average is about \$500. The great difficulty, and one on account of which perhaps even chlorination in any form will fail, is that after the pyrites is roasted the gold is very coarse. The mechanical attrition in revolving barrels does not seem to help this, at least, to any great extent; however, all these works are still in an experimental stage. It seems likely that a combination of a mechanical and a chemical process will be eventually found to answer best. There are also hundreds of thousands of tons of oxidized tailings lying around that will run from \$6 to \$18 or \$20 per ton, and the McArthur-Forrest people are now trying to treat them, but it is doubtful if they can do so at a profit.

I am sure that if some dry concentrator were designed (it need not work too close, but must have large capacity) for concentrating the black sands, which run from \$500 to \$1,000 per ton, there is an immense field for it in this country. For nine months in the year it does not rain, and, owing to paucity of water a wet concentrator would be of no use.

There can be no doubt now as to the permanency of these blanket deposits, and, against all experience, they undoubtedly get richer on the whole on going deeper. The deepest shaft we have, 430 feet vertical, cuts these beds at about 600 feet on their underlay. The ore at this depth

carries 1½ ounces of free gold, and assays over 5 ounces to the ton; but, of course, it is pyritiferous, and the pyrites averages from 3% to 8%. In the deeper drill holes these reefs have been cut at a depth of 800 feet vertically, or about 1,200 feet on the underlay, and assays of the cores have gone from 10 ounces to 20 ounces per ton. In all, there seems to be a wonderful future before the district, and when mine owners will not be content with less than 90% of the gold contents of the ores, I should not wonder if these fields took the premier place of any in the world.

Now that these mines are all getting deeper, there will be a great demand for economical large hoisting engines, as only one or two mines have anything that will carry them down to 1,000 feet. These engines should have two independent drums, and have surface condensers.

The production of the Witwatersrand mines in 1890, compiled from the monthly statistics of the Chamber of Mines, was as follows:

Reef series.	Tons milled.	Average stamps.	Average days milling.	Yield of gold.		Value of yield.
				Total.	Per ton.	
Main reef.....	629,689	903	292	453,509	0.72	£1,590,497
Black reef.....	36,821	63	275	11,292	0.31	39,588
Battery reef.....	12,435	28	247	4,721	0.38	16,526
Other reefs.....	23,882	52	259	20,379	0.85	71,320
Alluvial.....	.....	.....	.....	2,322	.....	8,219
Individual miners.....	.....	.....	.....	2,600	.....	9,100
Total and averages for district.....	702,827	1,046	285	494,823	0.70	£1,735,250

This bullion was produced by 51 companies, besides the small amount turned in by individual miners.

The Leydenburg fields produced 17,000 ounces; Barberton and Swaziland, 27,000 ounces; and Klerksdorf, 3,000 ounces. The northern fields promise well, but no work is being done there on account of lack of capital.

Barberton is very much excited over a rich strike that has just been made near there, 36 tons giving 39 ounces per ton, and 25 tons giving 51 ounces per ton. They are now milling 800 tons of the ore, but 10 ounces per ton will probably be as much as it will yield. The railroad to this place from Delagoa Bay is crawling wearily along. They are, however, working on a line from Pretoria to the Vaal River, and so we are really within measurable distance of being connected with Cape Town by rail.

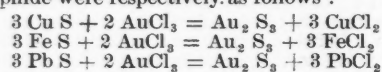
JOHANNESBURG, Jan. 20, 1891.

A. B.

#### The Precipitation of Gold from Chloride Solutions.

EDITOR ENGINEERING AND MINING JOURNAL:

SIR: In your issue of February 14th Mr. Werner Langguth criticises a statement made in my article printed in the ENGINEERING AND MINING JOURNAL of November 29th, 1890, on the precipitation of gold from chloride solution by means of one or other of the precipitated metallic sulphides. I stated at the time that the reactions obtained by using copper, iron, or lead sulphide were respectively, as follows:



Mr. Langguth says this is not the case; that the gold is precipitated in the metallic state, and the sulphide used as the precipitant is oxidized to sulphate. Let us consider this. He evidently expects to obtain his oxygen from the decomposition of the water by the action of the chlorine set free, and he would then have in his filtrate the sulphate of the metal used as precipitant, and hydrochloric acid equivalent to the amount of chlorine present, or else part hydrochloric acid and part free chlorine. I carefully tested my filtrates and found neither free chlorine nor hydrochloric acid. But would it be reasonable to expect any such reaction as he describes?

It is a well-known fact that chlorine gas will decompose water but very slowly at the ordinary temperature, and in order to furnish sufficient oxygen to oxidize all the sulphide necessary to precipitate 100 gallons per hour, of a heavily charged gold-bearing solution the action would have to be exceedingly lively instead of slow. Another factor comes in here: suppose that chlorine in the nascent state did have the power of decomposing water to such an extent, how would our solution in the chlorination barrel fare. Would it not become charged with hydrochloric acid? We all know this is not the case. I also tested my filtrates for sulphates and found barely a trace, but obtained a strong reaction for copper; the solution had no copper present before passing through copper sulphide. However, I will state here, that in most of these tests, made over a year ago, I used quite small quantities, and it is therefore possible that I may have been misled, but I do not think it at all probable.

I would also call attention to the results obtained by Messrs. Vautin & Blomfield in the use of  $\text{Cu}_2\text{S}$ . The reactions obtained by the use of  $\text{CuS}$  and  $\text{Cu}_2\text{S}$  would certainly seem to be similar, and their experience verifies the assumption. They also failed to find either  $\text{CuSO}_4$  or  $\text{HCl}$  in their reaction. Mr. Langguth further charges imperfect precipitation to the use of precipitated copper sulphide. In this he evidently has had a very limited experience, or else has not used proper precautions. I have frequently evaporated to dryness as much as two litres of the filtrate, and, when running through a press at the rate of 100 gallons per hour, carefully assayed the residue and failed to find a trace of gold. He also makes a vague statement about gold being redissolved. I should like to know the chemical present that could dissolve gold in presence of precipitated metallic sulphides; certainly not chlorine. The method of precipitating gold, introduced by Mr. Rothwell, is certainly an excellent one for a certain class of ores, such as do not contain any appreciable amount of copper, lead, or zinc; but whether even with this limited class of ores it is superior to the use of the precipitated sulphides remains to be seen. Mr. Langguth makes the statement that even if copper were present the difficulty would be easily overcome, by simply adding, at the end of the monthly or half-monthly clean-up, an amount of crude nitric acid proportionate to the amount of copper precipitated, and simply dissolving the copper that was

present as sulphide. This sounds very well; but what might be expected in the actual practice? Suppose our ore to contain only one or two per cent. of either copper or zinc, and if salt is added to the roasting we can include lead. The lead probably would not interfere very much when an oxidizing roast is used, but in general salt is added to the roasting whenever any appreciable quantity of either of these metals is present. If so, then the greater part of them will be converted into soluble chlorides. But suppose only one per cent. is rendered soluble, say copper, this simply means that there will be 20 pounds of copper, or about 50 pounds of copper sulphide, mixed with the precipitated gold for every ton of ore treated. Thus if 50 tons a day be treated, there will be 1,500 pounds of copper sulphide mixed with the gold in the evening. With a monthly or a semi-monthly clean-up, there would be enough to keep a small refinery going for some time. I have not exaggerated the conditions at all in supposing one per cent. of copper to be soluble. I remember one ore in particular that contained just 2-3% copper, which I treated with an oxidizing roast and found 1-2% in a soluble state.

An objection might be made that the ore was not thoroughly roasted, but ten charges were made of the lot, averaging about 2,100 pounds per charge, and the extraction showed from 93% to 96-5%. I was afterward convinced by experiment that if a few pounds of salt had been added (in the roasting) the extraction would have been better by nearly 2%; but every one knows that more copper would have then been rendered soluble. In my experience with the lixiviation of silver ores I have always found that if any copper, lead or zinc is in the ore the leaching solutions will always show it. If 1% or 2% of copper, lead or zinc create such havoc, what would become of ores carrying from 4% to 6%, as many concentrates and sulphurets do.

It is admitted that there are some difficulties connected with the use of the precipitated sulphides, but these difficulties come principally from the manner in which these sulphides have been used. If we have an imperfect filter press and persist in precipitating and filtering at the same time, and find as a matter of course that some gold is escaping, or if our filter cloth becomes clogged, for the reason that the sulphide was not properly made—not being granular—are we at once to throw it away and say it is of no use? Is it not just as easy to add the proper amount of precipitated sulphide to a tank of 5,000 gallons of gold-bearing solution than it is to add the proper amount of  $\text{H}_2\text{S}$  or  $\text{FeSO}_4$  or any other precipitant? Mr. Langguth tells us he can precipitate a tank of 5,000 gallons of solution in less than one hour; but if he will take two beakers full of the solution, stirring in one a proper amount of precipitated copper sulphide and treating the other with sulphuretted hydrogen, I will vouch that the sulphide will do its work in less than half the time required by the other. This, however, is of little consequence, as both precipitants are quick enough in their action. The precipitate caused by the one will settle just as quickly and filter just as easily as the other. The use of  $\text{SO}_2$  for removing the free chlorine is an excellent idea, but just as applicable in the one case as the other, and our gold sulphides in the one case will contain all the copper, lead and zinc we had present in our solution, and in the other case only the excess of copper added as sulphide. It is not worth while to refute the argument of the expensive precipitant, as a careful estimate will show the cost of either the copper or iron sulphide to compare very favorably with  $\text{H}_2\text{S}$ . To sum up:

1. The sulphide process is also based on reliable chemical reaction, whether we know just what that exact reaction is or not; neither is there any gold left (undetected in solution) after precipitation has been completed.
  2. The removal of the free chlorine by means of  $\text{SO}_2$  is as applicable to this process as to any other.
  3. It takes common chemicals in the crude state, and the simplest of apparatus. Neither is there any loss by oxidation, nor is a surplus of reagent necessary.
  4. The precipitate settles quickly, as the precipitant keeps it in a flocculent form. The supernatant liquid carries very little gold, and can be filtered just as easily as any other supernatant liquid.
  5. The  $\text{H}_2\text{S}$  process is applicable only to a small class of ores, while the sulphide process is applicable to all classes of gold ores.
- It will be seen from the above that all the advantages claimed for the  $\text{H}_2\text{S}$  process can with equal propriety be claimed for the precipitated sulphide process if the sulphide is applied as any other precipitant generally is—directly to the solution in the tank. In this case I would also advise a monthly or half-monthly clean-up, as it will at once be seen that any excess of sulphide added to the first batch of solution will settle to the bottom with the precipitated gold, and when the supernatant liquid is decanted and passed through the filter press, the excess of sulphide remaining with the gold in the bottom of the tank will help precipitate the next tank full of solution, and so on until a clean-up is made, at which time all the impurities that the precipitated gold will contain will be those which we put in, viz., excess of sulphide at the last one or two precipitations.

L. D. GODSHALL.

MONARCH, Colo., Feb. 24, 1891.

**Economical Liquid Fuel for Locomotive Engines.**—The increase in the cost of steam coal for locomotive purposes in England has led to a number of experiments being made for the purpose of seeing whether a more economical and efficient substitute for it could not be found. The Great Eastern Railway Company, which has taken the initiative in the matter, has met with undoubted success, says the *Iron and Coal Trades Review*. Mr. Holden, the locomotive superintendent of this company, has taken out a patent for what is termed an "injector" for using liquid fuel as an auxiliary to coal in locomotive engines. These injectors are now attached to some 12 or 14 engines belonging to the Great Eastern Company, and it is said that the work accomplished is all that could be desired. The fluid used is tar, and to it there is added a certain proportion of green oil, which is also obtained from the works where the tar itself is produced, the cost being about three cents a gallon. Each engine, it appears, used about 12 pounds of coal and over a gallon of oil, which is equal to about 11 pounds fluid fuel per train mile as against 34 pounds of coal. The relative cost of the combined material is rather less than coal at the present prices of both, but it is stated that the value of the "injector" is seen to especial advantage on gradients, when steam can be got up instantly by simply touching a tap close to the driver.

## REPRESENTATIVE MEN IN THE MINING INDUSTRY.

George Hearst.

Senator Hearst, one of the most successful and best known mining men in the United States, died at his residence in Washington on the 28th ult., after an illness of six months. He was a man of great popularity, and his death is sincerely mourned by a great many people in the West, as the going of a characteristic Westerner of thirty years ago; a man of rough and uncouth manner, perhaps, but one of great heart and generosity, whole-souled and full of the spirit of broad humanity. From one end of the Rocky Mountains to the other he was known as "Honest George Hearst." He belonged to that hardy, adventurous body of men, now rapidly passing away, who, allured by the stories of the discovery of gold in California, found their way across the plains and, beginning with nothing but their own strong determination, dug the foundations of fabulous fortunes out of the ground. Senator Hearst began as an ordinary miner, but within a few years became the owner of rich gold and silver mines, and at one time was employing as many as 2,000 men. He experienced the ups and downs of the Western life of that time, seeing fortunes melt away more quickly than they were made, and again piling them up. No man ever lived a life more full of adventure and business romance than he.

Senator Hearst was born in Missouri, September 20th, 1820, being the son of William G. Hearst, a South Carolinian of Scotch descent, who was one of the early settlers of that State, then on the frontier. His boyhood and early manhood were spent on his father's farm, but early in 1850, fired by the news of the rich discoveries of gold in California, he quickly made up his mind to go thither. At that time he was interested in a small

By 1866 he had accumulated a large fortune, said to have been about \$1,000,000; but in that year he met with reverses and lost all. Some fortunate transactions in real estate, however, brought him \$150,000, and, again on his feet, he turned anew to mining, and opened the Mineral Hill and Eureka mines.

In 1870 Mr. Hearst became connected with the mining interests of the famous firm of Haggin & Tevis, and since that time his career has been one of uninterrupted success. Upon the discovery of silver ore at Park City, Utah, he went there in the interest of his firm, and after watching developments, in 1872, purchased the famous Ontario mine for \$33,000. The sum of \$500,000 was put into this property, in exploration of the vein and construction of the mill before any return was received, but in 1877 it paid its first dividend, and the best proof of Mr. Hearst's good judgment in the matter is the fact that since that time \$11,675,000 have been distributed in dividends among the shareholders of the Ontario Company. In 1876 Mr. Hearst bought for the firm the great Black Hills group of gold mines, the most famous of which is the Homestake, which has paid \$4,656,250 in dividends.

In March, 1886, Mr. Hearst was appointed by the Governor of California to the seat in the U. S. Senate, made vacant by the death of Hon. John I. Miller, and in the following year was elected to the same position.

At the time of his death Senator Hearst was largely interested in ranch property in California and New Mexico, and was owner of the San Francisco *Examiner*; he had extensive mining interests in all parts of the country, among the most important of which were the Ontario and Daly in Utah, the Black Hills group in South Dakota, the Anaconda in Montana, the Dickens-Custer in Idaho, the Tiptop and Trench in Arizona, and most of the mines in the Superior district in New Mexico.



GEORGE HEARST.

country store, and selling this on a note for \$1,000, which was never paid, he started across the plains. He arrived in Placerville, Eldorado County, California, in October, 1850, and at once commenced placer mining, which he continued until the following December, when, with others, he discovered a rich ledge of gold quartz, which they developed and worked for a year at good profit. Not being quite satisfied with this manner of life, Mr. Hearst then sold his interest in the property and removed to Sacramento, engaging in the general merchandise business. Entirely unsuited to this occupation, he was naturally unsuccessful, and in 1856 his cash capital had become reduced to the sum of \$40. With this small sum of money he went to Nevada County and began mining anew. Here he remained for three years, opening some mines with good success, but in 1859 his fortunes were again at low ebb.

With the summer of 1859, however, came the turning point in Mr. Hearst's career, and then commenced the flood tide of his success. Rumors of the rich discoveries on what was afterwards known as the Comstock lode had then just come to California, and Mr. Hearst determined to go there to investigate them. He was entirely without resources at the time, but supplied with an outfit by a company of friends, he set out for the scene of the new bonanza and was among the first to arrive there. His familiarity with mining and practical shrewdness served him in good stead here. Perceiving the value of one of the claims, he made a contract for a large interest in it and returned to Nevada County to secure the money to complete the purchase, in which he was successful. This property afterward became known as the famous Ophir mine. In 1860 he sold half of his interest in it for \$45,000 and returned to Missouri, after 10 years' absence, to see his mother, who was in ill health. He remained with her until she died, in 1862.

During this visit he met and married Miss Phoebe Apperson, by whom he has had one son. Soon after his marriage he returned to California, making his home in San Francisco, and resumed mining operations on the Comstock and elsewhere, being at this time one of the largest placer miners in California. In 1865 he was elected to the California legislature, and served one year in that body.

Senator Hearst was very fond of horses, which he bred on a large scale at one of his ranches, and was a prominent figure on the American turf. He was a man of little education, but was a keen observer and was endowed with most excellent judgment, which, added to his long and varied experience, formed the basis for his wonderful success. At the time of his election to the Senate his fortune was estimated at \$20,000,000.

**A 10,000-Volt Electric Current.**—The London Electric Supply Corporation has finally succeeded in transmitting a 10,000-volt current. According to the statement of the directors this current of unprecedented strength was sent from the company's generating station at Deptford to the Grosvenor sub-station on the 17th ult. Hitherto the highest tension attained was 2,500 volts.

**Construction of Mining Contract.**—Where a vein of coal is granted, together with the right to mine it, and to construct shafts, tunnels, roads, drains and ditches across and upon the land wherein the coal lies, and to use and occupy such privileges and rights and appurtenances for mining and forwarding coal from adjoining land, the grantee acquires the present right to use the shafts and machinery on said land for the purpose of mining coal from adjoining land. The right of piling on the surface refuse coal taken from the vein underneath, being expressly given by said contract, extends under said contract to refuse coal taken from adjoining land. Under the right to use said land for mining coal from adjoining land, the grantee has the right to keep open the tunnels connecting the mines under said land with those under the adjoining land, and to drain the latter mines through such tunnels. Where the water thus brought under the land is pumped up and carried off by an underground channel, the owner of the surface has no right to enjoin the bringing of the water under his land, on the ground that if the pumping should be stopped by any accident, the mine would be flooded.

*Genett v. Delaware & H. Canal Co., Court of Appeals of New York, 25 N. E. Rep., 922.*

## THE MONEY QUESTION.

Our excellent contemporary the New York *Evening Post* of the 28th February contained the following excellent elementary exposition of the money question, which may cause reflection in some of those who think silver has some special claims as money:

The need of an instrument of exchange was one of the wants earliest felt by the human race. We know this because no history, whether it be written or whether it be the silent testimony of the lake dwellings and the kitchen-middens, goes so far back that it does not tell us of exchanges among men. Nor do we find any people on the earth, however barbarous, without some instrument for effecting exchanges. Mungo Park, when he made his first journey to the Niger, found cowries in use there as money. These are a species of ornamental sea-shell. The use of cowries as money was very extensive in the East Indies and China in earlier times. They are still used to some extent in Siam. Our ancestors found the North American Indians using wampum as money, and they adopted it from the Indians for want of anything better, and continued to use it in New England and New York until the beginning of the eighteenth century. This consisted also of ornamental sea-shells, cut, polished and put together like belts or strings of beads.

Time and space would fail us to describe all the substances that have been used at one time and another as money; that is, as instruments for facilitating the exchange of property between man and man. Cattle, tobacco, salt, ivory, olive oil, cocoa beans, 'coon skins, beaver skins, leaden bullets, leather, iron, copper, tin, bronze, silver, and gold have been used at different times and places. What are the requisites that have fitted and caused them to be so used?

Two such requisites are necessary in every case: First, the things must be useful. In the language of political economy, ornamental things are useful; that is, they are desirable; people are willing to give their labor to obtain them. Nothing is less useful, strictly speaking, than tobacco, yet tobacco was the legal money of Maryland and Virginia for a long time after the settlement of this country by Europeans. Court fees were settled in tobacco in Maryland as late as 1806. Since tobacco was much desired both at home and abroad, and could be cut up into small pieces without losing any part of its value, and could be kept a considerable time without deterioration, it was fitted to answer this purpose in the absence of anything better. Anything that is much desired and is portable and that is not furnished gratuitously may be used as money.

The second requisite is that the thing so used shall be universally acceptable. Now, acceptableness is a growth. Ages before any legal-tender laws, or any other laws enacted by governments, existed, there were instruments of exchange of various kinds, such as the wampum of our Indian tribes. These things, of whatever substance they may have been composed, must have been acceptable to every member of the community, so that A would take them from B, and B from C, and C would take them back from A and B without any question. The rates at which these things would be taken in exchange for the various other property circulating in the community would be determined by the "higgling of the market"; that is, by the competition of buyers and sellers.

Economists and historians have traced the evolution of money from the earliest to the latest times, showing how mankind has experimented with various things as instruments of exchange, learning by slow stages what things are best suited to the purpose, tacitly rejecting the worse and adopting the better, just as they have rejected the worse and adopted the better implements from time to time for cultivating the ground, for hunting and fishing, and for curing diseases and setting broken limbs. They have shown in how many different ways and with what sad results compulsion or deceit has been introduced by bad rulers to change the terms of bargains after the people have tacitly settled upon a particular kind of money for their daily use, by altering the weight of coins, by increasing the amount of alloy in them, and by laws of legal tender. History is full of these tricks and these acts of oppression. Let it suffice to say that money is a product of evolution just as any other labor-saving device is; for example, the reaping-machine; and that the presumptions are in favor of the kind of money which evolution has worked out just as they are in favor of the kind of reaping-machines which evolution has worked out. By this is meant that the kind of money, or of reaping-machine, which is voluntarily sought and accepted by society without the use of external force is the best for that society. In this way, and not otherwise, were the precious metals finally selected for use as money.

All the ancient Hebrew, Greek, and Roman coins were originally units of weight. So also were the English pound, the French livre, and the German mark, as their names signify. Coinage was a labor-saving device to save the trouble of weighing. When the character of a coin was once established so that it should be recognized by the eye, and when confidence was gained so that all persons believed that the amount of pure metal was there that ought to be there, the public would insensibly fall into the habit of considering the pound, the livre, the mark, or what not, as units of value instead of units of weight. The idea of weight would after a while disappear from the minds of all except the coiners, the experts, and the very small class which makes money-changing a specialty. It was this forgetfulness or unconsciousness on the part of the great mass of the people that enabled bad rulers to debase the coins and rob the public.

There was a necessary transition from weight-money to coined money, and this transition carried with it the idea that the drachma, the talent, the aureus, the shekel of ancient times and the pound, the livre, the mark, and the dollar of modern times were units of value instead of being units of weight. There was nothing harmful in this change of ideas, so long as the coins were really what they purported to be, namely, small lumps of metal of the requisite purity, stamped in such a way as to be easily recognized. Equivalence, or equality of value, being the essential feature of exchange, any arrangement which secured this answered the needs of society, and of course the arrangement which secured it with the least trouble, would prevail. Thus was born into the world the idea of the shekel, the drachma, the talent, the pound, the mark, the dollar, etc., and around such units has grown the mechanism of exchange in all civilized countries, so that we in the United States reckon by dollars instead of by ounces, pennyweights and grains,

Money is both a medium of exchange and a standard of value. These two offices are different from each other, and it is necessary to keep the distinction clear. By medium of exchange we mean something that we can pass from one person to another and from one country to another, that will be accepted as an equivalent for any kind of property. By standard of value we mean something that shall serve to measure the value of all other things—goods and services, lauds, buildings, securities, annuities—that have economic value.

Now, which of the two functions of money is the more important in the present posture of affairs in this country and in the commercial world—the function of passing from hand to hand or the function of measuring values? Only one-tenth of the business done through the banks of the United States is transacted with money (including in this term both metallic and paper money), and nine-tenths is done by checks, drafts, etc. Of all the exchanges effected through banks, 90 per cent. is effected without any money at all. The only function of money as regards this 90 per cent. is that of a measure of value. When we come to look at international trade—the trade between our own country and the rest of the world—we find the disproportion still greater. Our exports and imports last year amounted to \$1,647,139,093, whereas our exports and imports of money amounted to only \$30,217,833. All of our exports and imports were rated in terms of money, and in gold money alone, the gold dollar being the unit of value by law as well as by commercial usage. The relative importance of the measure-of-value function and of the medium-of-exchange function in our foreign trade was therefore as 55 to 1. It follows that the measure-of-value function is by far the more important of the two.

Does anybody suppose that the commercial world has chosen the gold standard out of mere caprice and without any sufficient reason? Does anybody fancy that the evolution of money went on its silent course for thousands and thousands of years, dropping the worse and adopting the better instruments of exchange and measures of value until the year 1873, and then stopped; and that then a lot of sharp rascals started up simultaneously in Germany, France, the United States, the Scandinavian countries, and wherever civilization has reached its highest mark, and by force and fraud imposed the single gold standard on the world? That looks sufficiently improbable, especially if it had to be done in the dark, and without any trace of the conspiracy being left or any motive shown for entering into it; yet the silverites in this country have had the hardihood to affirm that such a conspiracy existed and that its promoters in the United States, under the lead of Senator Sherman, secretly dropped the silver dollar from the coinage in order to enrich the holders of gold. Apart from the fact that the silver dollar was at that time worth more than the gold dollar, and that not a human being has ever been found who then anticipated that it would ever be worth less than the gold dollar, the whole story, with its implications of secrecy and fraud, has been shown over and over again to be false. It was shown to be false by Mr. Hewitt in the House on the 5th of August, 1876, and again, lately, by Mr. Sherman in the Senate on the 5th of June, 1890. On the latter occasion Mr. Sherman showed that Senator Stewart, of Nevada, who brought the accusation, voted for the obnoxious bill, together with every other Pacific Coast Senator, while he (Sherman) voted against it. He voted against it, however, on other grounds than the dropping of the silver dollar from the coinage, for on that point all were agreed, Republicans and Democrats alike.

The truth is very simple to those who wish to know it. The commercial world had reached in 1873 a stage in its progress when it wanted the single gold standard. In fact, it had reached that stage many years before, and was actually using it, not only in Great Britain, but in France and the United States as well. Both France and the United States had exported their silver to such an extent that they were obliged to adopt subsidiary silver coins of less than standard weight in order to keep any small change for retail trade. Both had, for like reasons, coined gold pieces of five francs and of one dollar, respectively. What was done in 1873 and neighboring years was merely to put the laws in conformity with preexisting facts. This is the *raison d'être* of laws everywhere and on every class of subjects—conformity with facts and custom.

## THE BASIC BESSEMER PROCESS.

The *Ironmonger*, of London, England, in a recent issue says: "This is a translation from the German of Wedding's standard work by Mr. W. B. Phillips, Professor of Chemistry and Metallurgy at the University of Alabama, and Mr. Ernst Prochaska, Metallurgical Engineer, Birmingham, Alabama, late of Teplitz, Bohemia, published by the Scientific Publishing Company of New York. As might be anticipated from the status and accomplishments of the author, this is a monograph on the whole subject, which it covers very completely from A to Z. Within the compass of a brief review such as the present, it would be impossible to properly describe the contents of the volume. It must suffice to say that Dr. Wedding recounts the earlier efforts at dephosphorizing by reduction, oxidation, alkali-carbonates, puddling, and so forth, and then passes on to the Thomas process. He deals fully with the process as a whole, and proceeds to touch upon it in every detail, both as to the physical and chemical sides. The reactions are described in a separate chapter, and a chapter is devoted also to the utilization of basic Bessemer slag. Dephosphorization in the open hearth is not dealt with so fully as we should have supposed it would be by Dr. Wedding, but the deficiency in that respect is to some extent made up for by a supplementary chapter contributed by Mr. Prochaska. Altogether the work is certain to be appreciated by all who are interested in basic steel making."

**Canadian Copper.**—In order to encourage the use of copper smelted from Canadian ore the Dominion Government has recently issued an order in council admitting this metal at a reduced rate of duty. At present importers have to pay a duty of 10% ad valorem, but under the order just issued copper smelted from Canadian ores will be admitted on the payment of 10% on the actual cost of smelting only. This will make a difference in the case of pig copper of at least 5%. Special regulations have been drawn up by the department to govern the importation and to prevent fraud.

POTTS' LABOR-SAVING PIPE FITTINGS.

Mr. Isaac B. Potts, of Columbus, O., has devised and is now manufacturing a system of pipe fittings consisting of ells, tees, crosses, etc., which are so constructed that they can be connected, in a comparatively short time, to the unthreaded ends of iron pipe, or of lead pipe without solder. These fittings are already coming into general use, and their inherent economy becomes apparent when we consider how often in accomplishing a comparatively unimportant result, such as repairing a break, putting in a branch or connection, the mechanic is forced to do a large amount of work which the use of these fittings renders unnecessary. Thus in repairing a break or leak a whole section of the pipe must frequently be removed, causing all sorts of inconvenience, delays, and considerable expense. For just such emergencies Mr. Potts' pipe fittings are practically adapted.

The "Hercules" pipe joint, shown in Fig. 1, was designed to obviate the necessity for cutting a thread or making use of rubber and other flexible joints, cement or solder, in connecting the ends of iron pipe. To accomplish this, each of these is passed through the threaded nuts, which have cone-shaped seats for the split rings. The unevenness of the pipe is compensated for by placing a little packing yarn between the rings and the central union. Nuts screwed upon this union compress the packing and cause the rings to clasp the pipe. A similar tee fitting is also constructed on the same principle for use under similar circumstances. In Fig. 2,

application of the same principle to a tee for lead pipe is shown in Fig. 9.

The great advantage that can be derived from the use of these couplings whenever time is an object, is too apparent to need further comment. They are manufactured in the various sizes necessary for all ordinary purposes, and a larger series is manufactured for use in connection with cast-iron mains of all diameters. The fittings are made of cast or malleable iron, galvanized or tinned, of rough or finished brass, etc. Each style is the subject of a patent, and they are made with asbestos packing for steam, rubber packing for water, and lead for ammonia, oil, brine, gas and alkali water.

**The Pig Iron Production of Germany.**—The German blast furnaces produced in 1890, according to the statistics of *Verein Deutscher Eisen und Stahlindustrieller*, in tons of 1,000 kilos, 2,029,100 of puddle pig iron and spiegeleisen; 438,500 of Bessemer pig; 1,555,700 of Thomas pig; 539,700 of foundry pig; or total pig iron, 4,563,000, against 4,387,500 in 1889.

**Nitric Acid Determined by Electrolysis.**—Vortmann (*Ber. xxiii.*, 2,798) finds that the nitrogen may be readily converted into ammonia by electrolyzing a solution of a nitrate acidified with  $H_2SO_4$ . The change is much more rapid if a metallic salt decomposable by the current is introduced. Copper sulphate is preferable. The amount must be proportional to the amount of nitrate present, *e. g.* with a certain amount of  $KNO_3$ , if we add half its weight of crystallized  $CuSO_4$ , the reaction is

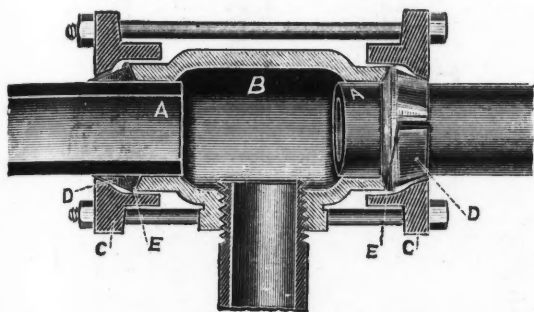


FIG. 2.

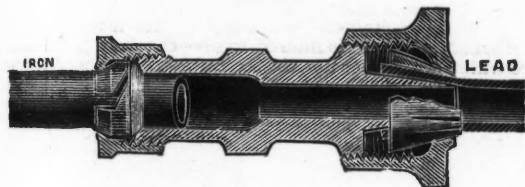


FIG. 4.

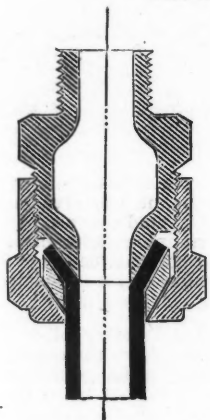


FIG. 5.

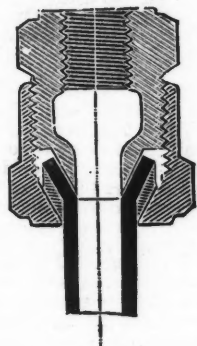


FIG. 6.

LABOR SAVING PIPE FITTINGS.

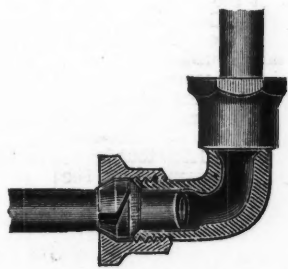


FIG. 3.

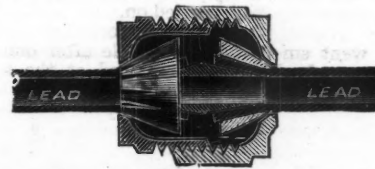


FIG. 7.

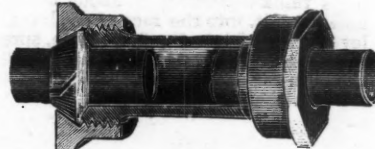


FIG. 1.

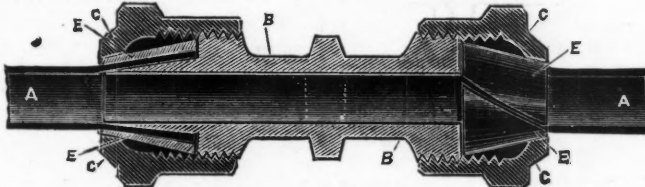


FIG. 8.

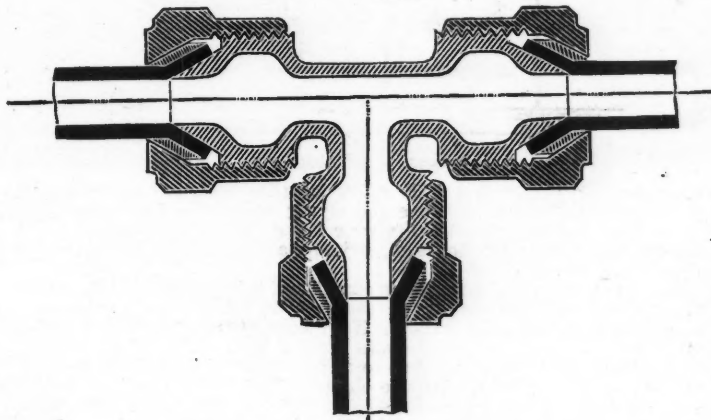


FIG. 9.

however, is shown a tee which is made so that it can be inserted without taking the pipe down, the design being a little more complicated than the one just described.

A combined union and elbow is shown in Fig. 3. Crosses which can be connected up to both lines without removing any stationary pipe from its original position are also quite extensively made use of, and are merely various forms depending upon the same principle. The compression exercised by a threaded screw-nut is also utilized for making a tight connection between lead and iron pipe, as shown in Fig. 4. This is a combination of the "Hercules" joint, already described, and the "Peerless." The "Peerless" joint is shown in Fig. 7. The main advantage incident upon its use is that it obviates the necessity for soldering, and can be placed in position permanently, connecting the ends of lead pipe.

Figs. 5 and 6 show male and female couplings which are used for making water-back connections, or for coupling boilers to hot and cold water pipes. Two different sections of the "Peerless" joint are shown in Fig. 8, which gives the special application of the principle to repair purposes. The joint is made of extra length to allow for the removal of the portion containing the break; A A represents the lead pipe, and B the coupling. When the pipe, A, is cut, the coupling nut, C, and the ring, E, are passed over it and then with a rounded piece of wood or iron the ends of the pipe are swedged to the form. The cylinder, B, can then be placed between the ends and the nuts, C, screwed onto it, when the joint is complete. An

complete when all the Cu has been precipitated by a current of 1 to 2 c. c. oxyhydrogen gas per minute. The solution may then be titrated acidimetrically, the degree of acidification and amount of  $CuSO_4$  added being known. Or the positive electrode may be plated with copper, and the current reversed as often as may be necessary to transfer the copper from one pole to the other.

**French and Belgian Mines.**—There are in France 1,363 conceded mines, including 636 of coal, 315 of iron ore, 279 of other ores, 52 of bitumen, plumbago, etc., and 51 of rock salt; but only 454 of the whole number are being actively worked. These employ 123,664 persons. This figure is small compared with that of Belgium, where the colliers alone number 110,000. In French mines there are only 3,336 women and 7,777 children employed, the law in that country restricting their labor to work suitable to their strength. The number of days worked by the 123,664 hands in France during 1888 was 33,162,966, corresponding to a sum of 122,490,504 francs (\$23,640,700), of which 113,840,957 francs (\$21,971,300) is the proportion of the collieries. The output of coal amounted to 23,172,029 tons, bearing a value of 229,128,895 francs (\$44,221,900). The coal production in France is far from sufficing for the consumption of the country which exports only 623,400 tons, and imports 10,551,000 tons from other countries, of which Belgium supplies 3,889,000, receiving but 213,000 in return.

## THE SPRINGHILL COAL MINE EXPLOSION.

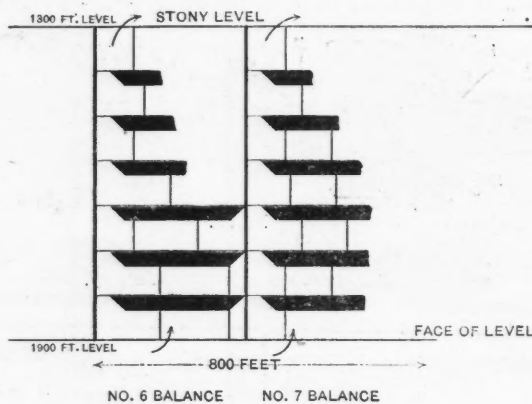
From our Special Correspondent at Halifax.

There has been a number of serious explosions in Nova Scotian coal mines, but that at the Springhill mines on February 21st will long rank among the worst that the mining engineer has had to chronicle.

There are three seams worked by the Springhill company: one is an independent mine, while the other two are connected by tunnels for convenience in working. The seam in which the explosion occurred is about seven feet thick, although in the portion of the workings immediately affected by the explosion only the lower portion was worked, on account of a stone band. The seam dips at an angle of about 25°, and is opened by a slope 2,500 feet long. The explosion occurred on the 1,900-foot level at a distance of about 2,500 feet from the slope in the workings of two counterbalances extending up to the 1,300-foot level. The air, supplied by a direct acting fan, passed through these balances in a current of from 25,000 to 30,000 feet per minute, being split between them, entering them at the lowest bord and passing up close to the face by means of brattice and heads to the return in the 1,300-foot level.

The lower bords in the first balance (No. 6) had been holed through into the second balance (No. 7), and the upper bords were not far behind. In this balance, which had been well forewon, open lights were used. In the No. 7 balance, which formed a separate district, closed lights were used, and a shot firer was employed in both balances. The No. 7 balance was dusty, but pipes were laid through the working places and systematic watering carried on.

The night watchman reported all clear in the morning, and everything went smoothly until a little after one o'clock, when the explosion occurred. It was not noticed at the surface, nor at the slope. Prompt measures were taken to get the men out, and a small fire arising from the explosion was promptly extinguished; but no less than 123 men and boys were killed. About a dozen of them were badly mutilated; the remainder were evidently suffocated, as few showed signs of more than slight burning. The accompanying sketch shows the place of the explosion. Experts think that it began about the middle of No. 7 balance, spread up and down it, into the face of the level, and thence out into the 1,300-foot level; crossed into No. 6 balance, spread up it into the 1,300-foot level, down the balance and along the 1,900-foot level. The damage on the upper level was inconsiderable, and that done to the main and lower levels, although heavy, extended only a few hundred feet toward the slope. The after-damp was swept rapidly up into the 1,300-foot level, where it killed a large number of men by the air current, which remained



comparatively unaffected. The effects of the explosion were such that the doors of the tunnel into the underlying seam were burst open, and a number of men in that locality were killed by the after-damp. The tunnel was on the 1,300-foot level, and only a few yards from the head of the No. 6 balance.

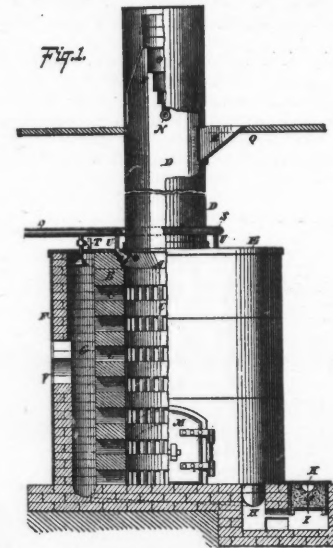
As no investigation has yet been completed, it is premature to surmise the direct cause. It is said that the shot firer for this section left the slope, stating that he had to fire a shot in No. 7 balance. He was found in the third bord on No. 7 balance, where a shot had evidently been fired. This shot was fired to bring down some roof stone on the low side to allow the box to pass in. This might be construed as indicating the shot in question as the inciting cause. The shot had done its work fairly well, leaving only a piece of loose rock at the heel of the hole.

There may have been some gas lying with an admixture of air, that in connection with the dust sufficed to cause the explosion. The instructions of the management as to shot firers, sulphur men, etc., appear, so far as investigation has been made, to have been carefully carried out. It is to be hoped that continued investigation will give more positive evidence as to the cause of this explosion, and, in view of the fact that a committee of the men, as well as the government inspector, had just completed a thorough examination of the whole mine, it would almost appear that some abnormal incident paved the way to the catastrophe.

**The Petroleum Trade.**—Messrs. Henry Faunck & Co., London, state that in 1890 the shipments of refined petroleum oil from America and Russia to England were: American, 1,357,122 barrels; Russian, 787,529 barrels; total, 2,144,651 barrels. The total in 1889 was 2,126,817 barrels—in the proportions of 1,355,590 American, and 771,227 Russian barrels. During the year just closed the oil drill has been actively at work in Russia, production reaching the highest daily average in May being 99,669 barrels of 42 gallons each. The average production declined at that time from May until October, inclusive, but not on account of any cessation in drilling; in fact, this was carried on to greater extent than ever before. These larger operations caused a temporary increase in the November production to about 80,000 barrels, or the same as the average for the year. At present the production is on the decline, although the field operations are still on the increase. The largest well now producing in the Russian field is a "tountain," yielding about 2,500 barrels daily, owned by Nobel Brothers.

## THE NENNINGER CONDENSER FOR FURNACE FUMES.

This is a new apparatus for catching the dust and condensing the fumes from metallurgical furnaces, which apparently has some merit. Its construction will be readily seen from the diagram. It consists of an inner cylindrical chamber, constructed of checkered brickwork, which is filled with coke. Above this chamber is a wrought-iron stack through which the coke is charged, and at the top of which is the arrangement, ejector or fan, for drawing the fumes to be condensed through the apparatus. Around the inner chamber is built a circular wall of fire brick, thus forming an outer annular chamber connected with the inner by means of the apertures in the wall of the latter. In the top of the condenser are arranged water pipes provided with sprinklers, from which a heavy shower



descends through the two chambers. Connection is made with the source of fumes to be condensed through the outer wall.

In operation, the fumes passing into the outer chamber are met by the shower of water, which precipitates the dust, and washes it to the gutter at one side of the furnace, where it is filtered, to save the dust, if valuable, and to clarify the water for further use, if necessary. The furnace fumes, thus freed from dust, enter the inner chamber and are there condensed in the coke, which is kept wet by the water percolating through it from the pipes overhead. The coke, after use, is discharged through the door at the bottom of the furnace. The draft through the apparatus is produced by the exhauster at the top of the stack.

**Prevention of Freezing in Exhaust Pipes of Compressed-Air Engines.**—A new and simple method of stopping freezing at exhaust pipes of engines or pumps using compressed air has been devised by a Swedish pump boy at the Hamilton Ore Company's mine at Iron Mountain, Mich. It consists of the introduction of a small ( $\frac{3}{8}$ -inch) pipe of water playing into the exhaust. It keeps the iron at a temperature above freezing, and operates very successfully.

**Abrasion of Gold Coin.**—By careful experiments made at the United States Mint, says *The Iron Industry Gazette*, it has been shown that \$5 are lost by abrasion every time \$1,000,000 in gold coin are handled. The experiments were conducted with bags containing \$5,000 each, and it was shown that the mere lifting of the 200 bags making up \$1,000,000 to a truck to be removed to another vault, resulted in the loss stated, and that their transfer from the truck again made a second similar loss.

**Electric Welding of Pipes.**—In welding together pipes by the electrical method it has, says the *Scientific Press*, been the usual practice to employ internal mandrels to prevent collapse or change of circumferential outline. Professor Elihu Thomson, however, has recently invented a simple process by means of which the use of internal fixtures is avoided. The invention is based upon the fact that if a hollow structure be heated at a certain portion of its length and subjected to an upsetting action, it will bulge exteriorly instead of collapsing. The structure will, therefore, have a larger diameter at the swelled portion. In the present process, where it is applied to the welding of pipes, hammer blows are delivered at the weld or on the side of the pipe, and are so graduated as to simply contract this bulging or lateral spreading tendency. The hammering is delivered laterally so as to restore the metal back to its original position on the sides of the pipe. There is no tendency to collapse on account of the bulge of the pipe acting as a sustaining support.

**Aluminum-Steel Armor Plates.**—Some interesting experiments, says the *American Manufacturer*, are being made at the works of the Carbon Iron Company, in Pittsburg, by which it is expected that the possibility of making armor plates of aluminum steel may be demonstrated. The fact that a small percentage of aluminum in steel increases its strength is well known, and, with this in view, the experiments mentioned above have been undertaken. The company is now engaged on a government contract for cruiser plates, and by introducing about  $\frac{1}{4}$  1% of aluminum into this steel some satisfactory results have been obtained. An ultimate strength of 105,000 pounds has been reached, and the metal showed remarkable toughness and ductility. With an ordinary steel plate, when a tensile strength of about 100,000 pounds was obtained, the amount of carbon would necessarily be about  $\frac{1}{4}$  1%, which would render the steel too brittle for armament. The present experiments at the Carbon Iron Works will be continued for some time, until it is established whether the project is entirely feasible.



## HENDEY'S NEW MINE TIMBER FRAMING MACHINE.

This is an improved machine designed for framing timber for use in mines. It has ten saws, as shown in the cut, five at each side, so that both ends of a timber are framed at the same time. The four rip saws are 24 inches; the four shoulder cut-off saws, 16 inches, and the two end cut-off saws 26 inches in diameter. They are adjustable in every way. The position of the rip saws is set by collars on the upright spindle; the shoulder cut-off saws by loosening their center bearing, their frame swinging on the same to carry them farther apart or closer together; while the upright casting holding the swinging frame of the cut-off saws being secured firmly to the large shaft by heavy set screws and jam nuts bearing against jibs, which in turn bear against the large feather shown in the cut, the position of the cut-off saws can be adjusted by these screws. In like manner the rip saws can be made to run true with the slides, swinging them backward or forward as necessary. Strong studs connect both the castings carrying cut-off and rip saws to the slides, by which they can be moved as required. A three-inch shaft carries the frames of the end cut-off saws and is in its turn carried in bearings provided in the slide frame. By a special arrangement the belts are always kept at one length, regardless of the position of the saws. The pulleys on the main shaft for driving the saws on the side that is adjusted for the different lengths of logs, are secured with set screws in their hubs, bearing on feathers so that they can be placed firmly without marring the shaft.

The log to be cut is rolled to position on the carriage and secured by dogs. It is drawn to the saws by means of a hand wheel, the shaft of which works through racks and pinions under each slide. Two cuts are made at a time, the carriage being racked back and the log turned for the final two.

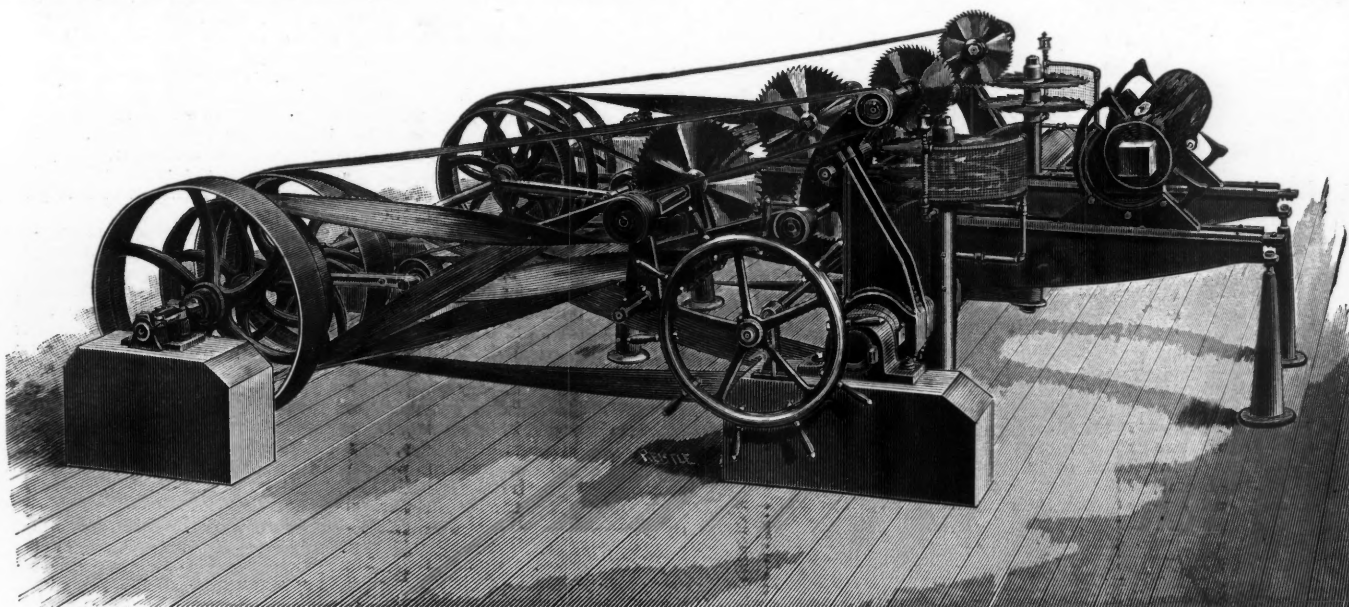
These machines are made by the Hendey & Meyer Engineering Company, of Denver, Colo. On the standard-size machine, timbers up to 10 feet in length and sixteen inches in diameter can be cut. They are also

generally speaking, the maximum of pressure coincided with the absence of firedamp. In summer, escapes were much more marked, and the proportion of 8% was even exceeded at the end of July. The phenomena were not simultaneous, one or two days being necessary for the alteration of the subterranean air to attain its maximum, but there were cases observed in which the action was in some way immediate.

## A DEVICE FOR COOLING WATER.

The following method of obtaining a constant supply of cold water at all times is described by the *Railroad and Engineering Journal* as being in general use in Hanover, York County, Pa. The town is closely built and without any system of drainage, so that the water from the wells is unfit to drink. Some years ago these reasons led to the introduction of a supply of very excellent water from a large spring about three miles distant. This water is brought through iron pipes, and when it reaches the consumer in summer is warm, while the water in the wells is cool. For this reason many of the inhabitants drink the well water, and, as a consequence, typhoid fever is a prevalent disease in that community.

In order to obtain pure cool water, not impregnated with lime, some of the inhabitants of the place have adopted a plan which is so simple and gives such excellent results that it is worthy of general adoption wherever there is a water supply other than wells or springs. The plan is as follows: A cylindrical galvanized sheet-iron tank 12 inches in diameter and 4 or 5 feet long, is placed in the bottom of a well. This tank is then connected by a galvanized iron pipe with the water-supply pipes, and another pipe is carried from the tank to the surface of the ground, or to any convenient point for drawing water, and has a cock at the upper end. The tank is consequently always filled with water from the water supply, and being in the bottom of the well, the water is cooled off and acquires the temperature of the



HENDEY'S MINE TIMBER FRAMING MACHINE.

made in special sizes, and for small mines a special type, which has a single end only, the log being placed on a revolving carriage, has been devised. These machines cut both round and square timber.

## RELATION BETWEEN FIREDAMP AND BAROMETRIC PRESSURE.

The coincidence of escapes of firedamp with barometric depressions has received the attention of mining engineers and colliery managers for many years. The hypothesis of a relation between the two phenomena was from the first well received, and the examination of the curves of barometric pressure appeared likely to furnish valuable data. Very many experiments have been made, but no formal conclusions in the matter have yet been reached. At Firminy those performed under the direction of M. Castel gave negative results, and the variations of atmospheric pressure might be considered as a secondary factor in the production of firedamp. A German engineer, Herr Köhler, has been carrying on, since October, 1888, at the mines of Kohlscheid, near Aachen, experiments which have led him, according to the *Colliery Guardian*, to admit a constant relation between the two phenomena. His researches have been conducted in the following manner: The barometer pressures were taken at noon and midnight; the amount of gas morning and night. A gasometer installed behind the fan of the ventilating shaft of the Gouley mine, and placed in such a manner as to exactly fill itself in twelve hours, furnished average samples of the composition of the air in the mine. For taking the amount of gas, a Coquillon fire damp meter was used, and the analyses furnished by that apparatus were controlled by experiments at the laboratory of the Aachen School of Mines. The comparison of the curves of firedamp and atmospheric pressure is very instructive. Thus, for January 1889, during the first fortnight, to the lowest pressure (737 millimetres) corresponded a maximum holding power of 3.9% of firedamp, which became nil when the pressure returned to 770 millimetres. During the second fortnight, the variations of the curves also agreed. In February, a fall of pressure showed itself by an increased holding power of firedamp up to 7%, when the firedamp decreased and ended by disappearing when the pressure rose. Sometimes considerable barometric falls appeared to be without effect, but,

well, so that that which is drawn from the tank is as cool as well water, and is without any of the impurities with which the latter is contaminated. The water drawn from the tank in one of the wells in the place named had a temperature of 56° when the thermometer in the atmosphere above stood at 76°.

This method gives an abundant supply of cool water during the whole summer, and can be adopted in all cities, towns, or in the country. If a well is available, it can be used; if not, by simply digging a hole in the ground deep enough so as not to be affected by the surface temperature, and burying the tank, it will answer equally well. This hole might be dug in a cellar or outside the building. If the water has any impurities in suspension, such as mud, the tank should be made accessible, so that it can be cleaned separately.

## TESTS FOR TURPENTINE AND OIL.

The following tests for turpentine and oil are described as having been used for a long time, with good results, by dealers in painters' supplies: In a flask or a bottle of clear, white glass, of capacity of about one ounce, is placed a small lump of potassium iodide, a piece the size of a pea being sufficient. The bottle is then half filled with turpentine, shaken thoroughly for about one minute and its contents allowed to settle. If the turpentine is pure the crystals will remain perfectly white and the liquid will be as clear as spring water; if the turpentine is adulterated the crystals will turn of a brownish color and the liquid will be of a pinkish color. By adding water to an equal volume of turpentine in a bottle, shaking thoroughly and allowing to stand, the upper portion of the liquid will be of a lemon color and the lower portion will be nearly white, if the turpentine be pure; if adulterated the lower portion of the liquid will be of orange color and the upper portion a lemon color.

The simplest method of testing spirits of turpentine is by the use of a hydrometer. The temperature of the turpentine should be 60° Fahr., and if pure the hydrometer should indicate 865.

Lansed oil may be tested by mixing equal parts of oil and nitric acid in a flask or bottle, shaking well and allowing to stand for about 20 minutes. If the oil is pure the upper stratum of the liquid should be of a straw color and the lower stratum colorless.

THE WADHAM'S COMPRESSION GREASE CUPS.

The accompanying engravings illustrate two improved forms of compression grease cups which are being manufactured by the Wadhams Oil and Grease Company of Milwaukee, Wis., and Seattle, Wash. By means of a slight pressure applied by springs, grease which will not flow by gravity can be used in these cups.

In Fig. 1 is shown a form of the cup suitable for nearly all kinds of

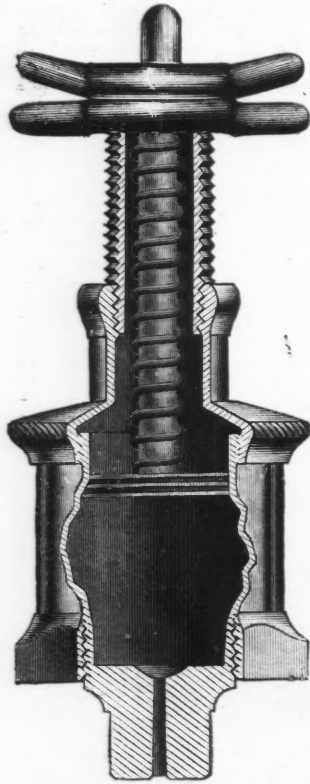


FIG. 1.

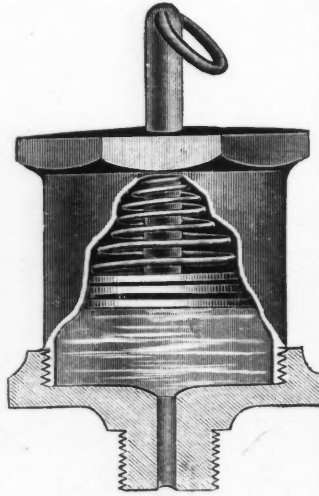


FIG. 2.

machinery lubrication; Fig. 2 shows a cup embodying the same principles, which is intended for use on line shafting and machinery bearings where a good but cheaper cup is required.

It is claimed for these grease cups that as there is no frictional heat required to liquify the lubricant, there is no loss in power and no danger of damage to the bearing which may be the case in heating. The feed is uniform and is easily governed by the tension of the spring, which is regulated by the threaded follower.

THE RELATIVE VALUE OF CEMENTS.\*

By Charles D. Lameson and Hubert Remley.

Cements such as are used for constructive purposes may be divided into two general classes, natural and artificial. The essential ingredients, carbonate of lime, silica, and alumina, are the same in both classes, the principal difference being the proportions in which they are present, and their purity.

In the manufacture of natural cement the raw material generally used is some stone in which the carbonate of lime, silica, and alumina are present in more or less correct proportions, while in the manufacture of the artificial cement the raw material used consists of the essential ingredients, each in a comparatively pure state, thoroughly mixed in theoretically the correct proportions. It is due to this fact that artificial or Portland cement is not only much superior to natural cements, but much more uniform in its quality. This feature of uniformity is perhaps the most valuable possessed by Portland cements, and one which can never be attained in the manufacture of natural cements.

The term Portland cement is now generally used to designate artificial cement, from the fact that the first artificial cement, made in England, when hardened resembled the famous Portland building stone.

Whether the mixture of the necessary ingredients is artificial or not, it is burned almost to the point of vitrification, and then ground to an extreme fineness. The fineness to which cement is ground is one of the most important points in its manufacture, for the reason that if not finely ground its strength may be reduced 75%.

The setting of a cement is, in general, a complex process, partly chemical in its nature, partly mechanical. Broadly stated, the chemical changes which occur may be said rather to afford opportunity for the mechanical changes which result in hardening than themselves to cause the hardening. The chemical changes are, therefore, susceptible of wide variation without materially influencing the result. In some cements, of which plaster of Paris may be taken as the type, water simply combines with some constituent of the cement already present. In others, of which Portland cement is the most important example, certain chemical reactions must first take place. These reactions give rise to substances which, as soon as formed, combine with water and constitute the true cementaceous material. Portland cement contains as chief, sometimes as almost sole constituent, a lime peroxide, and in addition a tricalcium aluminate,  $\text{Ca}_3\text{Al}_2\text{O}_6$ , soluble in 3,000 parts of water, and a dark-brown fusible substance,  $\text{Ca}_3\text{Al}_2\text{O}_6$ .

$\text{Fe}_2\text{O}_3$ . In the act of setting, the tricalcium aluminate first dissolves in water and then begins to separate again as a mass of felted needles consisting of calcium aluminum hydrate, which extend in every direction and are directly the cause of the first setting of the cement. At the same time an action begins which requires a much longer time for its completion, and which probably consists in a combination of the first formed aluminum hydrate with the calcium peroxide and the water, forming a mineral belonging to the zeolite class and possessing very probably the composition  $\text{H}_{10}\text{CaAl}_2\text{Si}_4\text{O}_{17}$ . This zeolite crystallizes out as it forms, and this continues, for long periods subsequent to the first setting of the cement, to add to its solidity and tenacity.

The effect of the presence of magnesia upon the quality of cement is not perfectly understood. The idea that an increased hardening in cement for a long period of time is due alone to its presence is not so, however, as cements that contain no magnesia have been known to improve constantly during a period of two years.

As a class, Portland cements are slower setting than the natural cements; but whereas the latter attain their full strength within a comparatively short time (within the first year as a maximum), after which limit this full strength may decrease as time goes on, no limit of time has been found beyond which Portland cement deteriorates, and for two or three years at least it improves its strength.

For general purposes the most valuable test of cement is that which determines its tensile strength. Although in construction cement is usually subjected to compression, or possibly in some cases to torsion, the compressive strength of cement being generally proportional to its tensile strength, tension tests have, on account of the facility with which they can be made, been adopted as the standard.

Test briquettes are usually made by hand. But as the amount of mortar that can be mixed at once is small, the process is too slow for an extensive series of tests, unless a great deal of help is available, and then the difference in the personal equations of the makers makes the briquettes unfit for comparative results. For this reason the engineering department of the State University of Iowa, which is now conducting a series of cement tests, had a machine designed which is capable of turning out more than 3,000 briquettes per day. This has made it possible to make a great number of briquettes under practically the same conditions. Owing to the greater amount of pressure to which machine-made-briquettes are subjected (about 150 pounds per square inch), they are probably stronger than the hand-made; this pressure being uniform for all the briquettes, which is not the case when they are made by hand, the comparative value of the tests is consequently far superior to anything attainable by hand-made briquettes.

The briquettes used in those tests were allowed to stand twenty-four hours in the air, and were then immersed. A number of briquettes were broken each day for the first seven days; after this a number were broken every seven days, and the results were averaged. Besides these briquettes, ten extra ones were broken at the expiration of one week, one month, three months, and six months. The testing machine used in these tests was Riehle Brothers' Standard Cement Tester, in which the strain upon the briquette is gradually increased by means of a screw-and-worm gear.

A comparison of the relative value of cements based upon their percentage of increase in strength is of no value. A cement that attains a certain strength in seven days, even if it only increases one per cent. during the following ninety days, is superior for constructive purposes to one that increases four hundred per cent. during the same time, provided the ultimate strength of the latter is not greater than the former.

Following are the results that have been obtained:

TENSILE STRENGTH OF CEMENTS.									
Age in weeks.	A. Lbs.	B. Lbs.	C. Lbs.	D. Lbs.	Age in weeks.	A. Lbs.	B. Lbs.	C. Lbs.	D. Lbs.
1	470	400	145	85	13	786	650	340	240
2	590	400	165	85	14	755	630	350	295
3	580	430	200	125	15	775	710	350	250
4	690	465	225	150	16	785	730	310	265
5	715	500	250	140	17	750	695	345	325
6	675	545	270	130	18	820	680	310	340
7	715	500	280	160	19	775	710	315	350
8	655	610	275	155	20	835	660	385	350
9	745	650	320	195	21	840	500	375	345
10	735	535	355	210	22	875	700	390	350
11	745	690	340	260	23	800	660	410	360
12	890	625	350	230	24	810	625	410	360

A. Buckeye Portland cement. B. Gibb's Portland cement. C. Natural cement, La Salle, Ill. D. Natural cement, Milwaukee, Wis.

RELATIVE STRENGTH OF NATURAL AND ARTIFICIAL CEMENTS.								
Age in weeks.	E. Lbs.	F. Lbs.	Age in weeks.	E. Lbs.	F. Lbs.	Age in weeks.	E. Lbs.	F. Lbs.
1	415	110	10	625	260	19	680	400
2	450	125	11	590	275	20	690	375
3	455	140	12	635	285	21	690	350
4	505	160	13	735	290	22	700	375
5	520	175	14	640	320	23	685	400
6	555	200	15	655	305	24	700	370
7	565	225	16	650	315	25	755	395
8	600	225	17	710	350	26	745	455
9	640	250	18	700	350	27	755	370

E. Average of seven brands of artificial Portland cements.

F. Average of five brands of natural cements.

Although English Portland cements are among the best in the market, still they are equaled by both German and French Portland, while there are now manufactured in the United States Portland cements that in tensile strength exceed any imported cements. Briquettes made of American Portland have shown a tensile strength as high as 1,100 pounds at the end of 26 weeks.

**Construction of Pumping Contract.**—There was a contract between the owner of a mine and another, under which the latter was to furnish a steam engine and the necessary appliances, and perform the work of pumping water from the mine, for which the former agreed to pay him \$75 per month. From time to time the latter presented bills or statements of account to the mine owner which were accepted without objection, and on which partial payments were made, in which night work was counted at an extra price. Having received these bills, and made no objection thereto, the owner, in the absence of clear proof that such was not in the contract, will be held to have acquiesced to any such charge, and a recovery against him therefor will not be sustained.

*Ingle v. Novington, Supreme Court of Indiana, 25 N. E. Rep., 900.*

\*Abstract of an article in *Popular Science Monthly*, March, 1891.

THE PELTON WATER WHEEL.

Mr. Ross E. Browne has recently made some remarkable tests of the Pelton water wheels, which have now come into such general use, at the University of California. A wheel of 15 inches diameter and 1.5 inches width, under a 50-foot head, showed an efficiency of 82.6% with a  $\frac{1}{8}$ -inch nozzle, and 82.5% with one of  $\frac{3}{8}$  inches. The efficiency was determined under as low a head as 8 feet, even then showing 73%. The wheel used was constructed in the workshop of the University, and is stated not to have conformed wholly to the company's standard, the size of the bucket being too small to permit of accurately shaping the curves.

The principles upon which the buckets for Pelton wheels are designed is illustrated in the accompanying engravings. In converting the energy of a jet of water, escaping from a nozzle, into useful work, according to Mr. Browne, the principal losses occur as follows: In sharp, angular diversion of the jet in entering, or in its course through the bucket, causing impact, or the conversion of a portion of the energy into heat instead of useful work; in the frictional resistance offered to the motion of the water by the wetted surfaces of the buckets; in the velocity of the water as it leaves the bucket, representing energy which has not been converted into work.

Hence, in seeking a high efficiency, there are presented the following considerations:

1. The bucket surface at the entrance should be approximately parallel to the relative course of the jet, and the bucket should be curved in such a manner as to avoid sharp angular deflection of the stream. If, for example, a jet strikes a surface at an angle and is sharply deflected, as shown in Fig. 1, a portion of the water is backed, the smoothness of the stream is disturbed, and there results considerable loss by impact and otherwise.

2. The number of buckets should be small, and the path of the jet in the bucket short; in other words, the total wetted surface should be small as the loss by friction will be proportional to this.

3. The discharge end of the bucket should be as nearly tangential to the wheel periphery as compatible with the clearance of the bucket which follows; and great differences of velocity in the parts of the escaping

machinery was said to be a vessel of boiling water. Objection was made to this part of it on account of the danger of explosion. No credence can be given to this story, as far as it has any reference to steam power.

1621.—Witsen's treatise on shipbuilding, published at Amsterdam in 1621, has an engraving of what is called a Liburnian or Leghorn vessel propelled by paddle wheels turned by oxen. A reproduction of this engraving is given in Vol. XIX. of the *Mechanic's Magazine*.

1651.—An English pamphlet, supposed to be by the Marquis of Worcester, contains an indefinite reference to what may have been a steam engine, and it was said to be capable of propelling boats.

1690.—*Denis Papin* proposed to use his piston engine to drive paddle wheels to propel vessels.

1707.—*Papin* applied his pumping engine to raise water to turn a water wheel, which in turn drove the paddle wheels of a boat. He drove a model boat in this way on the Fulda at Cassel. This was probably the first actual experiment in driving a boat by steam power.

1736.—*Jonathan Hulls* took out an English patent for the use of a steam engine for propelling ships. There is no record of it having been carried into effect.

1752.—*Bernouilli* obtained a prize from the French Academy of Science for the best essay on the manner of propelling vessels without wind. He proposed a set of vanes like those of a windmill (a screw propeller in fact) driven by either animal or steam power. He also proposed jet propulsion, or the driving of a vessel by the reaction of a jet forced out of her stern. About the same time *Gautier* proposed to use the Newcomen engine to drive paddle wheels.

1760.—*Genevois*, a Swiss, proposed to compress springs by steam or other power, and apply their efforts to propel vessels.

1763.—*William Henry*, of Lancaster, Pa., went to England in 1760, and there became acquainted with Watt's engine, which was then new. He returned to America, and in 1763 built an engine and put it in a boat fitted with paddle wheels on the Conestoga River. The boat sank on her trial. He built another, but nothing seems to have come of it. In 1783 he said to a German traveler: "I am doubtful whether such a machine will find favor with the public, as every one considers it impracticable against wind and tide." In 1877, Robert Fulton, then 12 years old, vis-

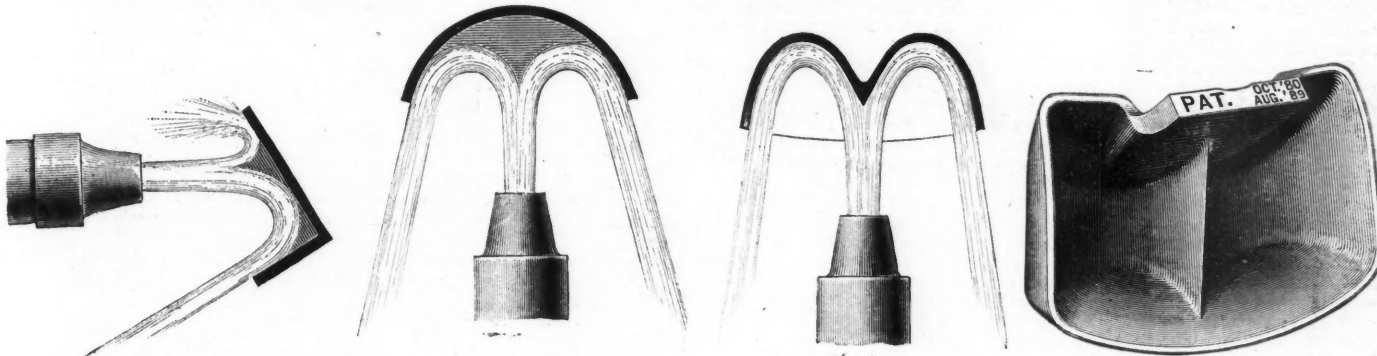


FIG. 1.

FIG. 2.

FIG. 3.

FIG. 4.

THE PELTON WATER WHEEL.

water should be avoided. In order to bring the water to rest at the discharge end of the bucket, it is easily shown, mathematically, that the velocity of the bucket should be one-half the velocity of the jet.

A bucket, such as shown in Fig. 3, will cause the heaping of more or less dead or turbulent water at the point indicated by dark shading. This dead water is subsequently thrown from the wheel with considerable velocity, and represents a large loss of energy.

EARLY HISTORY OF STEAM NAVIGATION.

The American Society of Mechanical Engineers held one of its monthly social reunions at its headquarters, No. 12 West 31st street, New York, on Thursday evening, 26th ult. The literary part of the entertainment was devoted to reminiscences of Robert Fulton and of the early days of steamboating on the Hudson River. The idea of having a "Fulton night" had been suggested by the presentation to the society by Dr. Thomas Egleston of a mahogany dining table once the property of Robert Fulton. An oil portrait of Fulton, painted by Benjamin West, was loaned for the evening by its owner, Mr. Robert Fulton Cutting, as were also two autograph letters of Fulton.

The programme of the evening comprised a chronological statement by William Kent of the several experiments in propulsion by steam which were made before Fulton's time, with lantern views illustrating many of them, followed by a lecture by Charles Hull Botsford on Fulton, in which he compared his successful work with the non-success of his predecessors, and the abandonment of their projects. Samuel McElroy followed with a description of Fulton's war vessel, the *Demologos*, launched in 1814, and traced the development of steam navigation down to the building of the second war steamer, called the *Fulton*, in 1851, which was at the time the finest war vessel afloat. Charles Haswell the veteran engineer, now over 70 years of age, gave some reminiscences of the difficulties of the early steam navigators. Professor Denton of the Stevens Institute of Technology, then exhibited a view of the new Sound steamer *Plymouth* with engines of 4,500 horse power, the latest example of the American type of steamboat, alongside of the *Clermont*, drawn on the same scale.

The "talk" was finished by J. F. Hallaway, past president of the society, who with Fulton's table as his subject described the characters who had sat around it in the olden time and paid a tribute to their memories. The following is an abstract of Mr. Kent's chronological lecture on steamboat experiments down to the time of Fulton. In it he gives due credit to all claimants of the honor of being the first inventor of the steamboat, arranging them in order of their dates.

1543.—Spanish writers tell a somewhat apocryphal story of a boat of 200 tons moved by paddle wheels, built by Blasco de Garay. Part of the

ited Henry to study the paintings of Benjamin West, who had long been a friend and protégé of Henry, and there he probably got his first ideas of steam navigation.

1770.—*D'Auxiron*, in France, prepared plans for adapting Watt's engine to propulsion, and in 1772 was granted the monopoly of the use of steam in river navigation in France for fifteen years, provided he should prove his plans practicable.

1774.—*D'Auxiron* and his friends, Mounin and Jouffroy, built a boat which, when near completion, sank at its wharf. *D'Auxiron* died before the boat was recovered and completed. After his death his monopoly was turned over to Jouffroy, who consulted Perier, a distinguished mechanic. The latter built the boat on new plans, and it was tried in the Seine, but failed to develop speed, and Perier abandoned it.

1776.—*Jouffroy* built a boat 14 feet long, 6 feet wide with a Watt engine and a chain carrying duck-foot paddles. The paddles proved unsatisfactory and he adopted a paddle wheel, driven by a ratchet wheel-motion by the piston rod of the engine.

1783.—This boat of Jouffroy's was tried in public at Lyons, July 15th, 1783, and is said to have been successful, but the French Government declined to confirm to Jouffroy the monopoly on the ground that the experiment was not made at Paris. Jouffroy became discouraged and abandoned further attempts.

1774.—*James Rumsey*, of Virginia, began experiments in steam navigation.

1786.—*Rumsey* succeeded in driving a boat four miles an hour in the Potomac at Shepherdstown, W. Va., in presence of General Washington. He used the system of jet propulsion which had been proposed about 30 years before by Bernouilli.

1787.—*Rumsey* obtained a patent for the State of Virginia. He wrote a treatise on the application of steam, and organized a Rumsey Society at Philadelphia for the encouragement of steam navigation. He died in London in 1793 while explaining his scheme to a London society. A boat of his was tried in the Thames in 1793 and made four miles an hour.

1785.—*John Fitch*, who was born at Windsor, Conn., in 1743 and died at Bardonia, Ky., in 1798, in April, 1785, conceived the idea of applying steam to locomotion on land, and a few days afterward was led to consider plans for applying steam to propulsion of vessels. In August he showed a model of his boat to Dr. Ewing, of the University of Pennsylvania, and in September presented a model to the American Philosophical Society at Philadelphia.

1786.—*Fitch* made experiments on a skiff, with a three-inch engine, driving paddles; he besieged Congress and the Legislature of Pennsylvania for funds, but was unsuccessful; in the same year he was granted a patent for 14 years by the State of New Jersey.

1787.—Fitch raised \$800, and in February began a boat of 60 tons, 45 feet long by 12 feet beam, with six oars or paddles on each side. The engine had a 12-inch cylinder. In May, 1787, a trial trip revealed some defects, which were corrected, and on August 27th of the same year a successful trial trip was made at Philadelphia. Patents were obtained in Pennsylvania, New York and Maryland. About the same time Fitch had a controversy with Rumsey concerning priority of the invention.

1788-1790.—Fitch built larger boats, which ran regularly in 1790 between Philadelphia and Burlington, making as high as 7 miles an hour.

1791.—Fitch received a United States patent August 26th.

1793.—Fitch went to France. The Cyclopaedia of Biography says that he deposited his plans with the American Consul at L'Orient, while he went to London. The consul showed his plans to Fulton, who was then in France, in whose hands they remained several months. Failing to get the privilege of building his boats in France, he returned to America in 1794.

1796.—Fitch experimented on a ship's yawl, fitted with a screw, in the Collect Pond, N. Y.

1798.—Fitch made a three-foot model boat at Bardstown, Ky. He committed suicide the same year.

1787.—Patrick Miller, of Dalswinton, Scotland, experimented with paddle wheels.

1787.—Jas. Taylor suggested the employment of steam instead of manual labor. This is denied, however, by the son-in-law of Symington in a letter to *Mechanic's Magazine*, Vol. XXVIII., 1838, claiming the invention for Symington.

1787-1788.—William Symington was employed by Miller to construct an engine for a new boat with two cylinders four inches in diameter. It was tried October 14th, 1788, and made five miles an hour.

1789.—Symington built another boat for Miller, December, 1789; it made 7 miles an hour. Miller then dropped the matter. He condemned Symington's engine as being "the most improper of all steam engines for giving motion to a vessel."

1801.—Symington's third boat, the "Charlotte Dundas," built under patronage of Lord Dundas, was tried in 1802. Mr. Symington's son-in-law says (*Mechanic's Magazine*, Vol. XIX.) that in July, 1801 or 1802, Fulton visited Symington and made a trip on his vessel on the Fourth and Clyde Canal, and obtained his designs and ideas. This statement is shown to be untrue by letters of Fulton now in existence, which prove that Fulton never was out of France during either of these years.

1802.—Symington's "Charlotte Dundas," in March, 1802, towed two 70 ton vessels in the Forth and Clyde Canal, but the proprietors of the cana disapproved of them, fearing injury to the banks. The Duke of Bridgewater gave Symington orders for eight boats for his canal, but died shortly afterward, and the completion of the contract was thus prevented. Symington became discouraged and gave up in despair.

1811.—Henry Bell, of Glasgow, who had seen the "Charlotte Dundas," built the first passenger vessel in Europe. He was a loser by his venture, but the boat was a success. In 1815 he built several other boats, and his success was then complete. Symington beginning his experiments in the winter of 1787-1788, and trying his first boat October 14th, 1788, is clearly anticipated by John Fitch in America, who made his first experiment with a paddle-wheel boat driven by a steam engine in 1786, and his first public trial on August 22d, 1787. The *Mechanic's Magazine*, Vol. XXVIII., 1838, p. 25, credits Fitch with being an independent, but second inventor, claiming Symington as the first; but it erroneously states that Fitch did not begin his operations until 1788. Between the time of Symington's second boat, 1789, and his third, 1801, much was done in America.

1792.—Elijah Ormsby built a small steamer at Narragansett Bay, using an atmospheric engine and duck-foot paddles. It made three or four miles an hour.

1798.—Nicholas Roosevelt is said to have built the "Polacca," a vessel 60 feet long, with a 20-inch engine having a 2-foot stroke, which drove it eight miles an hour. Livingston and Stevens had induced Roosevelt to try their plans still earlier, they paying the expense of the experiments. Livingston used jet propulsion and Stevens a screw.

1798.—The State of New York gave Livingston the right to steam waters in the state for 20 years, if he should succeed, within 12 months, in producing a boat that should go four miles an hour.

1803.—Livingston procured the re-enactment of the law in favor of himself and Robert Fulton, who was then experimenting in France.

1791.—John Stevens experimented on steamboats. In 1789 he had petitioned the New York Legislature for a grant similar to that made to Livingston, and he stated that his plans were then completed and on paper.

1804.—While Fulton was in Europe, Stevens completed a steamboat 68 feet long and 14 feet beam. This was a twin-screw boat. Its machinery is preserved in the Stevens Institute of Technology, Hoboken, N. J. In May, John Stevens and R. L. Stevens crossed the Hudson River in this boat.

1807.—John Stevens and his sons built a paddle-wheel boat, the "Phoenix," which made its trial just too late to anticipate Fulton's successful trial with the "Clermont."

1808.—The "Phoenix" went to Philadelphia by sea, being the first steamboat to make a sea voyage.

1804.—Oliver Evans built a combined wagon and steamboat called the "Oruktor Amphibolis." It was a flat scow with a five horse-power engine. He propelled it up Market street, Philadelphia; launched it in the Schuylkill, and sailed down to the Delaware. This was the first application of steam to carriage on land, in America. Evans was the inventor of the high-pressure engine, copied later by Vivian, Trevethick and others. He died, "poor, neglected, and broken-hearted."

1789.—Nathan Reid built a paddle-wheel boat turned by a hand crank. He designed a steam boiler, the first vertical tubular boiler, in 1788, intending it to be used in steamboats. He does not appear to have made any successful experiments in steam navigation.

1790.—Samuel Morey, Oxford, N. H., built a paddle-wheel steamboat and tried it successfully on the Connecticut River.

1791.—Rumsey, Fitch, Stevens and Morey all obtained patents in 1791 for various methods of propelling vessels by steam power.

1793.—Morey made a trip from New York to Hartford. He built a larger boat at Bordentown, N. J., in 1797 and made a trip to Philadelphia. His funds gave out and he gave up his project. Fulton, Livingston and Stevens met Morey in New York, but nothing definite is known of the dimensions of his boats or machinery.

1793.—Robert Fulton (born at Little Britain, Lancaster County, Pa., 1765, died at New York 1815) proposed plans for steam vessels, both to the United States and the British governments. In 1779, when only 14 years of age, he experimented with paddle wheels turned by hand on the Conestoga River. In 1802, while in France, he made drawings and a model of a side-wheel steamboat. In 1803 he had a boat built by M. M. Molar, Bordel and Montgolfier, on the Seine, and it made 4½ miles an hour on its trial, August 9th. The water tube boiler of this boat, known as Barlow's boiler, is still preserved in the Conservatoire des Arts et Métiers, in Paris. In 1804 Fulton ordered from Boulton and Watt an engine from his own plans, 2 feet in diameter and 4-foot stroke. This engine was completed in 1806, and shipped to the United States, Fulton having preceded it. He immediately contracted for a hull in which to set it up.

1807.—In 1807 the engine was fitted to the "Clermont," the hull of which was 133 feet long, 18 feet wide and 9 feet deep, a far larger steam vessel than any hitherto constructed. In August, 1807, it made a successful trip to Albany, 150 miles, in 32 hours, returning in 30 hours. Its success was such that it was soon afterward run as a regular passenger vessel between New York and Albany, and the era of steam navigation was at last begun. In 1808 two new steam vessels, the "Car of Neptune" and the "Paragon," each of which was nearly double the size of the "Clermont," were built by Fulton.

The Spanish story of 1543 has been settled by Mr. Botsford, who has shown that it had been investigated in Madrid in 1858 and that it was then proved that Blasco de Garay's boat had been moved by men secreted in the hull. He has also disposed of Symington's claim, by showing that if an unsuccessful experimenter who abandoned his work in despair is entitled to be ranked with Fulton, then Symington must give place to John Fitch, who both antedated him and more nearly reached success. But the higher honors must be given to Fulton, as the inventor, the engineer and the successful business man by whose labors steam navigation became an accomplished fact.

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

NAME OF COMPANY.	Paid in Feb.	Paid since Jan. 1st.	NAME OF COMPANY.	Paid in Feb.	Paid since Jan. 1st.
Adams Cons., Colo.....	\$7,500	\$7,500	Homestake.....	\$12,500	\$25,000
Alaska Treadwell, Alaska.....		50,000	Idaho, Cal.....	6,200	12,400
Aspen, Colo.....	20,000	40,000	Iron Mountain, Mont.....		25,000
Atlantic, Mich.....	40,000	40,000	Jackson, Nev.....		5,000
Bald Butte, Mont.....	10,000	20,000	Little Rule, Colo.....	10,000	20,000
Banister, Mont.....	6,000	12,000	Mammoth, Utah.....	40,000	80,000
Bimetallic, Mont.....	70,000	140,000	Maxfield, Utah.....	9,000	9,000
Boston & Mont., Mont.....	125,000	125,000	May Mazepa, Colo.....	12,500	25,000
Calliope, Colo.....		5,000	Montana Ltd., Mont.....		39,600
Calumet & Hecla, Mich.....		500,000	Morning Star, Colo.....	25,000	25,000
Centennial - Eureka, Utah.....	15,000	30,000	Mt. Diablo, Nev.....	10,000	10,000
Central, Mich.....	20,000	20,000	Napa, Cal.....		10,000
Champion, Cal.....	10,000	20,000	Ontario, Utah.....	75,000	150,000
Clay County, Colo.....	4,000	4,000	Parrot, Mont.....	18,000	36,000
Cortez, Nev.....	138,500	138,500	Quicksilver, Pref., Cal.....	64,360	64,360
Daly, Utah.....	37,500	75,000	Quincy, Mich.....	200,000	200,000
Derbec Blue Gravel, Mont.....	10,000	10,000	Richmond Cons., Nev.....	20,250	20,250
Granite Mountain, Mont.....	200,000	400,000	Running Lode, Colo.....	5,000	5,000
Hecla Con, Mont.....	15,000	30,000	Silent Frig., Colo.....	10,000	10,000
Helena & Frisco, Mont.....	10,000	20,000	Silver Mt. of L. V., N. Mex.....	50,000	50,000
			Tamarack, Mich.....	200,000	200,000

#### 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, MARCH 3D, 1891.

- 447,292. Steam Engine. Charles A. Blume and David Lanum, Colfax, Ind.  
 447,294. Water Wheel. Francis M. Bookwalter, Springfield, Ohio.  
 447,299. Apparatus for Mixing Gas and Air. George R. Cottrell, New York, N. Y., Assignor of one-half to Wm. W. Dudley and F. L. Browne, Washington, D. C.  
 447,300. Oil Cup Feeder. James S. Donnellan, Duquesne, Ia.  
 447,308. Steam Boiler. Charles F. Garland, Chelsea, Assignor of one-half to John J. Quigley, East Boston, Mass.  
 447,325. Lamp Carrier for Miners' Hats. Charles H. Hohson, Mount Carmel, Pa.  
 447,327. Grease Separator for Steam Engines. Levi Hussey and Edward McCann, New York, N. Y., Assignors of one-third to Theodosia Hatch, same place.  
 447,332. Electric Railway. Walter H. Knight, New York, N. Y.  
 447,333. Dust Collector. Oswald Kutsche, Chicago, Ill., Assignor by mesne assignments to the Allington & Curtis Manufacturing Company, of Michigan.  
 447,337. Automatic Valve for Air Brakes. Albert P. Massey, Watertown, N. Y., Assignor to the Eames Vacuum Brake Company.  
 447,340. Stuffing Box for Steam Hammers. Thomas H. Mirkil, Jr., Philadelphia, Pa., Assignor to the Southwark Foundry and Machine Company, same place.  
 447,344. Process of Preparing Ores for Amalgamation. Henry S. Meyers, Brooklyn, N. Y.  
 447,351. Tool for Plugging Openings in Boilers, etc. Henry S. Reynolds, Brooklyn, N. Y.  
 447,356. Railway Tie. Eugene Robinson, Detroit, Mich.  
 447,358. Nailing Machine. Stelman W. Robinson and Sern P. Watt, Columbus, Ohio, Assignors to the Wire Grip Fastening Company, of Chicago, Ill.  
 447,360. Process of Manufacturing Mineral Wool. Charles H. Rockwell, Cleveland, Ohio.  
 447,458, 447,459. Feeding Apparatus for Use in Burning Clay. Henry G. Butler, Kenosha, Wis.  
 447,480. Vulcanizing Apparatus. Arthur H. Stoddard, Boston, Mass.  
 447,490. Valve for Steam Engines. Albert L. Ide, Springfield, Ill.  
 447,511. Method of and Apparatus for Solidifying Molten Metal. George W. Goetz, Pittsburg, Pa.  
 447,529. Electro-Magnetic Cut Off. Giles Taintor, Worcester, Mass.  
 447,544. Fuel Feeder for Furnaces. Robert Newton, Providence, R. I.  
 447,550. Hydraulic Ram. George Yellott, Towson, Md.  
 447,562. Machine for Drilling Iron. Charles K. Dawes, Trenton, N. J.  
 447,592. Well-boring Machine. Chauncey F. Whipple, Nevin, Iowa.  
 447,600. Rock Drill. Albert W. Daw and Zacharias W. Daw, Laurvig, Norway.  
 447,674. Pulverizer. Samuel B. Frank, Nashville, Tenn., Assignor of one-half Edward B. Polk, same place.  
 447,725. Water Wheel. Richard E. Gray, Muncy, Pa., Assignor to the Gray Current Motor Company, Elgin, Ill.

## PERSONALS

Mr. Bradford H. Locke, M. E., who has been absent in London, England, for some time, has returned to his home in Central City, Colo.

Ex Senator Warner Miller will sail for Nicaragua on March 12th with a party of friends, to inspect the work on the Nicaragua Canal. He speaks most confidently of the early completion of this great project.

Col. C. A. Ball, it is reported, has resigned the general management of the Wheeling Bridge and Terminal Company on account of ill health. It is understood that as soon as Col. Ball recovers his health he will accept the general management of a small Southern railroad.

Mr. Wm. M. Curtis, Mining Engineer of Detroit, Mich., has associated with himself Prof. Frank C. Smith, lately of Ann Arbor. Messrs. Curtis & Smith have opened an office with a good laboratory at 27 Larned street, W., Detroit, for the general business of consulting mining engineers and metallurgists, assayers and analytical chemists.

Mr. Edmund Lefevre, who has been for some time a valued member of the staff of the ENGINEERING AND MINING JOURNAL, has closed his connection with us and gone to his home in Panama to enjoy a well earned vacation. During his absence Mr. Lefevre will send us some letters concerning the mining industry in Central America and Colombia.

Professor James Geikie, the famous geologist, the author of "The Ice Age," and one of the deans of the University of Edinburgh, has arrived in Boston, Mass., and is at the Tremont House. Professor Geikie, it is said, will deliver a course of lectures before the Lowell Institute, beginning next week. He returns to fulfill English engagements immediately on the conclusion of his stay in Boston.

J. Milton Titlow, principal assistant to the Chief of the Bureau of Surveys, Pennsylvania, has tendered his resignation, to take effect on April 1st, owing to continued ill health. Mr. Titlow has been connected with the Survey Bureau for about 25 years, having been a draftsman for 8 years, and since 1874 occupying the position he has resigned from. A civil service examination will be held to fill the vacancy.

Mr. Jas. B. Tonking, superintendent of the mines at Mt. Hope, N. J., according to a local paper, has been directed to proceed to Brazil with a party for the purpose of investigating some magnetic iron ore properties in that country in the interests of the Lackawanna Iron and Coal Company. The explorers were to have left March 3d, and will be absent about a month. Mr. John Moyses will take charge at Mt. Hope in Mr. Tonking's absence.

The United States Fish Commission steamer "Albatross" arrived at Panama on February 17th, 18 days from San Francisco, via Acapulco. She went to meet Professor Agassiz, and under his direction will make a scientific cruise in tropical waters. The area under investigation comprises the Gulf of Panama, the Galapagos Islands and the intervening space to Acapulco, a region of the Pacific Ocean almost unknown to the naturalist. It is expected that the results of the trip will prove of great value to the scientific world. The operations will be confined principally to the sea, yet among the wonderful group of the Galapagos, where Darwin met so many surprises, nothing will be neglected to complete the imperfect examination already made.

## OBITUARY.

Mr. Wm. H. Down, secretary of the American Meter Company, died on the 15th ult. He was in former years connected with the Manhattan Gas Light Company and the Greenpoint Gas Light Company.

Mr. Owen Grinnell Scofield died in Wheeling, W. Va., on the 23d ult. He was connected with our esteemed contemporary, the *Ohio Valley Manufacturer*, at its start as associate editor and manager, and engaged afterwards in the insurance business.

Jackson S. Schultz, the well-known leather merchant, died in this city on the 1st inst. In addition to extensive trade interests, he was for years practically interested in local reforms, notably in street cleaning, sanitary and rapid transit problems. In 1873 President Grant appointed him United States Commissioner to the Vienna International Exposition.

John H. Hall, a director of the Manhattan Railway Company, died in Thomasville, Ga., on the 2d instant, aged 64 years. He was one of the original promoters and directors of the New York Elevated Railroad Company and went into the Manhattan Railway Company when the consolidation took place, of which he was a director at the time of his death. He was also a director in the Richmond Terminal system and president of the Georgia Company, which is the controlling factor in the Georgia Central Railroad, of which he was a director. He was largely interested in other Southern railroads and investment enterprises.

Louis Henri Armand Behic, according to a cable dispatch from Paris, died there on the 3d inst. He was born at Paris on January 15th, 1809. In 1845 he was appointed Inspector of Finances, in which capacity he visited the French West Indies and other colonies, and on his return became Director of Accounts at the Ministry of Marine, and was elected Deputy for Avesnes in 1846 and 1849, and Councillor of State in 1849. He was instrumental in promoting the construction of the railway from Paris to Lyons. Resigning his seat at the Council upon the *coup d'état* of December, 1851, he became director of the furnaces of Vierzou, in 1853 Inspector-General of the Messageries Impériales, and subsequently administrator of that powerful company. In June, 1853, he succeeded M. Rouher as Minister of Agriculture, Commerce and Public Works, and was the promoter of the monetary convention of September, 1856, known as the Latin Union. On his resignation in January, 1857, he was made Senator and Grand Cross of the Legion of Honor. In January, 1876, he was elected by the Department of Gironde a senator for the term ending in 1879. He took his seat in the Bonapartist group of the "Appeal to the People."

Sir Joseph William Bazalgette, the eminent engineer, died in England last week. He was born at Enfield, Middlesex, England, in 1819. In 1845 he established himself as an engineer. In that year the railway mania began, and Mr. Bazalgette, at the head of a large staff of engineering assistants, was engaged in designing and laying out schemes for railways, ship canals, and other engineering works in various parts of the country. In 1848 he became assistant engineer under the Metropolitan Commission of Sewers, and in 1852 its head. On the reorganization of the commission in 1856 Mr. Bazalgette was elected engineer and was instructed to devise a scheme for the drainage of London. Accordingly he prepared estimates and designs, which were executed between 1858 and 1865. This is the work which made the designer's reputation as an engineer. Between 1863 and 1874 the Victoria, the Albert and the Chelsea Embankments were designed and executed by him. His latest works were a new granite bridge over the Thames at Putney, a steel suspension bridge at Hammersmith and an iron bridge at Battersea. He was created a Companion of the Bath in 1871, and was knighted in 1874.

## EXPORT NOTES.

The Tariff Committee of the Chamber of Deputies, France, has adopted a proposition to place a duty of 22f. on crude petroleum, with a rebate of 4f. when it is exported from France after having been refined.

Ecuador has adopted a new tariff measure that went into effect on January 1st, 1891. *The Reports from the Consuls of the U. S.*, No. 123, contains a translation of this law, including an itemized list of the rates of export as well as of import duty.

The Portuguese Cortes has recently substituted for all previous taxes collected for tonnage, anchorage, sanitary and quarantine dues, a "duty on the cargo," to which all vessels entering the ports of Portugal shall be subject. The law also removes the "additional six per cent. tax."

The great labor strike in Australia is said to be practically over. Free labor is being employed in all the colonies. Vessels' cargoes are loaded and discharged in Sydney, Melbourne, Adelaide and Brisbane without difficulty. The chief trouble experienced is an insufficient supply of coal.

There is being organized in Rio de Janeiro, according to newspaper reports, a company to build and run a line of steam and sailing ships between Brazil and the United States, the steamers to make two trips a month, and both steam and sail to carry the Brazilian flag. The company is called Companhia Americana de Navegacao.

An international exposition will be opened at Santo Paulo, Brazil, on November 1st, 1892, where American manufacturers are invited to send their wares for exhibition and sale. Santo Paulo is situated about 60 miles north-west of the Port of Santos, with which it is connected by railroad, and has a population of 75,000 people.

The total value of exports of merchandise from the United States during the seven months ended January 31st, 1891, was \$547,606,824, and for the corresponding period in 1890 \$540,634,133. The value of the imports for the seven months ending January 31st, 1891, was \$474,551,270, and for the seven months ended January 31st, 1890, \$441,405,789.

The United States Consul at Prague, Bohemia, reports to the State Department that an Exposition will be held in that city from May to October or November of this year. The Exposition is to be devoted exclusively to the products of Bohemia, with one exception, which admits inventions and patents from all countries, as well as devices for the prevention of accidents and disasters.

It is proposed to hold a mining exhibition on a large scale at Bilbao, Spain, in 1892. The building which is to be erected for the purpose will be of a permanent character, and will be afterwards used as a museum and technical laboratory for the training of workmen in mining and metallurgy.

The management of the exhibition will be in the hands of the provincial authorities.

From remote antiquity the only medium of exchange in China has been copper cash. This year the newly-established mint in Canton has commenced, as mentioned in these columns on February 7th, to coin dollars and various subsidiary coins, ranging in value from five to fifty cents, and the new currency, despite some opposition, is rapidly gaining in favor in the south.

The Gates Iron Works, of Chicago, builders of rock and ore breaking machinery, recently shipped to Australia eight large rock and ore breakers having a capacity equal to 9,000 tons output per day. Four of these breakers go to the Broken Hill mine, the remaining four to the government of New South Wales, where they will be used in producing rock ballast, etc., along the lines of railroad. In less than 60 days from the time this order was placed by cable, the eight car loads of machinery were on dock in Sidney.

The trade and navigation returns for Canada for 1890 have been issued. The exports were \$97,749,149, and the imports \$128,858,241. The imports increased last year by \$7,500,000, and the exports increased about the same. The balance of trade against Canada was \$31,109,092. Canada's exports to the United States were \$40,000,000 and imports \$52,000,000. The total exports from Canada to all countries for the month of January last were \$4,294,959. In January, 1890, the figures were \$3,241,270, showing an increase for January this year over the corresponding month of 1890 of \$1,053,689.

The export from New Caledonia to France, England and Germany during 1889 was 20,000 tons of nickel ore and 1,000 tons of melted nickel and cobalt. The New Caledonia nickel, cobalt and chromate of iron mines are the most extensive in the world, and, as Mr. L. L. Meseans, commercial agent in Nouméa, says in the *Australasian and South American*, American manufacturers could there find a cheap market for the acquisition of those metals. Vessels coming from the Pacific coast with loads of timber could easily find return freight.

The Hawley Hardware Company, New York, received a few weeks ago an order by telegraph from San Francisco for a large consignment of hatchets and other articles of hardware, which were sold to Siberian Russia. The quarter of the world alluded to absorbs considerable quantities of agricultural implements and tools, and is, from all accounts, in a flourishing condition. Trade with it has been very good this season, which, of course, is now about over, and it is expected that it will continue to grow in importance year after year.

The cost of carriage of galvanized iron on the Natal railways depends upon the way in which it is packed. The secretary of the Durban Chamber of Commerce recently wrote to the general manager of the Natal railways, drawing his attention to the fact that 85s. instead of 73s. 4d. per ton had been charged for conveying galvanized iron to Ladysmith. The reply was that the chamber had evidently overlooked the note in the tariff to the effect that galvanized iron will not be accepted unless packed in casks or tied in secure bundles at the through up-country traffic rate. The chamber was asked to co-operate in securing the packing of iron in bundles of 2½ hundredweights, as much time and labor are wasted when it is sent in loose sheets.

The Bureau of the American Republics, at Washington, has received a letter from a leading merchant in Brazil, who writes as follows: "Almost everything made in America is good for this country. Glassware is wanted badly, particularly big tumblers, water sets and small liquor glasses, knives and forks, all kinds of tinware, hardware, tools and notions of every kind, cotton, sheeting, prints, and cheap light-weight woolen goods. In fact, I can only say that I do not know what will not sell. We want paper and stationery of every kind, varnishes, felt shoes, wooden-ware, gloves and blank books. We have recently had the largest shipment of manufactures from the United States ever landed here, and although the prices charged were outrageous they met with a wonderfully quick sale. Lamps which are sold in New York at 85 cents were sold here at \$3 net, and I disposed of 200 in a couple of days."

The Brazil Trading Company, which was incorporated in Baltimore during the week, proposes to carry on a general shipping and commission business, importing and exporting merchandise of almost every description. The new company will procure and prepare for the market seeds, fruits and other products of the two countries, including coffee, wheat and corn. It proposes to establish an agency in Brazil for the sale and exchange of these commodities. It will ship to or from any port most convenient. If the business at Baltimore can be expanded sufficiently, a line of steamers may soon be established between this port and Rio. The present trade of Baltimore with Brazil is conducted almost wholly in sailing vessels. New York and Chicago capitalists are interested in the new company. It is contemplated to increase the capital stock from \$50,000 to \$500,000, as the requirements of the case demand.

The latest dispatches from La Paz, Bolivia, show that one more move has been made toward the

building of the international railroad which will run through the whole length of the two Americas. It is stated that Messrs. Thomas Ogden Osborn & Co., the contractors for a railroad in the Republic of Paraguay, are petitioning the Bolivian government to grant them permission to extend their line from the right bank of the Paraguay River as far as Sucre. That extension would connect the two neighboring Republics still more closely and develop their internal commerce, while it would open to Bolivia an easy communication with the Atlantic coast. Since the end of the Chilean war, which resulted in snatching from Bolivia her port of Antofagasta, on the Pacific, she has had no outlet for her products toward either the Atlantic or the Pacific. The Bolivian Minister of Commerce, after having discussed the question with General Osborn, has prepared a plan which will soon be presented to the Chamber. The proposed railroad, whenever constructed, will be a long and important link of the railroad which, sooner or later, will probably unite the United States with all the republics of the Southern Hemisphere.

American manufacturers, sending goods to a foreign market, should, when directions or warnings are necessary to the proper use of such goods, as well as for the purpose of advertisement, use the language of the foreign market. As a warning instance, can be mentioned, as pointed out by *The Nation*, the case of a well-known brand of canned corned beef, each can of which has printed upon it, in English, a warning to the effect that the meat should not be allowed to remain in the can after it is once opened. In Germany, this American canned corned beef is sold by the slice, from a five or ten-pound can, using the can in the meantime as a convenient receptacle for the meat until it is sold. As neither German buyer nor seller can read the English warning against this practice, the moral responsibility for any accident arising therefrom must fall upon the American manufacturer. Children's toys and games, of American make, offered for sale in Germany with only English explanations, and specially those American labor-saving articles, patent sweepers, ice cream freezers, apple parers, etc., are sometimes rendered ineffectual through their improper use, which too often arises from a lack of proper explanation in a language comprehensible by the user.

Agricultural implements in British Guiana, according to a consular report, differ greatly from those in use in the United States. A few steam plows have been introduced, but meet with little favor. The work is still, as in past generations, done by hand, hence the necessity, for exporting manufacturers, of adapting the implements to that mode of cultivation. The principal tools are the hoe, the cutlass and the four-pronged fork. Among several patterns of the shovel, the shape of that distinctively known as the "Demerara shovel" is convex on the back and concave on the front or upper side; in other words, a section of a hollow cylinder, with a socket attached for the long wooden handle to be inserted when in actual use. A variety of this, known as the "shovel spoon" is also used for special purposes, differing from the ordinary shovel chiefly in being of greater convexity, rendering the transverse diameter proportionately shorter, the length, also, being somewhat less, and the lower corners rounded. The varieties of the hoe in use do not differ materially from those employed in the United States, unless, perhaps, in being generally lighter, the average weight being about 1 pound and 12 ounces. The cutlass, or machete, has a blade from 18 to 22 inches in length, with a socket handle of  $4\frac{1}{2}$  or 5 inches, in which a longer wooden handle may be inserted if necessary, though this is rarely used. The blade is about 1 $\frac{3}{4}$  inches in width near the handle, widening to 2 $\frac{3}{4}$  inches or more toward the point, in approaching which the cutting edge, nearly straight throughout the greater part of its length, rapidly curves, giving the whole implement some resemblance to the Malay kris, though longer, thinner and lighter. It is used for cutting canes and a variety of other purposes. These articles are all manufactured in the midland counties of England. American manufacturers might, however, find it to their advantage to enter into competition with the British in this industry, just as it has resulted in the case of the Collins axes, which have well-nigh, if not entirely, superseded all others for the use of the wood cutters in the forests of this colony. Specimens of the above-mentioned implements of the patterns and sizes most in demand can be obtained and forwarded for the use of the government or the manufacturers.

W. J. Griffin, of the U. S. Commercial Agency at Limoges, France, is authority for the following statements regarding the prospects of exporting agricultural implements to France. The demand for mowers, reapers and binders is great, and as the French and English machines are fully one-third heavier, and of a poorer construction as well as workmanship than those of American make. The difference of about \$5 in price between the former and the latter can scarcely be a serious obstacle to the introduction of the American article. A good tedder would be a boon to French haymakers, and find

a ready market. American horse rakes ought to be tried also, as they are easier to work and cheaper than those in use now. American hand tools are sold in large quantity, as they are better made, lighter, and have better wood in the handles. The style of scythe generally used has a very short, heavy blade, somewhat like the kind employed in the United States for cutting brush. As to hay presses, almost entirely unknown in France, it will take time and care to introduce them, but ultimate success of such an attempt is almost sure. Drills of an inferior order, with limited and imperfect facilities for sowing all kind of grain, are already introduced into France from England. It is certain that machines which will sow any kind of grain, and at the same time have attachments for sowing chemical fertilizers and grass seed, have an advantage over heavier machines that do not sow regularly and are liable to soon get out of order. The Planet Horse Hoe and Cultivator Company, of Philadelphia, took the only prize awarded at the agricultural implement show at Perigueux last summer, a proof that the outlook for American cultivators and horse-hoes in France is excellent. Garden tools, especially spades and shovels, are in demand, the long-handled being generally preferred. Those with rounded edges are mostly in favor, but all are used. Barbed and ribbon wire has of late been successfully introduced from England. All kinds of small tools, as hoes, potatoe diggers, garden rakes, spades, etc., can easily find a market in France. But it is a general and indispensable condition, too often lost sight of in the United States, that "Americans must sell American machinery." As an instance in point may be mentioned that a certain machine manufactured in America was put on the French market five years ago, during which period not a dozen were sold, although it was placed in the hands of one of the best French houses. Last year the factory sent over an American who could not speak French, but who could show off the machine to its best advantage, and this year 500 machines have been sold, and there is a good demand for more.

OUR COMMERCE WITH BRAZIL.—Patterson, Ramsay & Co., of Baltimore, Md., have established the Maryland Line of steamers to ply between Baltimore and Brazil. The first steamer, the "Elvasion," a British vessel of 3,000 tons, sailed on the 25th ult. Steamers will be run monthly or oftener, as the business warrants. During the year ending June 30th, 1890, we bought from Brazil \$59,000,000 worth of her products and sold her \$11,000,000 worth of ours. The articles sent to that country were there mostly subject to heavy duties. Of the articles received, more than \$57,000,000 in value were admitted to this country free of duty, and less than \$2,000,000 were dutiable. The chief imports were coffee and rubber, both free. The value of the former was \$45,000,000; of the latter \$3,000,000. The imports of hides and skins (also free) amounted to more than \$2,000,000. Sugar was the leading dutiable import, the receipts amounting to \$1,600,000. Our largest exports to Brazil were flour, wheat and lard, the figures being \$3,300,000, \$1,600,000 and \$1,500,000. Besides these, we sold the Brazilians nearly \$300,000 worth of illuminating oils, \$350,000 of cotton goods, \$450,000 of lumber, \$378,000 of bacon and \$70,000 of pickled pork, \$377,000 of locomotives and \$347,000 of cars. The diplomatic consular report made to Parliament in 1889 contains this statement:

The United States of America take much over half the coffee export of Brazil, over half the india-rubber, fully half the hides and horns and about two-fifths of the sugar crop, altogether about half the entire exports; while the imports into Brazil from the United States barely reach one seventh of the total, the remainder being paid via Europe instead of direct export of products.

In 1888 there were entered at the port of Rio, not counting goods admitted free, \$25,000,000 of imports from Great Britain, \$1,000,000 from France, \$7,000,000 from Germany and \$1,000,000 from the United States.

The immediate transportation act, under which imported merchandise is forwarded in bond to interior ports without appraisement at the port of original entry, was enacted in June, 1880, and under it there have been transported goods of the following invoiced value in each fiscal year ended June 30th, the parallel column giving the value of the total merchandise imports each year:

Year.	For immediate trans- portation.	All mer- chandise imports.
1881.....	\$14,519,000	\$642,664,000
1882.....	21,410,000	724,639,000
1883.....	26,289,000	723,180,000
1884.....	27,896,000	667,697,000
1885.....	28,591,000	572,527,000
1886.....	29,255,000	654,436,000
1887.....	37,017,000	692,319,000
1888.....	33,929,000	733,907,000
1889.....	41,221,000	743,121,000
1890.....	45,318,000	789,310,000

The number of ports to which the law applies was in 1881 nine ports of entry and 23 ports of destination, against 21 ports of entry and 54 ports of destination in 1890. Of the above \$45,318,000, \$29,200,000 entered at New York and \$16,100,000 at all other ports the past year, and of the same there was \$13,400,000 forwarded to Chicago and \$31,700,000 to all other ports.

## INDUSTRIAL NOTES.

The Crane Iron Company, at Allentown, Pa., on March 1st reduced the wages of its employes 10 per cent. Trade depression and low prices of Bessemer iron are the causes assigned.

The Baltimore & Ohio Railroad Company is contemplating the building of 100 refrigerator cars, also 500 hopper bottom gondolas. The latter has the unique features of a hand rail on top of the high sides and a running board along each side.

The Russell Wheel and Foundry Company, of Detroit, Mich., has received the contract for furnishing 353,000 pounds of cast iron and 94,000 pounds of wrought iron for use on two movable dams in the Great Kanawha River. Their bid was \$11,750 50.

Mr. H. B. Cragin, agent of Washburn & Moen, the barbed wire manufacturers, of Massachusetts, announces officially that the company has purchased between 800 and 1,000 acres of land adjoining the town of Waukegan, Ill., a few miles north of Chicago, and will begin work on its manufacturing plant there this spring.

The Pennsylvania Steel Company, Steelton, Pa., will, it is stated, nearly double the capacity of the frog, switch and signal department in the near future. The company has recently started a bridge and structural department, which has been placed under the management of Charles E. Billin, who was in charge of similar work at the Pencoed Iron Works.

The Wagner palace-car shops, at Buffalo, N. Y., are to be enlarged by the erection of a new shop 140 x 458 feet, having accommodations for 23 tracks. The building is to be of brick and stone, and will cost about \$60,000. Operations will begin at once, and the shop is expected to be completed by July 1st, when the company will have 68 tracks under roof.

The State of Nuevo Leon, Mexico, has exempted from state and municipal taxation for seven years a brick manufactory, to be established near Monterey by three Americans. The company must begin work within two years and turn out daily 25,000 bricks. Manufacturing, under the liberal treatment accorded new enterprises in Nuevo Leon, is making gratifying advances.

The American Projectile Company, it is said, will be organized by the directors of the Thomson Electric Welding Company, with \$500,000 capital, to manufacture shells for army and navy use. The Thomson Electric Welding Company is to be paid \$250,000 of the stock for its patents and exclusive use of the welding process in the manufacture of shells in the United States. The remaining \$250,000 stock is offered to the stockholders at par.

Our Consul at Rome, Italy, reports to the State Department that a national Italian exhibition will be held at Palermo, from November 1st, 1891, to May 31st, 1892, and that there will be in the exhibition an international section for engines, machines and tools adapted to small industries. The Director of the Exhibition states that he would be much pleased if American manufacturers would avail themselves of the opportunity to exhibit their productions.

It is reported that the great table glassware trust, recently incorporated under the laws of Pennsylvania as the United States Glass Company, recently induced the five flint glass factories of Findlay, O., to enter the combine, which will go into operation with the beginning of the next fire. The five houses employ about 800 hands, and are among the most important in the country. They are known as the Columbia, the Model, the Bellaire, the Findley Flint and the Dalzell, Leighton & Gilmore.

On the 2d inst. executions aggregating \$44,345.42 were issued against Jacob K. Spang, proprietor of an iron furnace located near Lenhartsville, Pa. They were issued at the instance of Robert Bland, of this city, as trustee, for \$31,020.42, and for Mr. Bland, for the trust estate of Martha Stein, nee Lerch, now of Erie, Pa., under the will of George Lerch, deceased, for \$13,325. One-half interest in the furnace and property connected with it at Lenhartsville was purchased by Mr. Spang about seven years ago at the rate of \$35,000 for the whole. Connected with the furnace are between 200 and 300 acres of land, a grist mill, and about 15 dwelling houses. The furnace is still in operation.

The Malleable Castings Company organized in Ohio, it is reported, has united important foundry interests in Cleveland, Chicago, Indianapolis, and Toledo. The company has a capital of \$3,000,000, with headquarters in Cleveland. The officers are: A. A. Pope, of Cleveland, president; E. I. Whittemore, vice president, and O. K. Brooks, of Cleveland, secretary and treasurer. The management of the new company emphatically states that it is not a trust nor pool of different interests, but merely the marshaling of four foundries owned by substantially the same men into one general company.

## SOUTHERN INDUSTRIAL NOTES.

(From our Special Correspondent.)

The Pell City Pipe Works, at Pell City, Ala., are being rapidly completed, the main building having been almost entirely finished.

The Shelby Rolling Mill at Helena, Ala., is now being repaired, and will be set in operation in a very few days. It was considerably damaged by a recent cyclone passing over that place. The mill has been idle for nearly two months.

The Glass Works at Tallapoosa, Ga., have been recently overhauled and repaired under the supervision of Mr. A. E. Finkell, and is now one of the best equipped plants in the country. The factory started up on the 18th of February, and now there are nine shops in operation. There are employed in and about the factory over 80 men.

The Richmond Locomotive and Machine Works, of Richmond, Va., has secured the contract for furnishing the cylinders for the two ships of the Morgan Steamship Company, now building in the Newport News dry dock. Single triple expansion engines will be used in these ships. The six cylinders will weigh about 70 tons.

A claim of \$67,000 held against the Macon (Ga.) street railway by the Thomson-Houston Electric Company fell due, and was not able to be paid, on the 2d inst. The Thomson-Houston Company, through its attorneys, have presented a petition to the Superior Court of Bibb County asking for the appointment of a receiver. Major E. E. Winters has been appointed temporary receiver and the road will doubtless be sold at an early day.

The new furnace of the Rome, Ga., Iron Company has been about completed. It is located at New Rome, on the East Tennessee, Virginia & Georgia Railroad, about two miles south of the city. The Chattanooga, Rome & Columbus Railroad also runs near the furnace, over which the red ore will be hauled from Dirt Seller Mountain to the furnace. It is intended to go into blast about the last of March. The plant is one of the best in the South, and the furnace will have a capacity of 80 tons per day; the capital stock is \$300,000, mostly owned by Lyerly & Colyer, of Chattanooga, Tenn. It is understood that two more furnaces will be erected at an early day.

**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 in this column can obtain their addresses from his office. No charge will be made for these services.

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

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

**GOODS WANTED AT HOME.**

2,086. Boiler and engine; also a freight elevator, shafting, pulleys, belting, etc. District of Columbia.

2,087. A 35 horse power boiler, and a 25 horse-power engine. Alabama.

2,088. Pug mill, clay crusher, pulverizer and other clay-working machinery suitable for terra cotta and front brick. Alabama.

2,089. Chemicals, such as Baryta, Manganese, Cobalt, etc. Alabama.

2,090. Machinery for a planing mill, door, sash and blind factory. Georgia.

2,091. A road grader. New Jersey.

2,092. A portable house. New Jersey.

2,102. Five to 7 H. P. vertical engine and boiler; 20 H. P. Buhr stone corn mill; 14 to 18 H. P. planer and matcher and molder. Florida.

2,103. Good second-hand power lathe; 18-inch swing. West Virginia.

2,104. A lathe outfit. Tennessee.

2,105. One-arm sander, one 30-inch resaw, one 4-inch molder, one single-headed tenoner and a No. 2 mortiser. Virginia.

2,106. A small amalgamator of sufficient capacity to handle from one to ten pounds of ore. Minnesota.

2,107. Engine, boiler and everything to equip a first-class incline at Lookout Mountain. Tennessee.

2,108. Two miles 30-pound steel rails, spikes and plates necessary to lay the same. Georgia.

2,109. One standard locomotive. Price f. o. b. Wenona, Georgia.

2,110. An apparatus for heating a house and a conservatory. Tennessee.

2,111. Bids, estimates, etc., for the construction of a complete system of water-works. Georgia.

2,112. Machinery for a complete plant for gold mining. South Carolina.

2,113. Complete plant for hydraulic gold mining. South Carolina.

2,114. Water wheels for mining purposes. South Carolina.

2,115. An overshot water wheel, of cast iron, shaft and the other machinery necessary to run a cotton gin and grist mill. Water wheel to be about 20 feet in diameter. South Carolina.

2,114. Electrical outfit for 200 sixteen candle-power incandescent lights and 2,000 ten to fifteen candle-power arc lights and wiring; want but one dynamo. North Carolina.

**AMERICAN GOODS WANTED ABROAD.**

2,083. Chaser mills for pulverizing materials of several kinds. Canada.

2,084. An importer and dealer in mica, asbestos, graphite and rutile desires to enter into correspondence with miners and producers of these minerals with the object of buying their products. Belgium.

2,093. A good second-hand mill for free silver ore, wet crush, 5 or 10 stamps. Mexico.

2,094. A brick machine, to be driven by belt from steam engine, for at first making common brick, and afterwards for bricking fine ore and flue dust, preparatory to its being smelted in a blast furnace. Mexico.

2,095. A lot of water pipe and fittings. Mexico.

2,096. Tools for cutting and threading pipe and bolts. Mexico.

2,097. Shovels.

2,098. Wheelbarrows. Mexico.

2,099. Scales for weighing cars, wagon platform, wheelbarrow and charge scales. Mexico.

2,100. Blacksmith tools. Mexico.

2,101. Boilers and engines. Mexico.

**GENERAL MINING NEWS.**

**ALABAMA.**

**COAL.**

The Mexico Coal and Steamship Company, composed of New York capitalists, is reported to have about completed arrangements for the shipment of Alabama coal to points in the interior of Mexico; the mineral is to be sent from Pensacola by Corpus Christi, Tex., and thence to its destination over the Mexican National Railway, which runs to and beyond the City of Mexico. The Louisville & Nashville railroad for the transportation of coal from the mines to the seaboard at Pensacola has named acceptable rates and gives the use of its coal docks to the company. Satisfactory terms have also been made with the Mexican National Railroad, and it is given out that the first cargo in the new trade will be shipped within two weeks. The company will own its vessels. They have already closed a contract for the delivery of 40,000 tons of coal to Mexican parties, and expect to ship 100,000 tons before the close of the year.

**MORGAN COUNTY.**

Great excitement and interest are shown in the oil development of Hartsell's. Investments in real estate are being made rapidly. Over \$5,000 worth of real estate is said to have changed hands within the past two or three days. The arrival of machinery for boring an oil well was made the occasion for general festivity and work will now be pushed as rapidly as possible.

(From our Special Correspondent.)

**THE MEXICAN COAL AND STEAMSHIP COMPANY.**—This company, composed of New York capitalists, has made arrangements for shipping Alabama coal to the interior of Mexico. It will be sent from Pensacola to Corpus Christi, Tex., thence to its destinations over the Mexican National Railway. Satisfactory terms have been made with the Louisville & Nashville and Mexican railroads, so that the shipment will commence at once. The company owns the vessels employed in the transportation, and expects to ship 100,000 tons of coal by January 1st, 1892, of which over 40,000 have already been contracted for.

**JEFFERSON COUNTY.**

**THE DEBARDLEBEN COAL AND IRON COMPANY.**—Twenty-five coke ovens are being added to the large number already belonging to this company. The new ovens are on the Birmingham Mineral Railroad near Johns. A large number belonging to the same plant have been recently built, and it is expected will start up as soon as the new ones are completed.

**LAWRENCE COUNTY.**

**GOYER OIL COMPANY.**—Well No. 1 of this company was shot on the 26th inst. with nitro-glycerine and the flow was increased from 25 to 40 barrels per day; it produces 33% illuminating fluid of 150° test and 12% lubricating oil. The prospects for a large production of oil in this section are very good.

**MORGAN COUNTY.**

**MORGAN COUNTY ASPHALT, OIL AND GAS COMPANY.**—This is the second company that has been formed for the purpose of developing the oil fields of Morgan County. It has 2,000 acres of land, which will be developed immediately, the machinery having already arrived.

**CALIFORNIA.**

**NEVADA COUNTY.**

**SIERRA BUTTES MINING COMPANY.**—This company has ordered lumber to rebuild the mill at No. 7 tunnel and is repairing its flume preparatory for resumption of work in the spring. The company has leased a portion of the water of Packer Lake to Mr. Berger, to be used in running his 10-stamp quartz mill.

**YOUNG AMERICA MINING COMPANY.**—The stamp mill has been shut down for a month for repairs, some of the shafting needing straightening. It had been running almost continuously for more than five years.

(From our Special Correspondent.)

**SAN FRANCISCO, Feb. 26.**

Reference has already been made in the ENGINEERING AND MINING JOURNAL to a bill introduced in the State legislature prohibiting transactions in the capital stock of corporations in any stock exchange. Senator Williams, the author of this bill, has just introduced a second, dealing specially with the sale of stock on margins. Both these bills have passed the first reading.

Senator Campbell has introduced a bill providing that it shall be the duty of every secretary of every mining corporation formed under the state laws, and the secretary of any other mining company doing business in this state, to keep a complete set of books fully showing all the operations of the corporation, which shall be subject to the inspection of every stockholder. The act, however, is to apply only to corporations, the capital stock of which has been, or shall be, listed at a stock exchange in this city, or which are regularly bought and sold in the stock market of this state.

Senator Campbell has introduced another bill providing all elections must be by ballot, and every stockholder shall have the right to vote in person or by proxy the number of shares owned by him. The proxy must be in writing, duly executed and acknowledged by the bona fide owner of the stock at the time of such election. Whether the same shall at the time of said election stand on the books of the corporation in his name or the name of some other person, said bona fide stockholder shall have the right to vote such stock for as many persons as there are directors to be elected, or to cumulate said shares and give one candidate as many votes as the number of directors, multiplied by the number of his shares of stock shall equal; or to distribute them on the same principle among as many candidates as he shall think fit. In corporations having no capital stock, each member of the corporation may cast as many votes for one director as there are directors to be elected, or may distribute the same among any or all of the candidates. It will be readily understood that, with the law amended as above, the plan which has hitherto obtained of stock being handed over by the brokers to manipulators to enable them to re-elect themselves, or do anything else they may deem fit, will be at an end.

Similar bills were introduced at the last session of the Legislature, but were defeated. Senator Campbell's bills are upon the file for their third reading.

**PLUMAS COUNTY.**

The suit instituted over five years ago by C. M. Fry and A. F. Higgins against the California Land and Timber Company, an insolvent corporation; the Sierra Valley and Mohawk Railroad Company, the Huntington-Hopkins Company and several other individuals, was decided during the past week in the United States Circuit Court, a decree in favor of the complainants being rendered. The suit was commenced to foreclose a mortgage on an immense acreage of timber and mining lands, saw-mills and mining plant in Plumas and Lassen counties. The California Land and Timber Company mortgaged the property to secure an indebtedness of \$300,000.

**COLORADO.**

The State Senate, on the 28th ult., unanimously passed a World's Fair bill appropriating \$150,000.

Mineral surveys approved by the U. S. Surveyor General of Colorado, for the week ending February 28th, 1891: Survey No. 6,739, land district Durango, name of claim Matchless; No. 6,655, Leadville, M. H. Rice, Loring Ritchie and Mule Shoe; No. 6,857, Leadville, Altoona, Copper King, Rose and Josephine; No. 6,835, Del Norte, Trap, Dillen, Prospect, Flag and Evergreen; No. 6,864, Leadville, Silver Horn, Chloride No. 2, and Fellmore; No. 6,848, Central City, Golden Age No. 2; No. 6,723, Leadville, Kimberly and Kimberly No. 2.

**CHAFFEE COUNTY.**

**SEDALIA.**—The lower tunnel of this copper mine, said to be run in just below the tramway, has attained a total length of 577 feet, and will soon intercept the vein. This will greatly facilitate the handling of the ore, and enable the shipments, which are now in the vicinity of 300 tons per month, to be very largely increased.

**CUSTER COUNTY.**

**PHENIX LEAD COMPANY.**—The Bull-Domingo concentrator, after several weeks' idleness, leased by the cold weather, started up last week. The mill is piled full of galena ore of good grade, and it is expected that the present run will be very profitable; the new ore body in the mine is said to be immense and the quality never before equaled.

**GILPIN COUNTY.**

**HUBERT MINING COMPANY.**—This company will resume work in its mine in Nevada district during the current month with a full force of miners. Recent development work made at a point 950 feet below the surface shows that the mill dirt has an average yield of five ounces gold per cord.

**NEW CALIFORNIA MINING COMPANY.**—A cage is to be put in the main shaft of the California mine, and it is also to be equipped with a large Cornish pump. The shaft is now over 2,100 feet in

depth, and at the 2,100-foot level good ore, both milling and smelting, has been found. The latter class of material yields \$177.50 per ton, and the stamp-mill dirt is giving satisfactory and profitable returns.

**NEW GREGORY MINING COMPANY.**—The property of this company has been leased to a syndicate of Denver capitalists, who have already taken possession. A small force of miners has been put at work in the incline shaft in arranging for deeper development work. The mine will be worked through this shaft. Operations will be commenced on the 1,200-foot level. The syndicate has an ample amount of capital at its command to prosecute development work on this heretofore productive property, which embraces a large number of well known and defined veins, all of which are so located as to be worked through the incline. Hon. J. W. Bostwick, of Denver, will manage the property. The owners of mines adjoining are much elated over the fact that the property will start, for the immense pumping plant of the Bobtail seems to drain all of the adjacent properties.

**RIALTO MINING COMPANY.**—This company has leased the Cashier stamp mill in Black Hawk, and the mill ore taken from the mine will be crushed by the company instead of at custom mills, as heretofore. The mill was fitted up some months ago, and is in good condition for doing good work. In driving the lower level east of the shaft, recently, the rich ore chute found in the adit workings of the mine was struck.

#### GUNNISON COUNTY.

**FAIRVIEW MINING COMPANY.**—A rich strike is reported to have been made in this mine recently at the foot of the incline, which is now down 345 feet from the surface. The ore is galena. The vein is from 12 to 14 inches in width. The mine is showing better than ever as work progresses, and has been shipping on an average of four cars of ore per week during the past winter and will increase this output shortly. There are now several cars of ore in the ore-house ready for shipment as soon as the road, which is blocked with snow, can be opened. This mine has about 1,278 feet of development in levels and inclines, and now has more ore in sight than ever before. About 37 men are at present employed.

#### LAKE COUNTY.

**BREECE MINING COMPANY.**—This company is shipping about 100 tons of iron ore per day, which is broken in the upper deposit. A station is being cut at the 470-foot level in the shaft, and preparations are being made for further sinking.

**SYNCLINAL MINING COMPANY.**—A strike has been made in the Blind Tom, in a drift run southeast from the shaft at the 420-foot level. It is reported to be looking so well that negotiations are pending for a heavy plant of machinery to go over the shaft. The ore streak is steadily opening out as development proceeds, and there seems to be no doubt that a portion of the ore body opened in the McKeon mine of the Iron Silver Company has been uncovered.

#### SUMMIT COUNTY.

**GREAT HOPES.**—An important strike is reported to have been made in this mine, which is located on Sheep Mountain, at Kokomo, adjoining the old Snow Bank and Michigan mines. The ore was found at the outcrop of the vein, which is a contact between shale and limestone, and samples have assayed as follows: First-class, 192 ounces of silver, 43% lead, 1½ ounces of gold; second class, 37 ounces of silver, 25% lead and 7-10 ounces of gold. The vein has now been opened to a depth of 17 feet, and the ore seems to improve. It has been uncovered at six different places for a distance of 300 feet. Shipments to Leadville from the new strike have already been commenced.

#### FLORIDA.

(From our Special Correspondent.)

**STANDARD PHOSPHATE COMPANY.**—This company has been incorporated at Ocala, Fla., by W. L. Trimble, J. H. Porter, A. J. Orme and others, with a capital stock of \$2,000,000. The company proposes developing phosphate mines in Marion, Levy, Citrus and other counties.

#### GEORGIA.

(From Our Special Correspondent.)

On the 2d inst. a petition was filed for charter of the Atlanta Mining & Stock Exchange by Jno. Stevens, D. G. Wylie, Jas. F. O'Neill, M. C. Stoner, R. M. Hardman, Paul Faver, D. P. Stewart and R. D. Mann. The object for which said corporation is formed and incorporated is for maintaining a mining and stock exchange in the city of Atlanta, for the mutual convenience of those engaged in the business of dealing in mines, mining stocks and other securities in that city and elsewhere. The amount of capital stock to be employed by them, 10% of which is paid in, is \$50,000, with the privilege of increasing the same, in a manner to be prescribed by the by-laws of the corporation, to a sum not exceeding \$500,000, divided into shares of the par value of \$100 per share.

#### CHEROKEE COUNTY.

It is said that arrangements were made on February 26th by which a large section of gold-bearing territory in the northern part of this county and the western part of Dawson County was consolidated for development. The consolidated property consists of a mineral right on 3,000

acres of land lying on both sides of the Etowah River, including the bed of the river. The property is situated near the Franklin mine, which has been successfully operated for several years. It is claimed that the Franklin vein runs through the consolidated properties, and that its outcrop has been traced.

#### WHITE COUNTY.

**HAMBY MOUNTAIN GOLD MINING COMPANY, LIMITED.**—Mr. W. Sandall Mappin, Managing Director, has just arrived from London for the purpose of looking into the affairs of this company. Its property at present consists of the Parks, Nacoochee, Frazier, Asbury, Reynolds and the Richardson mines. The company was stocked at \$1,500,000. At present the company is financially embarrassed and it is understood that its properties will be consolidated with other adjoining properties and the new company stocked at \$250,000.

#### INDIANA.

A company headed by D. J. Mackey, the railroad man, of Evansville, is reported to have leased 3,000 acres of land in the Daviess and Martin counties, on both sides of the Evansville & Richmond Railway. The roadbed is said to be underlaid with canal coal beds. It is expected that the mines will be developed on a large scale.

#### KANSAS.

A special report shows that during the week ending February 28th the output of ore from the mining districts of Galena and Empire City was: Rough ore, pounds milled, 1,794,630; zinc ore, pounds sold, 743,830; lead ore, pounds sold, 122,830. Sales aggregated a total value of \$10,509.

#### MONTANA.

##### DEER LODGE COUNTY.

**GRANITE MOUNTAIN MINING COMPANY.**—On returning to St. Louis from his recent visit to the mines, President Rumsey is reported to have assured a newspaper representative that both the Granite Mountain and Bi-Metallic properties were looking well. In No. 13 tunnel, east of the Granite Mountain, the vein is 22 feet wide, and the ore assays 25 ounces. The vein is narrowing up, and as it decreases in width it improves. Narrowing to five feet, it ran from 50 to 200 ounces, 18 inches on the foot wall going 200 ounces. In the eighth level of the Bi-Metallic there is a vein 15 feet wide, 8 feet of the ore assaying 60 ounces. In speaking of the cause of the decline in the price of the stock, he said the decline in the price of silver had something to do with it. The company is at present working the upper stopes to close them up. The ore in these stopes is low grade, but the stopes have had to be worked in order to save the ore, and, as a consequence, the output has been materially reduced. President Rumsey thinks as soon as work is resumed on the lower levels the output will reach former records. The report is current at Phillipsburg that the John Mitchell mining claim, south of that camp, has been sold to the company for \$60,000 cash. The owners of the claim were Lawrence Donelan and Thomas F. Hynes. The property has been bonded for the past couple of months to Mr. Goff of Helena, it is supposed in the interest of the Granite Mountain Company. The John Mitchell is located between the San Francisco Company's property and the Silver Chief.

#### MISSOULA COUNTY.

**IRON MOUNTAIN MINING COMPANY.**—This company has declared its fourth dividend of \$25,000, five cents a share, making a total of \$100,000 up to date, and is shipping more ore than at any previous time in its history. A tunnel is being driven as rapidly as machine drills and men can do so. It is now in about 600 feet and will penetrate the ore chute by May 1st about 600 feet from the surface. Three ox teams are constantly employed transporting the first-class ore from the mine to the railroad, a distance of six miles. The product is about eight tons daily. Large quantities of concentrating ore are accumulating on the dumps, which will necessitate the erection of a concentrator. The shipping ore from this property averages over 100 ounces silver and between 55% and 60% lead.

#### MICHIGAN.

##### OPPER.

**ATLANTIC MINING COMPANY.**—The product of this company's mine for February was 195½ tons of mineral, as against 227½ tons for January, making 423½ tons produced since January 1st, against 382½ tons in 1890, an increase of 40½ tons.

**CALUMET & HECLA MINING COMPANY.**—During February this company produced 3,215½ tons of mineral, against 3,545 tons during January, making 6,760½ tons for the two months, against 6,346 tons in 1890, an increase of 414½ tons.

**CENTENNIAL MINING COMPANY.**—The contract for the solid bed and mortar for the stamphead in the new stamp mill has been given to E. P. Allis & Co., of Milwaukee, the contract calling for delivery on April 10th. The contract for the stamp shaft and machinery has been let to the Lake Superior Iron Works, at Portage Lake. A portion of this work is now finished, and by the opening of navigation the stamp mill will be nearly ready for operation.

**NATIONAL MINING COMPANY.**—A letter from Agent Vivian says that this company's mine shipped a carload of mass and barrel copper, 35,993

pounds, to the smelting works February 25th. The drifts at the thirteenth level are well under way and showing some harrel copper, but not extra rich. He expects to find rich ground west of the shaft within 100 feet of drifting. He also expected to get the skip down to the bottom March 2d and sink balance of the thirteenth level started before the 10th. In the winze sinking below the twelfth level the vein is producing some harrel copper, and has a very favorable appearance for making masses, when stoping is started from the level below. The stopes in the back of the twelfth level are showing barrel work and small masses. Some good pieces of barrel copper are being taken out of the fissure vein between the eleventh and twelfth levels daily.

**OSCEOLA COPPER MINING COMPANY.**—This company has declared a dividend of \$1 per share, payable April 8th to stockholders of record March 14th. The last dividend was paid in December, and was \$1.50 per share, making \$4.50 for the calendar year of 1890.

**PENINSULA MINING COMPANY.**—This company's mine produced 60 tons of mineral in February, the same as for January. For two months it was 120 tons, against 162 tons a year ago, a falling off of 42 tons.

**QUINCY MINING COMPANY.**—The officials of this company have at last yielded to the demand for an explanation of the action whereby the Pewabic Mine was purchased. A circular addressed to stockholders, signed by Mr. Thomas F. Mason, president, says "the total cost, including all expenses of litigation which Messrs. Mason and Smith had conducted, and which had extended over a period of some seven years, was estimated at about \$800,000. After a full consideration by your board of directors, as there was not time to offer rights to stockholders, and it was impossible to realize promptly on the stock from open sale the amount of money needed, it was unanimously voted to accept the offer of Messrs. Mason & Smith to transfer the property to the company, in consideration of the issue to them of the 10,000 shares of increased stock, upon the delivery of a satisfactory deed. Your directors think this plan was the wisest and best that could, under the circumstances, have been adopted. With an increased capital of 25%, we will acquire additional mining territory, that not only insures longer life, but is expected soon to enable us to increase our product fully 50%, and at a cost, when all contemplated improvements are completed, that will compare favorably with that of any copper mine on Lake Superior. All of which it is hoped may meet the approval of the stockholders."

**QUINCY MINING COMPANY.**—This company's mine produced 445½ tons of minerals in February, against 451 tons in January, making 896½ tons produced since January 1st, against 626½ last year, an increase of 270¼ tons.

**TAMARACK JUNIOR MINING COMPANY.**—The drifts along the vein are in about forty feet on each side of the shaft, making about eighty feet that have been drifted. The vein rock is reported fully as rich in copper as the management expected to find it, and the miners say it is "looking very good." No equipment has been ordered yet, and probably none will be until summer, by which time the explorations on the vein will have more fully proven the wealth of the mine. No. 2 shaft, which is down about 2,000 feet, will take, it is said, another year to reach the vein.

#### MINNESOTA.

##### IRON.

Advices from the Lake Superior Region state it to be a conceded fact that the output for 1891 will not exceed 7,000,000 tons, against the 9,000,000 of last year.

The iron fields of Minnesota are the only ones which are being explored to any extent. On the Mesaba range a number of new properties have been stripped. The Mountain Range Iron Company has uncovered the ore body for a length of 700 feet and a width of from 60 to 75 feet. Shafts have been sunk 40 and 50 feet in ore. At the Buckeye mine, on this range, a shaft has gone down 190 feet, of which 155 feet is in ore, said to be 66% metallic iron, and the company has contracted with a Duluth machinery builder for a full hoisting and drilling plant of large capacity. Surveys are now being made to this mine by the Duluth & Winnipeg Railway Company, and a line 12 miles from the main road is to be built as soon as spring opens. At most of the mines, wages have been reduced 10%, and at many the force of men has been reduced one-half.

#### MISSOURI.

##### JASPER COUNTY.

(From our Special Correspondent.)

##### JOPLIN, March 2.

The cold weather of the past week rather interfered with the mining operations, but there was an average output and fairer sales of ore. There was a steady advance in the price of zinc ore, the maximum for extra grades being \$25.50 per ton, and the average price ruling strong at \$24.00. Lead advanced to \$24.50 per thousand. The miners and operators are anticipating a strong advance on zinc ore for this week, as the sale of 1,000 tons of zinc ore to Vivian & Sons, of Swansea, Wales, reported last week, has had the effect of stimu-



lating the ore market. Following are the sales of ore as far as reported:

Joplin Mines, 2,230,450 pounds zinc ore, and 166,272 lead; value, \$30,189; Webb City Mines, 1,104,610 pounds zinc ore, and 41,300 lead; value, \$13,976.50; Cartersville Mines, 1,076,500 pounds zinc ore, and 141,880 lead; value, \$16,117; Zincite Mines, 84,240 pounds zinc ore, and 5,140 lead; value, \$1,089; Lehigh Mines, 61,000 pounds zinc ore; value, \$750; Oronogo mines, 33,340 pounds zinc ore, and 9,120 lead; value, \$649.8; Galena, Kans. Mines, 742,830 pounds zinc ore, and 122,830 lead; value, \$10,509; Aurora, Lawrence County, Mines, 180,000 pounds zinc ore, 450,000 pounds silicate and 130,000 lead; value, \$8,390; lead and zinc helts, total output, \$81,670.30.

Pittsburg and Weir City spelter output: R. Lanyon & Co., 180,000 pounds; S. H. Lanyon & Brother, 96,700 pounds; Granby Mining and Smelting Company, 96,600 pounds; W. & J. Lanyon, 97,000 pounds; Weir City Zinc Company, 146,000 pounds; total, 616,000 pounds.

OSWEGO MINING COMPANY.—Holibaugh & Stealey, Mining and Civil Engineers, have just completed an expert examination and submitted a detailed report on this company's tract of land. It is understood that this report was prepared for parties in Europe who are becoming somewhat interested in the resources of this district. A synopsis of the report shows the tract of land to contain 751 acres, 200 acres of which are now within the corporate limits of the city of Joplin. The land has been operated by prospectors and miners on the surface deposits of lead and zinc ore for the past 15 years, but up to the present time no systematic plan of development has been followed. From its records it is found that the land has produced and sold lead and zinc ores to the amount of \$1,360,071.62, and not one-tenth part of it has yet been prospected, even.

SILVER BOW COUNTY.

BOSTON AND MONTANA CONSOLIDATED COPPER AND SILVER MINING COMPANY.—It is authoritatively reported that this company intends to make a further issue of bonds for the enlargement of the smelting works under construction at Great Falls, Mont. An issue of \$600,000 7s is being considered, but it does not appear that the precise amount has been irrevocably decided upon, nor is it true that the full plan of construction has been settled. One very important item, that of establishing an electrolytic plant, is said to be still under advisement. The company has purchased a large site at Great Falls, opposite the town, and has been preparing the ground for the foundations and superstructure, so as to admit of the handling of ores by the gravity plan. The grounds are so extensive that in time the company can take the ore as it is delivered from the mines at Butte and convert it into manufactured copper by providing the buildings and machinery. Present plans hardly reach so far as that. Captain Daniell, of the Tamarack and other mines, gives the opinion that the Boston & Montana mines can be made to yield easily twice their present output. The company, therefore, purposes to build larger works than it originally contemplated for the production of casting copper. Works of this description, with provisions for enlargement, will cost from \$1,000,000 to \$1,200,000. If the electrolytic plant is added, the cost will be materially higher; just how much is now being investigated. According to the Boston Herald the company finds a foreign market for all the copper matte which it can produce. The foreigners manufacture this matte in electrolytic copper, and are believed to be making heavy profits off the process. The Montana matte is sold so that the refiners have all the silver in matte where it runs less than 30%, and it is calculated that the silver thus saved will pay the cost of applying the electrolytic process. Why may not the Boston & Montana supply all of these processes and produce the next best grade to Lake Superior ingot, and save all the cost of triple handling, as well as the silver which it now loses? This is a question which the company is solving. It is estimated that the company lost \$300,000 a year for two years in this item of silver, which the electrolytic process would save. Call it \$200,000 and it equals 5% on \$4,000,000. The company has sold toward paying for the Great Falls plant \$500,000 7% bonds due February 1st, 1900, at 90, realizing \$450,000, of which it is believed that less than \$400,000 has been expended. The proposed \$600,000 7s at 90 would yield \$540,000 or \$990,000 for both issues. This money and a moderate levy upon current income would, it is estimated, pay for the works, except the electrolytic addition, which would have to be subsequently provided for. There are outstanding of the \$500,000 7s, due in 1900, \$477,000, and of the former issue of \$1,000,000 7s, due January 1st, 1898, \$755,000, a total of \$1,232,000. Add \$600,000 and there would be \$1,832,000 bonds outstanding. The interest on this amount would be \$128,240. The sinking fund requirement would be \$210,000, making \$338,240 a year, or less than one-third of the supposed present net earnings. The capital stock is \$3,125,000. Add \$1,832,000, as above, and the total debt and capital would be \$4,957,000. There is talk of selling the new bonds to shareholders, perhaps at a price to give a value to the subscription privilege.

NEVADA.

STOREY COUNTY—COMSTOCK LODE.

(From our Special Correspondent.)

SAN FRANCISCO, Feb. 26.

During the past week ore from Comstock mines was milled as follows:

	Tons.	Assay value.
Con. Cal. & Virginia.....	1,510	\$26.50
Chollar.....	550	18.00
Justice.....	190	17.27
Overman.....	427	15.31
Savage.....	500	14.10
Yellow Jacket.....	240	19.00

CONSOLIDATED CALIFORNIA AND VIRGINIA MINING COMPANY.—A general improvement is noted in the mine, and there is every probability of the grade of ore now being extracted being maintained for several months. On the 1,750-foot level a raise is being made on a vein of good ore which promises to yield well, and on the 1,200 foot level a raise is following an encouraging prospect. A drift is being run in a southerly direction from the old Consolidated Virginia Shaft, 1,100 level, to cut the upward extension of the ore found in the raise, but it will be some weeks before it can be reached. As the prospect is in a hock of unexplored ground any improvement at this point will be a most important feature.

UNION CONSOLIDATED MINING COMPANY.—Preparations are being made for the resumption of work in the Union shaft (owned by the Union, Sierra Nevada, and Mexican Companies) about the middle of March, by which time the hoisting engine is expected to be in condition.

NEW MEXICO.

GRANT COUNTY.

Charters have been granted to the Wilcox & Rocky Run Railroad Company (capital \$25,000), to extend nine miles, from Wilcox, Elk County, to a connection with the New York, Lake Erie & Western Railroad, near Hutchins, McKean County; and to the Emporium & Rich Valley Railroad Company (capital stock \$100,000), to extend ten miles from Emporium, on the Philadelphia & Erie Railroad, to the mouth of Elk Run.

ALPHA AND OMEGA.—Messrs. Carrera and Doheny, lessees of these mines, are reported to have uncovered large bodies of ore, which average over 20 ounces per ton in silver and \$2 to \$4 per ton in gold, with 12% to 16% lead.

MOUNTAIN KEY MINING COMPANY.—This company has completed the erection of an additional five stamp battery in its mill, making fifteen altogether. The addition was rendered necessary by the increase in the ore reserves of the mine. With 50 per cent. increase in mining facilities a large increase in production will be made.

PEERLESS.—This mine has been leased by Mr. James C. Woodward, and he is now engaged in getting the machinery in shape to pump the water out, when a new shaft will be sunk to reach the ore bodies that have been opened. The failures heretofore made in this property he attributes to extravagant methods in working, and is confident that he can operate it with success.

SILVER CREEK MINING COMPANY.—This company is operating the Little Fanny, Four Hawks and Sheridan mines. The latter two large chutes of ore are reported to have been uncovered recently, and a considerable amount of ore is already exposed. Two hundred tons of ore stoped from one of the new bodies have given good results, and the prospects of the company are considered good.

OREGON.

LANE COUNTY.

(From our Special Correspondent.)

SAN FRANCISCO, Feb. 26.

Recently Messrs. Frazier & Berry purchased 800 acres of land two miles south of Eugene, and started workmen to break the ground for planting. They had not worked long when rich croppings of coal were found. At once a gang of men was drafted to develop the find, and a shaft now having been sunk to a depth of 18 feet, a well-defined vein of what local experts pronounce to be pure anthracite has been uncovered. The vein is almost three feet in thickness, and widens considerably in its almost perpendicular dip.

TACOMA MINING AND MILLING COMPANY.—W. H. Reed, manager of this company, started last Saturday with provisions, etc., for the Blue River mines in the Cascade Mountains, 50 miles east of Eugene. The company has carried on work at the mines throughout the winter and will erect a ten-stamp mill early in the spring. An effort is being made to secure the co-operation of those interested to build a road from the mouth of the Blue River to the mines, a distance of seven miles, when communication would be much facilitated and cost of transportation of supplies reduced.

UNION COUNTY.

RED JACKET MINING COMPANY.—A telegraphic dispatch from Cornucopia tells of a heavy snow slide crushing down the cañon and utterly destroying the quartz mill belonging to this company. As the mill was shut down for the winter no lives were endangered, but as it was well equipped the loss will be heavy.

PENNSYLVANIA.

COAL.

W. J. Rainey, the Fayette County coal and coke operator, has filed a bill in equity in the United States Court against John McSloy, Patrick Mc-

Bryde, Peter Wise, C. M. Parker, Michael Disman, R. D. Kerfoot, Frank de Haven and J. B. Rae. He claims that the strike of February 10th was incited by the defendants, who afterward used every means to intimidate his men into joining the strike. Clubs and revolvers were flourished and threats made, and on February 25th a mob attacked his men. On February 15th one of the plaintiff's mines was fired by incendiaries. He asks that the defendants be restrained from congregating at his works and interfering with his men.

Four hundred more hands commenced work on the 4th inst. at the Park Place No. 1 Colliery of Riley & Co., at Mahanoy, which has been idle a long time.

It is stated that the strike of the Monongahela River miners, by which 10,000 miners and laborers have been thrown out of employment since January 1st, is now in a fair way of settlement. A meeting of the operators and shippers has been called for next Monday.

Advices from Uniontown say that Superintendent R. L. Martin, of the Fairchance Coke Works, has sworn out a warrant against District Master Workman Peter Wise for interfering with his men, who returned to work on the 26th ult.

The Schuylkill Coal Exchange report dated Pottsville, February 28th, shows the following collieries drawn to return prices of coal in February, 1891, to determine the rate of wages to be paid for work for the last two weeks of February and first two weeks of March: Ellangowan colliery, Philadelphia & Reading Coal and Iron Company, \$2.24; Locust Gap colliery, Philadelphia & Reading Coal and Iron Company, \$2.35; Girard colliery, Philadelphia & Reading Coal and Iron Company, \$2.28; Girard Mammoth colliery, Philadelphia & Reading Coal and Iron Company, \$2.33; Otto colliery, Philadelphia & Reading Coal and Iron Company, \$2.37.5. The average of these rates is \$2.31.56, and the rate of wages to be paid is 6% below \$2.50.

BIG MINE RUN.—This colliery, at Ashland, shut down on the 28th ult.

MOYER.—The underground workings of this mine are again reported on fire. Big volumes of smoke are issuing from the openings. The officials claim that the fire is due to incendiaries and accuse the strikers. The bodies of three men who are supposed to have been in the shaft at the time the fire broke out have not yet been recovered.

PENNSYLVANIA COKE WORKS.—An agreement with the strikers to go back at the old wages has been signed. It is thought several small operators will follow.

PHILADELPHIA & READING COAL AND IRON COMPANY.—Eight hundred men and boys have been given employment at Ashland and Mahanoy City by the resumption of work at the North Ashland and Tunnel Ridge collieries of this company.

OIL.

The Pennsylvania oil report for February gives the following figures: 253 wells were completed during the month just past, producing 6,618 barrels and 41 dry holes, against 310 wells, 13,364 barrels, and 46 dry wells the month before, and 410 wells drilling and 195 rigs up and building, against 407 drilling wells and 245 rigs in January.

TENNESSEE.

COFFEE COUNTY.

BUTLER LAND, OIL AND MINING COMPANY.—This company is about to drill for oil near Tullahoma. The par value of the company's shares has been placed at \$5. The following board of directors was recently elected: R. H. Richardson, M. R. Campbell, G. D. Buckner, W. M. Ross and J. D. Rahl.

UTAH.

SUMMIT COUNTY.

ONTARIO MINING COMPANY.—The No. 2 shaft is now completed, its depth being 1,525 feet. A station is being cut at 1,515 feet, leaving ten feet for a sump. There is said to be some doubt concerning the advisability of the plan of drifting on the line of the tunnel, and it may be that it will not be done. At any rate, it will not be commenced at present. The tunnel is now 6,200 feet in length.

FOREIGN MINING NEWS.

BRAZIL.

A company called "Companhia de Viaco Central do Brazil" has been organized to run two steamers and five launches on the river San Francisco, the most important branch of the Amazon. The steamers are 100 feet in length, have a carrying capacity of 40 tons of cargo, and accommodations for 16 first-class and 22 second-class passengers. This enterprise will open up trade along the margin of the river in the State of Bahia, a producer of coffee, sugar, cocoa, grain, cotton, wax, oil, rubber, etc.

ENGLAND.

According to reports from Durham, the eviction of the families of striking coal miners from the houses they occupied on the Marquis of Londonderry's and other property in the coal districts caused most intense excitement. During the course of the day occupants of eight houses who were turned out of their homes returned in a body and attacked the police who were on guard about

the buildings. The evicted tenants pelted the police with stones and hooted and yelled at the officers until the latter made a charge upon the strikers. During the furious fight which followed the police used their batons freely and the strikers retaliated with sticks and stones. Many persons were injured on both sides, and when the battle was over, and the police remained in possession of the field, numbers of wounded men were found lying by the roadside fainting and covered with blood.

#### GERMANY.

In the expectance of a general strike among the men employed in and about the coal mines of Germany, it is reported that the mine owners have come to the determination to form a federation similar to the Shipping Federation which is now fighting the striking dock laborers in England.

#### INDIA.

The Jherria coal field, which has recently been examined under the orders of government, says the *Indian Engineer*, is only 26 miles distant from the Bengal-Nagpur Railway, and a short line, starting from near Purul a, is to be built very shortly, in order that the field may be worked. It contains many million tons of good coal, which will be available for the locomotives of the new railway and to meet any demands that may be made from Calcutta.

#### MEXICO.

It is announced that the Illinois Central Railroad Company has decided to send agents to Mexico, Central and South America, to develop trade between those countries and Chicago, via New Orleans.

**SANTA JULIANA MINING COMPANY.**—This company has issued the following statement: It has been decided to redeem notes, to a limited amount, due April 1st and July 1st, 1892, at the same rate as offered for those due January 1st, 1892—that is, 40 shares of stock for each \$1,000 note. A large portion of the January notes has already been exchanged for stock, and many applications have come in to exchange the April and July notes, which, heretofore, were rejected. The general sentiment among the stock and note holders seems to be in favor of the plan adopted.

#### SOUTH AMERICA.

##### ECUADOR.

According to a recent consular report there is but one mine, the Zorenna gold mine, being developed at present in the republic. This is being operated by an English company; washed gold from the region beyond the Andes known as the "Napo," an unexplored country inhabited solely by Indians, is being brought in by them, however.

#### MEETINGS.

American Zinc Lead Company, at No. 57 Exchange street, Portland, Me., March 18th, at 2 P. M.  
Chollar Mining Company, at Room 79, Nevada Block, San Francisco, Cal., March 18th, at 12 o'clock noon.

Denver Natural Gas and Oil Company, at the office of the company, Room 1, 540 Lawrence street, Denver, Colo., March 10th, at 2 P. M.

Hale and Norcross Mining Company, at Room 58, Nevada Block, San Francisco, Cal., March 12th, at 10 A. M.

May-Mazepa Consolidated Mining and Milling Company, at Room 7, News Block, Denver, Colo., April 2d, at 10 A. M.

National Mining and Exploring Company, at No. 33 Wall street, New York City, March 12th, at 12 o'clock noon.

Potosi Silver Mining Company, at Room 79, Nevada Block, San Francisco, Cal., March 11th, at 10 A. M.

Sloss Iron and Steel Company, at the office of the company in Birmingham, Ala., March 18th, at 12 o'clock noon.

#### DIVIDENDS.

American Coal Company, dividend of three per cent., payable March 10th, at the office of the company, Room 152, No. 1 Broadway, New York City.

Bi-Metallic Mining Company, dividend No. 9, of 35 cents per share, \$70,000, payable March 10th, at the office of the company in St. Louis, Mo.

Delaware & Hudson Canal Company, dividend of 1½ per cent., payable March 16th, at the office of the company, No. 21 Cortlandt street, New York City.

Edison Electric Illuminating Company. The coupons of the first mortgage bonds of this company, due March 1st, will be paid on and after March 2d at the office of the company, No. 16 and 18 Broad street, New York City.

Granite Mountain Mining Company, dividend No. 74 of 25 cents per share, \$100,000, payable March 10 at the office of the company, Room 128, Laclede Building, St. Louis, Mo.

National Lead Trust, dividend of 50 cents per share, payable April 15 at the office of the company, No. 1 Broadway, New York City.

Osceola Mining Company, dividend No. 30 of \$1 per share, \$50,000, payable April 8 at the office of the company, Boston, Mass. Transfer books close March 15 and reopen April 9.

#### ASSESSMENTS.

COMPANY.	No.	When levied.	D't'nd't in office.	Day of sale.	Amn't per share.
Atlantic, Con. Nev.	7	Nov. 19	Mar. 2	Mar. 21	.25
Belcher, Nev.	41	Feb. 17	Mar. 24	Apr. 13	.50
Best & Belcher, Nev.	48	Feb. 17	Mar. 25	Apr. 15	.25
Challenge, Nev.	8	Jan. 26	Feb. 27	Mar. 18	.50
Confidence, Nev.	18	Feb. 12	Mar. 16	Apr. 9	.75
Con. St. Gothard, Cal.	2	Feb. 12	Mar. 31	Apr. 20	.15
Crocker.	16	Feb. 16	Mar. 20	Apr. 13	.10
Crown Point, Nev.	54	Feb. 19	Mar. 26	Apr. 16	.50
Gould & Curry, Nev.	66	Feb. 3	Mar. 11	Apr. 7	.30
Head Center.	2	Jan. 19	Feb. 19	Mar. 25	.05
Idlewild, Cal.	1	Jan. 29	Mar. 2	Mar. 21	.10
Martin White, Cal.	15	Feb. 2	Mar. 6	Mar. 30	.50
Midas, Cal.	1	Jan. 13	Feb. 23	Mar. 23	.20
Milwaukee, Mont.	1	Jan. 22	Feb. 20	Mar. 12	.00½
Savage, Nev.	7	Feb. 13	Mar. 18	Apr. 7	.50

#### MINING STOCKS.

For complete quotations of shares listed in New York, Boston, Salt Lake City, San Francisco, Baltimore, Denver, St. Louis, Pittsburg, Birmingham, Ala.; London and Paris, see pages 303 and 304.

NEW YORK, Friday Evening, March 6.

The market during the week under review seems to have lost even the hold it had on better times. Last week it was dull, with slightly encouraging prospects. This week it has been a little duller, with prospects anything but bright. The Comstock stocks, the pedestal upon which hopes were being built, seem to have succumbed to the inevitable. Transactions have been lighter during the week than for some time past. The advance in price has stopped, except in one notable instance—that of Consolidated California & Virginia—and in most cases has suffered more or less of a decline.

One thing can be said in favor of more encouraging prospects, that being the general inquiry. Bids have been plentiful, but have mostly been at laughably low figures.

It was expected that the adjournment of Congress at noon on Wednesday would have a tendency to alter values. But, as one broker expressed it, so general was this belief that everybody loaded up, and in consequence, when the adjournment was announced, the feeling was one of depression. The members of the Stock Exchange indulged in an impromptu demonstration when the news was received. Those of the Consolidated Exchange were more mindful of their dignity, however. The general opinion seems to be that the adjournment will have a tendency to settle financial affairs, inasmuch as it will for a time at least remove the possibility of a change in our monetary system or the enactment of measures affecting commercial interests.

Those who have their fingers on the pulse of the mining stock market claim that there will be no improvement until financial matters generally improve. They look for an advance all along the line at no very distant day.

About the only cheerful feature of the week was the marked advance in Brunswick. It sold as high as 16c on Tuesday. Those heavily interested in this stock claim that the rise is caused by public confidence, as shown by the fact that but a few thousand of the 500,000 shares recently taxed with a two-cent assessment remain encumbered. Those who have watched the many ups and downs of this exceedingly unstable stock are of the belief that manipulators are getting in their work. One broker is very expressive with the statement, "There is a deal on."

The total number of sales for the week were 47,290 shares, as against 41,500 shares of last week, and of 143,240 shares for the corresponding week last year.

Many of the Comstock stocks were quite active during the past week, notably Consolidated California and Virginia, which opened at \$6.00 and advanced to \$6.50 on Wednesday, closing at \$6.13 to-day. Gould & Curry declined from \$2.20 to \$2.25 and Crown Point rose from \$1.50 to \$2.15. Ophir shows one solitary transaction of 100 shares at \$3.80 and Savage one at \$2. Yellow Jacket went from \$2.35 to \$2.10. Alta remained stationary at 75 cents. Andes was neglected at \$1.10. Best & Belcher also showed an upward movement in the beginning of the week, going up to \$3.25, but to-day closed at \$2.20. Bullion was quoted at \$2.40. Chollar at \$2.20 to \$2.10. Exchequer at 80 cents. Mexican declined from \$2.75 to \$2.50 and Occidental from 95 to 80 cents. Overman sold at \$1.75 and Potosi \$4.75. Scorpion at 30 cents. Seg. Belcher at \$1.10. Union Consolidated declined from \$2.60 to \$2.30 and Utah from 80 to 75 cents.

There is absolutely nothing doing in the Comstock Tunnel stocks and bonds. There was a sale to-day of the bonds at \$39 and of the scrip at 35 cents.

Eureka Consolidated, which is a stranger at the exchange, shows one transaction at \$3.85.

The Tuscaroras attract but little attention. Grand Prize is quoted at 30 cents and Navajo at 25 cents.

Phoenix of Arizona, as usual, is one of the stocks in which a great deal of interest is centered, but it was on the downward movement. It opened at 53 cents and closed to-day at 40 cents, some 1,600 shares changing hands.

The promoters of Brunswick are again in active operation. Through their efforts some 17,800 shares changed hands, the price advancing from 10 cents to 16 cents, the closing quotations to-day being 12 and 14 cents.

The Bodies are neglected. There was a single sale of Bulwer at 45 cents. There is also nothing doing in Plymouth, which is quoted at \$2.

The Amadors were, as in times gone by, some of the most active stocks on the list. Astoria sold at from 2 to 5 cents, Belmont was firm at 35 and 36 cents, Middle Bar 3 and 4 cents.

Alice, in which there is very little business done, holds its own at \$1.40 to \$1.50.

The Black Hills stocks were neglected and there was not a single transaction in Caledonia, Deadwood-Terra, Father de Smet, Homestake and Iron Hill.

There is little change to report in the price of Horn Silver, which this week ruled at \$3.20@3.25. Stormont, which rarely appears on the list, shows a sale of 500 shares at 7c.

Silver King sold at 10c. El Christo stands neglected at 45 and 50c.

Mutual Smelting and Mining Company continues to move along in the usual course. It went from \$1.50 to \$1.35, and closed at \$1.45 to-day.

There was no attention given to the copper stocks.

There is little doing in the Colorado stocks, and the only sales were Leadville at 12 cents, Little Chief at from 30 to 34 and Robinson at 30 cents.

#### Boston. March 5.

There is not much in the present outlook to encourage speculation in the copper stocks. The market during the past week has ruled dull, although prices are quite firm, and there are but few stocks pressing for sale; in fact, an order to buy a few thousand shares would be hard to execute without a material advance over present rates. The situation, however, is one of hopefulness for a better market in the near future, but just at present it is a waiting market, and requires a good degree of patience on the part of both operators and brokers.

The advance in Boston & Montaua to \$44½, noted last week, met with quite a set back, on the report that the company contemplated a further issue of bonds for construction purposes. This brought out considerable long stock, causing a decline to \$41½; at about \$41 there seems to be a disposition to take the stock freely. This is the only stock on the list which shows a lower price than last week. Calumet & Hecla sold at \$260, chiefly in small lots.

Tamarack sold early in the week at \$148½, but reacted to \$145. Butte & Boston was steady at \$15½ @ \$16. There has been more activity in Centennial during the past week; several good orders to purchase it appearing at the board, carried the price from \$15½ to \$17½, and it is holding the advance quite firmly. Late advices from the mine are considered highly favorable. Kearsarge also advanced from \$12¼ to \$13½, in sympathy with its near neighbor.

Osceola holds steadily at \$37½ @ \$38¼, with a fair amount of dealings. A dividend of \$1 per share was declared to-day, payable April 8. Franklin sold at \$16½ @ \$17. Nothing has been heard regarding a dividend as yet. Atlantic sold at \$15½. Quincy is firm at \$95 @ \$96. A circular, explaining the action of the company in regard to the purchase of the Pewabic property, has been issued by the company, and may be found in the column of general mining news.

Allouez continues firm at \$2½ @ \$3, with sales at both figures. National sold at \$3, and Santa Fe advanced from 60c. to 62½c. Bonanza declined from 62½c. to 60c.

The silver stocks were neglected. Dunkin sold at 65c. and later at 60c.

The Governing Committee of the Boston Stock Exchange has ordered the striking from the unlisted department of the Standard Coal and Fuel Company, and dealings in the stock, consequently, will not be resumed. As a matter of fact, there have been sales of only a few odd lots since publicity was given to the very peculiar case in connection with an order for the sale of a 1,000 share lot. The trouble was that the Exchange was not informed of the various classes of stock, and an attempt was made to make delivery of a pool certificate instead of stock.

By *Teletype*.—Calumet, \$290; Tamarack, \$145; Quincy, \$90; Boston and Montana, \$40½; Centennial, \$16½; Kearsarge, \$13½; Osceola, \$37½.

#### Chicago. March 4.

(From our Special Correspondent.)

The National Stock and Mining Exchange Company of Chicago is now being organized by the following gentlemen: Col. Geo. H. Harlow, R. D. Atchison, Fernando Jones, W. W. Watson and A. P. W. Skinner. They have secured a charter, have sold a good proportion of the stock, and will elect permanent officers on the 9th inst. The capital stock is \$100,000, divided in 10,000 shares at \$10 each. The object, as stated in the charter, is the development of mineral property and to deal in the product of the same, and transact such business as appertains thereto. They will have daily public call sales of mining and other stocks for cash. This is a different concern from the Chicago Mining Stock Exchange, the organization of which we have already noted.

Denver. Prices and sales for the week ending February 28, 1891:

Table listing various stocks and mines in Denver with columns for opening, high, low, closing prices and sales volume.

San Francisco, Feb. 26. (From our Special Correspondent.)

The special feature of the past week's trading has been the sharp advance of Consolidated California & Virginia, with exceptionally heavy sales on Tuesday.

There is no reason, however, to think that this stimulation is anything but temporary, and the general tendency seems to indicate that no market will be made until Consolidated California & Virginia advances to a higher and more stable point than at present.

Most of the north end stocks have been stronger during the week, in sympathy with the leader. Ophir sold to \$3.35 on the report of favorable improvement in the mine.

The middle group advanced from 5 to 10 cents each on Wednesday, Potosi leading at \$4.85. Today it is quoted at \$4.80 with moderate sales.

Savage is the stock of inactivity. Whatever news may arrive from the mine the stock varies little from the dead level price.

The Bodie, Tuscorora, and Quijotoa stocks have remained in a state of stagnation during the week, the sales being merely nominal.

Of the outsiders, Kennedy has been more active than at any other time since it was listed on the board, a year ago. Last week it was selling for \$1.50, but advanced to \$5 on Tuesday, with moderate sales.

St. Louis, March 4. (From our Special Correspondent.)

Business in mining stocks has been very weak, and since the 1st of the month only a few sales have been made. The excitement over Granite Mountain has died out somewhat, and but very little is now being done in this stock.

Elizabeth has had very little range in prices, and remains at \$2.17 1/2. It opened at \$2.30, but soon fell to \$2.17 1/2, and since then it has been fluctuating between \$2.17 1/2 and \$2.25.

Breen has also declined, and from an opening quotation of \$1.07 1/2 it is now bid at 90c. The market was varying and at one time the stock had recovered from 95c. to \$1.05, but it has since dropped again and plenty of stock was to be had at 95c.

Central silver opened at 9 1/2c. with 100 shares sold, and later two sales aggregating 900 shares sold at the same prices. Present quotation is 9c.

American & Nettie was strong this week and formed an exception to the rule of the market fluctuations; it held its opening bid of 38 3/4c. and at one time was quoted at 40c.

Cleveland had a sale of 100 shares at 1c. Silver Age advanced from \$1.75 to \$2.00 when a sale was made of 100 shares; it afterwards fell to the closing price, \$1.97 1/2.

Two hundred shares of Pat Murphy sold at 4 1/2c., the first sale for many weeks.

Salt Lake City.

Table of prices and sales for various locations in Salt Lake City, including Alice Mont, Alliance, Anchor, and others.

Minneapolis, March 5. (From our Special Correspondent.)

Our Minneapolis exchange is soon to be reopened. Mining interests are growing steadily here, and, notwithstanding our disadvantages of distance from the mines, we look forward to the time in the near future when Minneapolis will be recognized as much a mining center as perhaps Kansas City or Denver.

Pittsburg, March 5.

The Board of Directors of the Stock Exchange at Pittsburg, it is stated, on the 19th ult. decided to suspend trading in Consignee Mining Company stock pending an investigation of the non-assessable clause on the certificates, which, it is claimed, has been violated.

PIPE LINE CERTIFICATES.

(Specially Reported by Messrs. Watson & Gibson.) The oil market during the early part of the week was inclined to be firm, but during the last few days it has weakened under the influence of outside speculation, which is bearish.

CONSOLIDATED STOCK AND PETROLEUM EXCHANGE.

Table showing opening, highest, lowest, closing prices and sales for Consolidated Stock and Petroleum Exchange.

NEW YORK STOCK EXCHANGE.

Table showing opening, highest, lowest, closing prices and sales for New York Stock Exchange.

COAL TRADE REVIEW.

NEW YORK, Friday Evening, March 6. STATEMENT of shipments of anthracite coal (approximated) for the ten days ending February 28th, 1891, compared with corresponding period last year:

Table comparing coal shipments from various regions (Wyoming, Lehigh, Schuylkill) for February 28, 1891, and March 1, 1890.

For the purpose of comparison the table of anthracite coal shipments for the week ending February 21st, as published in our issue of Feb 28th, is given as follows:

Table comparing coal shipments for the week ending February 21, 1891, and February 22, 1890.

PRODUCTION OF BITUMINOUS COAL for week ending February 28th and year from January 1st: EASTERN AND NORTHERN SHIPMENTS.

Table showing production of bituminous coal by region (Phila. & Erie, Cumberland, etc.) for the week ending Feb 28, 1891, and the year 1890.

WESTERN SHIPMENTS.

Table showing production of bituminous coal for the West (Pittsburg, Westmoreland, Monongahela) for the week ending Feb 28, 1891, and the year 1890.

Grand total... 448,959 3,434,534 3,188,653 PRODUCTION OF COKE on line of Pennsylvania R.R. for the week ending February 28th, 1891, and year from January 1st, in tons of 2,000 lbs.: Week, 5,226 tons; year, 639,917 tons; to corresponding date in 1890-967,704.

Anthracite.

The cold weather, with which the month of March began, already has been sufficient to act as a slight stimulant upon the coal market. This in conjunction with other and more potent causes has somewhat lightened the ominous cloud which for some time has hung over the anthracite market.

From the tables preceding, it will be noted that a marked restriction was made last week over the previous one, the decrease being 104,281 tons. It is divided as follows: Wyoming region, 36,800 tons; Lehigh region, 47,881 tons; Schuylkill region, 19,600 tons. Still more encouraging are the figures making comparisons with the corresponding weeks of 1890.

The result of this policy has been to make the product for the year to March 1st 5,225,166 tons, this being but 25,166 tons above the figure set by the sales agents at their meeting held on the 26th ult., when they fixed the output for January, February and March at 7,500,000 tons. It practically leaves them a March tonnage of 2,000,000 tons.

The Connellsville strike has been the cause of creating something of a demand for the larger sizes of anthracite, although it is not felt in the East to any appreciable extent. In the West, however, it is said to be cutting quite a figure in the market.

A meeting of the sales agents will be held within a short time, probably next week, for the purpose of fixing spring prices. After these go into effect a general revival in the trade is looked for. Shippers are hopeful for a reduction in railroad transportation rates, but are not expectant.

**Bituminous.**

The action of the railroad companies in announcing an increase in freight rates, and that of the Seaboard Association in agreeing upon an advanced price for coal, have wrought the trade into a peculiar condition. The sales agents are confident that prices will be much higher after April 1st. Notwithstanding this, retailers are either heedless or indifferent, and are only buying to meet current demands. The sales agents, while they claim to be selling March deliveries at last year's prices, are not anxious to stock the market, and for a very good reason. This reticence on the part of one and the indifference of the other, combine to make trade circles very dull. However, it can readily be seen that it is only temporary.

Because of notice of an advance in freight rates served by the railroad companies (see ENGINEERING AND MINING JOURNAL February 28th) operators are determined to raise prices. This determination is shaping itself in well-defined action. As stated in a previous issue, they decided to fix the minimum price of their product at a figure which would equal one-half of the advance in freight rates. Word now comes that there is a strong movement toward a further increase, covering the entire advance in freight. This latter movement is being brought about by separate conferences of operators in the different districts, and by sub-conferences of operators of a district who ship to certain points.

Very few contracts are being made, and these, it is fair to suppose, are placed at a figure which will cover any possible advance which can consistently be demanded by the association or brought about by the railroad companies. Thus affairs steadily are shaping themselves, and they will be in tangible shape before the month has passed. Owing to the small stock on hand lively times may be anticipated.

There is a scarcity of vessels at lower ports. Rates from Philadelphia to Boston and Salem are \$1.00; to Sound ports, 80 cents.

Prices may be quoted as follows: At Philadelphia, \$2.50; at Baltimore, \$2.60; at Sound ports, \$3.15 to \$3.25 f. o. b.

The conference of interested operators and the Connellsville strikers, which was held in Scottsdale, Pa., on the 2d inst., proved that each faction is deeply in earnest. The miners state that they would not submit to a reduction, as coke at the time of the strike was selling at \$1.90, a higher price by 15 cents than that which ruled when the old scale was formulated. The operators held that they would not agree to settlement except on a basis of 10% reduction in the present scale. An adjournment was taken without fixing a date for a future meeting and without the prospect of a settlement of differences. Preparations are being made for a protracted struggle.

Although there is but very little coke moving, prices, especially in the Eastern market, are about the same, the stocks on hands not having been exhausted. These will not last many weeks. The Western market is beginning to feel the stringency in a more marked degree.

**NOTES OF THE WEEK.**

The Tennessee Coal, Iron and Railroad Company will hold its biennial meeting in Tracy City, Tenn., on the 7th prox.

Mr. C. J. Wittenberg, vice-president of the Cresson & Clearfield Coal and Coke Company, is absent from the city on a business trip to his company's collieries.

The Reading Company has just completed a coal storage trestle near the mines, increasing its capacity to 400,000 tons. The additional storage capacity of the company at Buffalo and tidewater shipping depots swells its total to 1,200,000 tons.

Representatives of the Clearfield miners will meet the Cumberland miners at Cumberland on the 16th inst. for the purpose of discussion of the eight hour question. The Clearfield miners held their adjourned meeting on the 17th inst.

The Delaware and Raritan Canal has given notice that the canal is expected to be open to navigation on Monday, March 9th, at 7 A. M., from Bordentown to New Brunswick, but the feeder will not be open till a later date.

The Board of Health, at a special session held on the 3d inst., ordered the Mayer's brewery management, Third avenue and 169th street, to immediately discontinue the use of Luna oil with which they were experimenting with a view of using it for fuel. The action was taken in the interests of the general health of the community, it being held that the fuming oil filled the air with a pungent, disagreeable and unhealthy odor.

The Mexico Coal and Steamship Company, composed of New York capitalists, has about completed arrangements for the shipment of Alabama coal to points in the interior of Mexico, sending the product from Pensacola, Fla., by Corpus Christi, Tex., and thence to its destination over the Mexican National Railway to and beyond the City of Mexico. The company will own the vessels employed in the commerce. It has closed a contract for the delivery of 40,000 tons of coal to the Mexican, and expects to ship 100,000 tons before the close of the year.

**Boston. Mar. 5.**

(From Our Special Correspondent.)

Notwithstanding the cold and stormy weather of the past week, the anticipated good demand for

coal has failed to materialize. The conditions locally have been favorable to an improvement in the anthracite market, but so far the only change noted is the slightly better feeling which prevails. Not that the tone can be said to be any stronger, but the pressure of cold weather has given agents at least a temporary air of confidence. A few small lots are being sold, apart from which there is not the smallest business passing. Prices may be said to be in a sorry condition, and it would be hard to say just what a large buyer would have to pay at present. Offerings are large and holders display a strong desire to sell even at figures much below what they are supposed to be getting. Stove coal can be purchased for \$4.75 here on cars.

Bituminous coal continues to come forward at a good rate, and plenty of it is offering. The market rules quiet, and there is but very little doing. Gas coal remains unchanged, and most all of those pinched in the recent scare have fully recovered. Rumors that several large contracts had been placed have been discredited, and it is evident that nothing will be done in this direction until transportation rates have been positively settled.

Freights are practically unchanged, although they show a tendency to weaken, a fact due to the poor condition of trade. The high winds and snowstorms which have been prevailing along the coast are said to have prevented the drop which was thought to be imminent last week. From New York, 75c.@85c. is quoted; from Philadelphia, 90c.@\$1, and from Baltimore, \$1@\$.10.

Retailers have derived some benefit from the change of weather, and have been selling off at a fair pace. They have good sized stocks on hand and can stand a good demand. Prices at retail hold fairly well, and most of the coal is being sold at the Exchange prices.

The receipts of coal at this port for the week ending February 28th were 18,251 tons of anthracite and 41,965 tons of bituminous, against 18,396 tons of anthracite and 21,780 tons of bituminous for the corresponding week last year. The total receipts thus far this year have been 163,660 tons of anthracite and 186,508 tons of bituminous, against 128,123 tons of anthracite and 147,988 tons of bituminous for the same time last year.

**Buffalo. March 5.**

(From our Special Correspondent.)

A few days of severe and almost zero weather has cheered the hearts of dealers in coal. Prices of anthracite unchanged, and there is nothing new in regard to supply or stocks.

Bituminous coal is quiet, at unchanged quotations. The supply is ample and quite a number of cars are on track on demurrage.

It is reported that the Grand Trunk Railway of Canada has placed 200,000 tons of its coal contract, but extreme reticence is manifested as to price and other matters that would interest the bituminous coal trade generally.

It is said that the New York, Ontario & Western Railroad is seeking terminal facilities at this port and have opened an office here.

The Reynoldsville & Falls Creek Railroad will be extended during the coming summer from Reynoldsville to a point near Punxsutawney, opening up a very productive coal territory.

There seems to be, at the present time, indications of low opening rates for spring trade. Harmony appears to exist in the Hocking and Pittsburg districts among producers and others on the subject of coal freights for the present and coming season, and it is thought that no concessions will be made lowering the present rate. It is proposed to organize a coal board in the city of Chicago, and a committee has been appointed to prepare by-laws, etc. It is thought there that many advantages would follow the establishment of such an organization.

**Chicago. March 4.**

(From our Special Correspondent.)

Trade has been very active this week owing to sharp winter weather. Winter stocks have been exhausted and an immediate demand created for fresh supplies. Prices, as a rule, have been adhered to pretty strongly, yet the desire to get an order has resulted in a little cutting in order to meet buyers' views. The regular monthly meeting of the Coal Exchange last Friday was postponed for the want of a quorum. As some important changes in the by-laws are contemplated, a special meeting may be called for this month.

The anthracite market has been fairly active and a great many small orders have been sold. Prices have been cut a little by dealers anxious to secure orders. Prices per ton of 2,000 pounds f.o.b. Chicago are: Lehigh lump, \$6.75; large egg, \$5; small egg, range and chestnut, \$5.25. Retail prices are: Large egg, \$6.75; small egg, range and chestnut, \$7.

The bituminous trade has been very active, and the business done quite large and makes a very good showing in the reduction of stocks. Prices per ton of 2,000 pounds f.o.b. Chicago are: Pittsburg, \$3.30; Hocking Valley, \$3; Youghiogheny, \$3.40; Indiana hock, \$2.40@2.60; Illinois hock, \$2@2.20.

No material change has occurred in the coke market. The wants of consumers are promptly supplied and the strike has not yet had any effect here. Prices f.o.b. Chicago are: Connellsville, 72 hours, \$4.95@5.05; Connellsville, crushed, \$5.40.

**Pittsburg. March 5.**

(From our Special Correspondent.)

**Coal.**—The local demand continues active and is daily increasing on account of the rapid decline of natural gas, the supply of which, during the present week, has been unusually small. The Monongahela strike continues; the mines are idle, and so are a large number of miners. A settlement seems as far off as ever. Prices are without change. The entire shipments by the Ohio River for February were 300,000 bushels. In February, 1890, shipments were 11,500,000 bushels.

**Coke.**—The Connellsville region, with the exception of Rainey's plants, is idle. The market does not manifest a single sign of improvement. The meeting held last Monday was a dead failure; the miners wanted an advance and the coke men demanded a reduction of 10%. This was the situation when the meeting adjourned. The estimated idle ovens in the region are 15,700. Shipments last week averaged 55 cars per day, being 225 less than the preceding week, showing a deficiency for the week of 1,410 cars. The larger iron-producing establishments are well fortified against the coke strike, but there are a number of smaller furnaces and foundries not so well situated.

The coke supplies of these furnaces and foundries are getting very low. If the strike continues through March, and Rainey is able to operate his works, he can sell his product at his own price.

Prices remain unchanged; furnace, \$1.90; foundry, \$2.80; crushed, \$2.65. Freights are unchange d.

**FREIGHTS.**

The Executive Committee of the Southwestern Railway and Steamship Association on the 5th inst. adopted the rates, rules and regulations established by the Rate Committee.

**METAL MARKET.**

New York, Friday Evening, March 6.

Prices of silver per ounce troy.

Feb.	Sterling Exch'ge	London Price.	N. Y. Cts.	% at.	Sterling Exch'g.	London Price.	N. Y. Cts.
28	4 87½	44½	97½	4	4.88	44½	98
*2	4.87½	44½	97½	5	4.88	44½	97½
*3	4.88	44½	98	6	4.88	44 11-16	98

\*March.

Council bills advanced 1-16d. on Wednesday's allotment.

Silver prices have been firm, with good inquiry for London account, resulting in shipments to Europe of some 1,000,000 ounces.

Stock on hand here is visibly decreasing, and with the adjournment of Congress speculation is eliminated and prices are settling down to a commercial basis.

The United States Assay Office at New York reports total receipts of silver for the week to be 65,000 ounces.

**Silver Bullion Certificates.**

	Price.		Sales.
	H.	L.	
Feb. 28.....	97¾	97¾	55,000
March 2.....	98½	97¾	122,000
March 3.....	96½	97¾	486,000
March 4.....	98½	98¾	231,000
March 5.....	98½	97¾	175,000
March 6.....	98¼	97¾	310,000
Total sales.....			1,379,000

**Government Silver Purchases.**

The Treasury Department informs us that the amount of silver purchased by the government during the past week was as follows:

	Offered ounces.	Purchased ounces.	Average price.
March 2.....	748,000	105,000	\$3825
" 4.....	1,089,000	745,000	"3869

WASHINGTON, D. C., March 6th.—(By Telegraph.)

The Treasury Department purchased 276,000 ounces of silver to day.

**Coinage at the Mints of the United States.**

The following statement shows the coinage executed at the mints of the United States during February, 1891:

Denomination.	Pieces.	Value.
Double eagles.....	159,410	\$3,188,200
Eagles.....	9,910	99,400
Half eagles.....	23,600	118,000
Quarter eagles.....	3,520	8,800
Standard dollars.....	3,035,000	3,035,000
Dimes.....	430,000	43,000
Five cents.....	1,532,000	76,600
One cent.....	4,730,000	47,300
Total coinage.....	9,923,470	6,616,300

**Foreign Bank Statements.**

The governors of the Bank of England at their weekly meeting on Thursday made no change in its minimum rate of discount, which remains at 3%. In the week the bank lost £180,000 bullion, and the proportion of reserve to liabilities was lowered from 38.72% to 36.80%, against an advance from 47.33% to 48.93% in the corresponding week

last year, when its discount rate was reduced to 4 1/2%.

Domestic and Foreign Coin.

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

Table with 3 columns: Item, Bid, Asked. Items include Trade dollars, Mexican dollars, Peruvian soles and Chilean pesos, English silver, Five francs, Victoria sovereigns, Twenty francs, etc.

Copper.—The Lake companies have evidently dispensed with the formality this time of fixing an official price, but copper is now easily obtainable at 14c., and even the Calumet & Hecla is understood to be a seller thereof.

The London market has been rather unsettled during the week, mainly owing to the disturbed money and stock markets, it being again rumored that some South American houses are in difficulty.

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

Table with 4 columns: Destination, Copper, Lbs., Price. Includes To Bordeaux, To Antwerp, To Havre, To Liverpool, To Hamburg, To Amsterdam.

Tin.—After a long period of dullness, and with prices at or below the parity of the European and Eastern markets, the market has at last shown a little more life.

The London market, which opened £89 12s. 6d. and gradually hardened, closes firm to-day at £90 7s. 6d., £90 10s. for spot and £90 15s. to £90 17s. 6d. for three months prompt.

Lead.—Lead shows some improvement. Western refiners have held back with the sales, and the demand being decidedly better, prices advanced to 4 35-40 New York, with a fair amount of business doing.

In London Spanish lead is quoted at £12 10s., and English lead at £12 15s.

Chicago Lead Market.—Messrs. Everett & Post telegraph us as follows: "The market has been much better during the past week and sales will

foot up 400 tons, most of which has been sold at 4.10c. The closing is steady, the low offerings being almost confined to one seller."

Spelter.—After the very heavy drop in prices experienced during the last two months, a decidedly firmer tone was noticeable during the week. The sale is reported of about 1,200 tons of ore at about \$24@25 per ton, which is being shipped to Swansea, England, and the demand for refined metal was considerably better.

In Europe a good demand exists, and the London quotations are: Ordinaries, £23 15s.; specials, £24.

Antimony.—Antimony remains quiet and dull, and we quote Cookson's, 17 1/2c.@17 1/2c.; L. X., 16 1/2c.@17c., and Hallett's, 16c.@16 1/2c.

Quicksilver.—The London market shows a slight change since our last. We quote £8 10., with a fair business according to latest advices. Values here have declined considerably on account of large accumulations.

IRON MARKET REVIEW.

NEW YORK, Friday Evening, March 6.

During the past week the iron market has remained in the same condition of uninteresting inactivity that has prevailed for so long. There has indeed apparently been a slight falling off in demand, if anything.

Advices from abroad indicate a similar depression in the iron market in England and Scotland at the present time, trade having fallen off very considerably.

American Pig Iron.—The market has a firm tone, although there have been fewer orders placed during the past week than in the preceding.

The most important news of the week is that the iron masters of the Mahoning and Shenango valleys have received the concessions in freight rates asked from the railway companies, and will now prepare to hlow in again.

Spiegeleisen and Ferro-manganese.—Business is showing a little improvement, and some orders of fair size have been placed during the week.

Steel Rails.—The important feature in the steel rail trade during the past week has been the refusal of the stockholders of the Scranton Steel Company to ratify the consolidation with the Lackawanna Iron and Coal Company.

Notwithstanding this, it is still possible that the two companies may yet come together, a meeting for further consideration of the matter having been held to-day.

be considered problematical. At all events, the railways are evidently so regarding the matter and are still holding off from the market, awaiting events, no transactions of importance having been reported.

Rail Fastenings.—Trade is still dull, although there have been slightly more inquiries. The price paid for the large lot of spikes purchased last week by the New York Central & Hudson River Railroad Company is stated to have been about 1.90c.

Tubes and Pipes.—Business continues to be very good for this time of the year, and is showing the natural improvement as the season progresses.

Structural Iron and Steel.—The market still remains inactive and comparatively few transactions are reported.

Merchant Steel.—Business continues to be very good, and numerous orders are being freely placed. Prices still remain unchanged, and we quote as last week: Best English tool, 15c. net;

Old Rails.—Old rails are very dull and no transactions of much consequence during the week are reported. The price remains \$22@23 for tees and \$25 for doubles.

Wrought Iron Scrap.—The market is quiet, and sales of nothing but small lots have been noted. We quote from \$21@22, at yards.

Chicago, March 4. (From Our Special Correspondent.)

The Chicago iron market has been quite active during the past week, and considerable business has been done. Orders of good size have been quite numerous in some branches.

Pig Iron.—A prominent feature in the pig iron market is the continued firmness of coke irons, particularly of Southern brands, most of the furnaces in that region being quite independent as regards prices and deliveries.

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

Structural Iron.—Business has been remarkably good in this branch of the trade this week and some good orders have been hooked.

Plates.—Orders are being received in fair numbers, and business is very satisfactory for this time of year. Inquiries continue in good numbers, and the outlook is bright.

Merchant Steel.—Business has been very satisfactory in merchant steel this week. Orders have not been large but are in fair numbers and at regular prices.

\$2.60; toe calk, \$2.60@2.75; Bessemer machinery, \$2.20@2.30; open-hearth machinery, \$2.60@2.75; open hearth spring, \$2.75@3; crucible spring, \$2.75@4.

**Steel Rails.**—Business continues very satisfactory in steel rails. Small orders continue to be received, and some large orders are being looked forward to. The Joliet works of the Illinois Steel Company are shut down at present, but its other works are running full. Prices are quite firm at \$31.50@32.50 f.o.b. Chicago. Splice bars are quoted at \$1.95@2, and spikes at \$2@2.10 per hundred pounds.

**Galvanized Sheet Iron.**—Business in galvanized iron continues very active. Store sales have fallen off a little, but orders from dealers cannot be filled rapidly enough. A great many orders for special sizes are being received, which mills refuse to deliver inside of a month. Quick delivery is only promised on small orders of standard sizes. Discounts remain unchanged at 67% off on Juniata and 65% and 5% off on charcoal. Jobbing lots are quoted according to quantity.

**Black Sheet Iron.**—Trade in black sheets remain rather quiet, and but little business is being done. Inquiries are somewhat better. The roofing trade has been taking the larger part of the output of the mills. Quotations are: \$2.85@3 f. o. b. Chicago.

**Bar Iron.**—The store trade of bar iron has been fair this week, but mill orders have been very dull. A couple of good orders are reported. Inquiries are not being received in any numbers. Local mills quote \$1.70@1.80, half extra f.o.b. Chicago, and Valley mills, \$1.60@1.65, f.o.b. mills; freight is 15c. per 100 pounds.

**Nails.**—The nail trade has been quite active this week, and good orders continue to be received. Some mills report to have all the orders they can take care of. The Lake Side Nail Company's works at Hammond, Ind., started up on February 22, after a four weeks' shut down, and is now running at full capacity. Quotations are: Steel wire nails at \$2.20@2.30; steel cut nails, \$1.75@1.85 car loads f.o.b. Chicago.

**Tubes.**—Trade in tubes has been very good, particularly in the smaller sizes for plumbers' use. Well casing continues dull. Boiler tubes have been in fair demand. Discounts remain unchanged; two inches and larger, 5%; and 4 1/2 for inch and three-quarters and smaller.

**Scrap.**—The scrap market has been only fairly active this week, and not much business is reported. Steel scrap is in moderate demand, but scrap iron is slow and looking weaker. There is considerable offering of all grades, and Pittsburg has bought a little. Quotations per net ton f.o.b. Chicago are: No. 1 railroad, \$20; No. 1 forge, \$19; No. 1 mill, \$14@14.50; fish-plates, \$22; axles, \$25; horseshoes, \$18.50@19; pipes and flues, \$13@13.50; cast borings, \$8.50; wrought turnings, \$11; axle turnings, \$13@13.50; machinery castings, \$12@12.50; stove plates, \$8.50; mixed steel, \$11.25; coil steel, \$13.50; leaf steel, \$16.25; tires, \$17.50.

**Old Rails and Wheels.**—Old steel rails continue quite active, and a ready market is found for the full supply. Prices asked are: \$19.50 for long lengths and \$15 for short lengths. Old iron rails are scarce and also in poor demand, and very little business is reported. Prices may be quoted at \$23.50. Old wheels have been very dull and but little business is reported. They look somewhat weaker. Prices quoted, \$17 per ton.

**Cleveland.** March 4.

(From Our Special Correspondent.)

During the past two weeks the ore market has been full of rumors, reporting sales of Lake Superior ore for delivery during the coming season of navigation. Some of the ore men have apparently lost their heads, and are trying to force the furnace men to buy before they are ready. As the latter are well aware, there is a large stock of ore on hand at Lake ports, which they had not expected to buy before April or May.

They were quite surprised, therefore, when some of the agents for Gogebic hematites began, two or three weeks ago, to press them for orders. The result was as might have been expected. The furnacemen made up their minds that the ore market was in a worse condition than they had thought, and they not only did not buy (with one or two exceptions) but they made up their minds that when they do buy they can get the ore at a lower price than they had before thought probable.

A very few sales have been made in Wheeling and Pittsburg, but the great bulk of the consumers say that they do not intend to buy at present, unless some great bargain is offered them. The older and stronger companies, conservatively managed by men who have before passed through these crises and periods of depression, are still taking things easy and not quoting prices. If some of the weaker ones desire to give their ore away it cannot be helped, and the strong companies will have to wait until the furnaces have filled up with contracts which yield them no profit.

In all probability standard ores will sell at about \$1 less than last year. This would make prices as follows: Extra low phosphorous "Lake Angeline," \$6.25; "Minnesota Bessemer," "Republic," "Champion," \$5.50; "Lake Superior" and "Cleveland No. 1," \$5; high-grade Gogebic Bessemer hematites, \$4.75; non-Bessemer hematites, \$3.50@4.25. On the above basis, it is probably safe to make the

following quotations, although at present ores are not selling either for present or future delivery:

**Spectacular and Magnetic Ores.**

Table with 2 columns: Ore type and price. Includes Bessemer (66@68% at \$5.50@6.25), Non-Bessemer (66@68% at 4.75@5.25), and Soft Hematites Dried at 212° (5@60% at 3.75@4.00).

**Soft Hematites Dried at 212°**

Table with 2 columns: Ore type and price. Includes Bessemer (62@65% at \$4.50@4.75), Non-Bessemer (58@61% at 4.00@4.25), and Non-Bessemer (55@63% at 3.50@4.25).

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

**Louisville.** Feb. 28.

(Special Report by Hall Bros. & Co.)

There is about the same general firmness in the market as last week. Furnaces seem sufficiently well fixed with orders, so that they can run several months without booking more, and they are of the belief that prices will advance further quite soon. Some furnaces have given their agents instructions not to offer anything beyond March, claiming that the advance is that near at hand. The strike in the Connellsville coke district is being felt by both producers and consumers, coke scarcity and advance in prices adding to the cost of iron, etc. Quite a number of attempts has been made to place orders at last week's figures, but none is being placed that we know of. Some furnaces are asking \$12, Birmingham, as basis for No. 2 foundry, and a number of sales from carload lots have been made at full figures and in some cases at a fractional advance, though we quote substantially as last.

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

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

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

**Philadelphia.** March 5.

(From our Special Correspondent.)

**Pig Iron.**—A general improvement in inquiry for pig iron has taken place, and quite a number of large transactions for both forge and foundry have been closed within two or three days. Quite a number of brands have been advanced, and small sales are being made at the higher quotations. Quotations for No. 1 foundry are still \$17.50@18; but there is more iron called for and sold at \$18 than for some weeks past. For No. 2 quotations are still \$16@17, but there is more selling at \$17 than usual. The inquiry just now is for the better brands, and the buyers are more particular to obtain the brands they want than to buy at a very low price. The restriction in output is producing its legitimate result, namely, increased anxiety to buyers. Southern irons are also being offered; but from all accounts, there is not much Southern iron to be thrown on this or any other market. There is more activity in grey forge. Since Monday quite an amount of iron has been sold on a basis of \$14.50@15. There is also some inquiry for charcoal car-wheel iron. The general tone of the market has improved. Some inquiries have also been received for Bessemer pig, but buyers have supplied themselves elsewhere.

**Foreign Material.**—Spiegeleisen is nominally \$29; ferro-manganese has been advanced nominally \$1@2 per ton.

**Merchant Iron.**—The large amount of rolling capacity and the anxiety of manufacturers to secure business keeps prices way down. Some business has been done in Eastern mills at as low as \$1.70, but the average business heard of ranges from \$1.75@1.85.

**Skelp Iron.**—Buyers of skelp iron are waiting a drop in prices. To-day's quotations are given at \$1.75 for grooved and \$1.85 for sheared.

**Wrought Iron Pipe.**—A drop in wrought iron pipe quotations seems to be expected by some parties who have business to place, but are not inclined to do so just yet.

**Sheet Iron.**—There are several large buyers of sheet iron who are also holding back business in anticipation of lower rates, but manufacturers think they will be able to sell their output at present quotations, which are 3 cents to 3 1/2 cents for best refined, according to gauge.

**Steel Billets.**—There are a good many inquiries to-day on the market for steel billets, but buyers have not yet decided to act. Quotations are \$28.50@29.

**Plate Iron.**—The placing of a few large orders during the past four or five days for shop plate and tank has helped business, but there is more anxiety among manufacturers to secure orders than there is among buyers to place them. There is an anticipation that still better quotations will be named for plate iron before the month is out. Steel flange has been sold at \$2.50.

**Structural Material.**—Angles are quoted at \$2 @ \$2.10; plates about the same; tees, \$2.50; beams and channels, \$3.10. There is nothing new to report.

**Steel Rails.**—Quotations are \$30. Large buyers are not being heard from, according to expectations. Makers are a little disappointed at the amount of business they are doing. The only busi-

ness here that brokers are handling is for small lots.

**Old Rails.**—Old rails are quoted at \$22@23. **Scrap.**—There is an active demand for No. 1 railroad at \$22.50; other kinds are not much sought after, but all yards are doing a fair business.

**Pittsburg.** March 5.

(From our Special Correspondent.)

**Raw Iron and Steel.**—The market last week presented a strong and healthy appearance, with fair prospects for a continuance. Through a combination of circumstances during the past three days it has been less firm, and buyers have been disposed to hold off.

Several parties of iron ore men were in the city during the week endeavoring to make contracts for supplying furnace men with their annual supply. For reasons no doubt satisfactory to themselves, the furnacemen decline to purchase, notwithstanding the fact that their supply could be obtained at \$1@1.50 per ton below last year's rates. Notwithstanding the weakening noted in the market generally, there has been a moderate inquiry for certain grades of Bessemer and Grey Forge, on which some sellers refused to make any concessions. There were others, however, who were disposed to shade prices in order to affect sales. Many persons are of the opinion that a further advance of 50 cents to a dollar per ton would soon start up furnaces that are now non-producers. Hence the chance of any important change in prices is not taken in serious consideration at present.

The stock of iron now on the market is not large. The reduction of freights from Pittsburg next will, no doubt, assist trade very materially; it will go into effect on the 30th of the present month.

The effect of the change is to reduce the freight charges on manufactured iron and steel 2 1/2 cents per hundred or 50 cents a ton to Chicago, and 3 and 3 1/2 cents per hundred to St. Louis. This reduction amounts to about 12 1/2%, and will be an important factor in the business prosperity of this city.

According to an estimate by a well known freight agent of this city, there are at present from 4,000 to 5,000 tons of iron and steel such as are covered by this schedule shipped westward every day. The saving in freight charges to the iron men will thus be over \$2,000 daily. The parties who have made the fight for lower freight rates have been the Mahoning and Shenango Valley iron men. This reduction is the first concession that the railroads have made, and cannot fail to be of great benefit to the iron interest.

Table with 2 columns: Item and price. Includes Coke Smelted Lake and Native Ores (2,000 Tons Bessemer, March at \$17.00 cash), Charcoal (100 Tons No. 2 Foundry at 22.00 cash), Steel Slabs and Billets (2,500 Tons Billets and Slabs at 26.50 cash), and Mack Bar (1,000 Tons Neutral, April, May at 27.50 cash).

Table with 2 columns: Item and price. Includes Ferro-Manganese (200 Tons 80% Jersey City, May at 60.65 cash), Steel Bloom Ends (500 Tons Bloom Ends at 18.00 cash), Skelp Iron (300 Tons Narrow Grooved at 1.75@4 m), and Old Iron and Steel Rails (500 Tons American T's at 24.50 cash).

**CHEMICALS AND MINERALS.**

**NEW YORK, Friday Evening, March 6.** The arrivals of almost all heavy chemicals during the past week have been quite large. The demand has been fair and this, combined with the fact that the larger part of what came in was on contract, has allowed prices, with very few exceptions, to be maintained. It is generally expected, as now the menace of dangerous financial legislation has been removed by the adjournment of Congress, that business will become settled and

that buyers will supply themselves more liberally. Renewed confidence in the market, after the past uncertainty, will be conducive to good business. From our reports we judge, however, that whatever influence this may have the reaction has not yet made itself felt.

There was only a fair volume of trade at the beginning of the week and no improvement at the end. Brimstone and nitrate of soda continue the two articles the possibilities of which most puzzle the traders; both have continued their upward course, and no signs indicate that high-water mark has yet been reached. Large quantities, considering the spot supply, have changed hands, and sales of January shipments have been as large as conditions would allow.

**Caustic Soda, 60%.**—Arrivals on contract have come to hand, but stocks remain small. Sales of spot, in hardly more than a jobbing way, however, have been noted; while in to arrive some business has been done. We quote 3'32½@3'35c. 70@74%.—No large additions have been made to the stock here. The demand has not been very good, and as a consequence but little has been changing hands. Values have decreased a little, and sales could probably not be made now at more than 3.10c. Fairly large quantities have been changing hands at less, 77%.—The demand for this grade continues highly satisfactory to dealers and leaves the market rather bare. Most of that which arrived last week was on contract and the remainder has almost entirely gone into second hands. The market is firm at 3'07½c.@3'10c., with inquiry resulting in business noted.

**Alkali, 48%.**—This continues to come in, but has not met with quite as much favor at buyers' hands as heretofore. Accumulations are not large enough to have weakened the price perceptibly, but the tone of the market is not as firm as it was. High test is meeting with a fair demand at from 1'50@1'55c. Most business is done in shipments to arrive and near by, as very nearly all of that, coming in, is on contract, thus keeping the available spot supply very small.

**Caustic Soda Ash, 48%.**—The nature of business has not changed since our last report; small quantities are changing hands and stocks remain small, but the demand shows no signs of increasing. We quote 1'55@1'60c.

**Carbonated Soda Ash, 48%.**—Business has been fairly active, and values, with few exceptions, have been well maintained at our last quotations, 1'60@1'65c. Sales of some quantity have been made at 1'57½c., but the market closes at our first figures. Arrivals have come in and some sales to arrive have been reported. The market for high test is firm; some quantities have been changing hands at 1'50@1'55c., with sales of smaller lots at 1'60c.

**Sal Soda.**—Business has not been quite as satisfactory as in the preceding week, most of it has been of a jobbing nature. Quotations for small lots remain about 1'15@1'17½c. Large lots to arrive are sold as low as 1'07½c. Domestic makers report a good-deal of inquiry and a satisfactory business. They continue to quote 1'00@1'05c.

**Bleaching Powder.**—Has arrived in some quantity, but without affecting the market as most of it was already contracted for. Demand has been better and sellers are more confident than they have been. Stocks are small. We quote 1'75@1'80c.

**Acids.**—The very material rise in raw materials, both brimstone and nitrate of soda, has at last forced manufacturers to raise their demands. A general stiffening in prices has been noted and business at the higher figures is said to be good. The pyrites acid manufacturers are now very advantageously placed. Our former quotations still hold good for them and the business they are doing leaves no cause for complaint.

The prejudice which has so long kept a large number of consumers from using this acid seems also to be on the wane, a fact well recognized by some of the staunchest supporters of brimstone acid. We understand that the next two or three months will see at least one, if not more, new pyrites acid factories in full operation.

If brimstone continues on its upward course, present prices for acid will be ruinous and the demands of manufacturers will have to be very materially increased. Business in acetic, muriatic and nitric acids continues hardly more than of a jobbing nature. The usual demand for this period of the year is easily met. Nitric has increased considerably in value since last week.

We quote as follows: Acid, per 100 pounds, in New York and vicinity—Acetic, \$1.55@1.52; muriatic, 18° 80c.@1.1; muriatic, 20° 90c.@1.10; muriatic, 22°, \$1@1.20; nitric, 40°, \$3.75@4.25, nitric, 42°, \$4.00@4.50; sulphuric, 60°, 85c.@1.05; sulphuric, 66°, \$1.00@1.37½.

**Fertilizers.**—Business through the week has been quite active, and both the crude materials and special grade fertilizers have met with a good buying demand. Business in brimstone has been restricted by the fact that there was not much offering. Speculation in nitrate of soda is said to have become quite extensive. In speaking of the general fertilizer market in London, Messrs. Couper, Millar & Co. say under date of February 16th:

"This month's business has not been so active as anticipated, manufacturers complaining of the lateness of the season and being indisposed to purchase raw materials until their present stocks are

reduced. South Carolina River Rock remains at 10½d. to 11d. per unit. Canadian 80% is practically off the market for the present, sellers having placed the bulk of their output at prices previously quoted. Florida has been offering at cheap figures but principally in small parcels for trial purposes; 70% may be taken at 12d. to 13d. per unit. Somme 70% at 14½d. to 15½d., but not much offering. Belgian for early shipment has recently been sold on a parity of 5½d. per unit for 40% f. o. h. Antwerp and even under."

We quote f.o.b. rock, \$7.25@7.50; freights by sail from Charleston to New York, \$1.75@2; ground rock, \$8@11.50.

Sulphate of ammonia gas liquor has changed hands quite freely. We quote spot, 3'17½c., with not much offering, and May and April shipments, in which a good deal has been done, 3'20c.

Bone sulphate is not quite as firm, though the demand continues fair. Most sales have been made at 3'15c. High-grade blood is selling for \$2 a unit, with low grade 10c. less.

Nitrate of soda is now quoted at from 2'12½@2'15c. for spot and January sailing. Sales of at least 3,000 bags have been made during the last three days. Following is the monthly report of F. B. Nichols, Esq., under date of the 3d inst.:

	1891.	1890.	1889.	1888.
Stocks in store and afloat in Atlantic ports, February 15th, bags.....	44,094	85,151	63,994	59,563
Arrivals at New York....		46,120	23,980	8,505
Previously reported, 73-160; total arrivals to date, 73-160; same time 1890, 144,196; same time 1889, 74,870.	44,094	131,271	87,974	68,068
New York.....	28,554		141,000	
Boston.....	Nil.		23,000	
Philadelphia.....	4,000		21,000	
Baltimore.....				
Hampton Roads.....			4,500	
For orders.....	32,554			
200,500 Charleston.....			11,000	
Visible supply.....	233,054.			200,500

	1891.	1890.	1889.	1888.
Deliveries fortnight ending March 2d.....	11,540	40,787	12,076	5,287
Previously reported.....	71,020	64,651	72,896	47,541

	1891.	1890.	1889.	1888.
Total deliveries to March 2d.....	82,560	105,438	84,972	52,828
Sales spot..... 202'05	1'75@1'80	2'35@2½	2'10@2'20	

The market during the last fortnight was very lively. The small stock here in the hands of dealers, was easily controlled, and a reasonable advance followed. The price may be carried to 2½. The political situation in Chili is undoubtedly serious, but the quarrel between President and Congress has been worked for all it is worth in the interest of nitrate holders. January sailings have been sold in large quantity at 1.80 to 2c.

Our list to arrive includes nothing later than January sailing. We have stricken from the list several vessels that were in doubtful position when the blockade was declared on. It is not at all unlikely that these, if no others, got off last month after Iquiqui and Pisagua fell under the control of the Congress party. The only arrival of the month was the "Drot" at this port.

**Brimstone.**—The price of brimstone continues to increase steadily. According to the latest reports there have been no sellers in Sicily and the stock here is withdrawn to a great extent, so that everything indicates that a further rise will be experienced. Spot is quoted here at \$33; shipments nearby \$31, with to arrive March-April held a little higher.

**Muriate of Potash.**—Notwithstanding the fact that the arrivals during the week have been large, the spot supply is very small. The arrivals amounted to 500 tons, and all went immediately into second hands. Further sales of 300 tons have been reported. There is quite a large quantity nearby, but the demands recently have been so large that the available stock bids fair to remain almost nil for some time to come.

NOTES OF THE WEEK.

It is reported that the Rathbone Acid Works, of Parkersburg, W. Va., were recently sold to the Grasselli Chemical Company, of Cleveland, O. It is expected that the works, already one of the largest in the country, will be greatly enlarged and a greater number of men employed.

Liverpool. Feb. 20.

(Special Correspondence by G. G. Blackwell.)

**Minerals.**—Our market has continued to rule firm. A fair amount of business has been done at full prices. Manganese: Arrivals still small; prices unchanged. Magnesite: Stocks of raw lump still large, and prices low. Raw ground £6 10s. and calcined £12 10s. Bauxite (Irish Hill brand): The strong demand continues at full prices. Pumice stone: In lump and ground, more doing. Iron ore quieter, also manganiferous and Santander; Irish and Cumberland in good demand at full prices. Emery stone firm for best qualities. No. 1 lump, £5 10s.@£6; smalls, £5@£5 10s. Fuller's earth unchanged; best lump, 55s.; fine impalpable ground, £7. "Emerald" ground, 80s. Scheelite,

wolfram, tungstate of soda, and tungsten metal firmer. Chrome ore: High grades more inquired for at full figures. Antimony ore and metal steady. Asbestos firm, especially Canadian rock. Potter's lead ore of best quality easier; smalls, £13 to £14; selected lump, £15 to £16. Calamine: High qualities sought after at full figures. Strontia sulphate (celestine) steady, 15s, 6d to 17s. Carbonate (native), £15 to £16; powdered (manufactured), £11 to £12. Limespar in more demand; English manufactured old G. G. B. brand in request at 50s (ground). Felspar and fluorspar firmer. Plumbago: Best qualities sought for; Spanish, £6; best Ceylon lump at last quotations; Italian and Bohemian, £4 to £12 per ton. Ground mica, £50. China clay steady; common, 18s 6d; good medium, 22s 6d to 25s; best, 30s to 35s (at Runcorn). Bog ore (oxide of iron) scarce; finest quality 22s.

**Chemicals.**—Prices continue to rule firm without much alteration. Soda ash 1½d up. Caustic soda firm; 60% white, £10; 60% cream, £9 15s; and 70% white, £11 10s; 74%, £12. Bicarbonate, £5 15s. Nitrate of soda, 8s 6d to 9s. Soda crystals, £3 10s. Bleaching powder, £7 2s 6d. Saltcake, 42s 6d. Chlorate of potash, 5½d. Arsenic strong at £14. Sulphate of copper, £18 10s to £19. Manganese: Sulphate, £22; chloride of manganese, £15 per ton; carbonate £12 10s; borate, best English make, 6½d. Chloride of magnesium (antiseptic) strong at 45s to 50s.

BUILDING MATERIAL MARKET.

NEW YORK, Friday Evening, March 6.

**Bricks.**—The stocks here continue so large that no hope of immediately higher prices can be entertained unless extensive building should suddenly commence. The weather was, of course, a depressing factor, but yesterday and to day have brought out a large attendance at the exchange. What may be considered the incubus under which builders are at present laboring is the fact that so many of them are waiting for payments which are due, but on which they have been forced to give more time. Brickmakers are, of course, reticent about supplying more material until they can at least see the money.

The trouble between Bricklayers' Union No. 7 and the American National Bricklayers' Union has turned out to be of a very serious nature and promises to complicate matters in building circles here. Altogether, the situation is far from pleasant for the large manufacturers, and seems to foreshadow a very poor business year. Haverstraws, being in heavy stock, will not bring more than \$6 per thousand, and sales of large quantities at \$5.50 would probably be made. Pales are also quoted much lower, \$2.50@2.75, with far more sales at the first than at the last figures. Keyport is quite as weak as the other qualities of brick, though the stock is not so large comparatively.

**Lime.**—Arrivals have been very large, with consumption lagging very much behind. Sellers and buyers are apart just now. Rockland common is held at \$1, and finishing at \$1.10. Consumers are not willing to give that price, and as a consequence only the most immediate wants are being supplied. Not much is reported as coming in.

NOTES OF THE WEEK.

It is reported that 95 brick manufacturers, doing business in and around this city, assembled at 11.30 A. M. on Thursday at the Astor House for the purpose of forming an association for mutual protection. This meeting is the outgrowth of the trouble which the brickmakers had last summer over a boycott which was declared against several of their members by the labor unions. Other manufacturers have gradually been persuaded to consent to a combination, until now 118 signatures have been obtained. It was not until yesterday, however, that the new combination assumed definite shape. Its objects are, first, to defeat any tyrannical or unjust demands of the labor organizations, and second, to so regulate the price of bricks that the market will have some stability. It is claimed that the dealers and contractors have practically controlled the market, and that the tendency is to combine against the brick manufacturers. The market has been made very unreliable, and in consequence of the cutting and competition not only have bricks been made to vary from \$2 to \$18 a thousand, but it has been very difficult for the brickmakers to get any reliable contracts. The makers now propose to do away with the middlemen, and through the Trust to sell directly to the contractors. By doing this, and by keeping control of their own stock, limiting the supply, and not allowing a surplus to accumulate in the hands of third parties, they will establish a condition of things better for the building trade generally, as contractors will have something definite to figure on. Their scheme is practically as follows: Each brick yard will be appraised according to the capital represented, and stock of the Trust will be issued to the owners *pro rata*. The Trust will be run by a board of directors, who will regulate the output of each yard and also the price of the brick. There are 176 members in the association, of whom 118 have already signed the agreement, and it is expected that the remainder will soon come into the fold. The Trust will go under the name of "The New York and New Jersey Brick Manufacturers' Association."

DIVIDEND-PAYING MINES.

NON-DIVIDEND PAYING MINES.

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

G. Gold, S. Silver, L. Lead, C. Copper. \* Non-assessable. + This company, as the Western, up to December 10th, 1881, paid \$1,400,000. † Non-assessable for three years. ‡ The Deadwood previously paid \$75,000 in eleven dividends, and the Terra \$75,000. The consolidated California and Nevada paid \$1,320,000 in dividends, and the Con. Virginia 40,000,000. \*\* Previous to the consolidation of the Copper Queen with the Atlanta, August, 1888, the Copper Queen had paid \$1,350,000 in dividends.





STOCK MARKET QUOTATIONS.

Table with columns: COMPANY, Bid, Asked, Baltimore, Md. Includes entries for Atlantic Coal, Balt. & N. C., Big Vein Coal, etc.

Birmingham, Ala. March 4.

Table with columns: COMPANY, Bid, Asked, Birmingham, Ala. Includes entries for Ala. Coal & I. Co., Ala. Conn. & C. Co., etc.

Pittsburg, Pa. March 4.

Table with columns: COMPANY, B, A, Closing, Pittsburg, Pa. Includes entries for Allegheny Gas Co., Bridgewater Gas Co., etc.

St. Louis. March 4.

Table with columns: COMPANY, Bid, Asked, St. Louis. Includes entries for Alabama, American & Nettie, Aztec, N. Mex., etc.

Table with columns: Old Colony, Fat Murphy, Puzzle, Richmond Hill, etc.

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

Table with columns: COMPANY, Sales, Price, Trust Receipts. Includes entries for American Cotton Oil, National Lead, etc.

Foreign Quotations.

Table with columns: COMPANY, Highest, Lowest, London, Feb. 20. Includes entries for Almada, Mex., Amador, Cal., etc.

Paris. Feb. 19.

Table with columns: Belmez, Spain, Callao, Venez, East Oregon, etc.

CURRENT PRICES.

Table with columns: CHEMICALS AND MINERALS, Acid-Acetic, Muriatic, Nitric, etc.

Large table with columns: Ammoniates-Azotine, Blood, dried, Concentrated tankage, Bones, rough, etc.

Table with columns: Salt-Liverpool, ground, Turk's Island, Salt Cake, Saltpeter, etc.

THE RARER METALS.

Table with columns: Aluminum, Arsenic, Barium, Bismuth, Cadmium, etc.

BUILDING MATERIAL.

Table with columns: Bricks-Pale, Jerseys, Up Rivers, Haverstraw, etc.

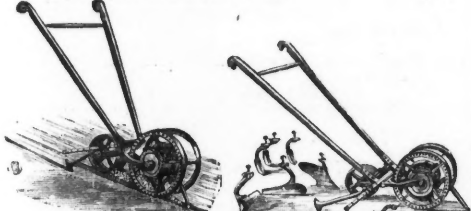
**NEW YORK PRICES CURRENT.  
MARCH 7, 1891.**

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

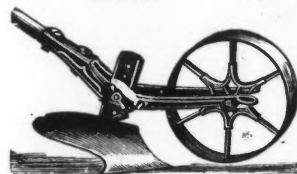
The names and addresses of the manufacturers of goods quoted in this list can be obtained by applying at this office.

**Discounts are for Wholesale Export Only.**

**Agricultural Implements.**



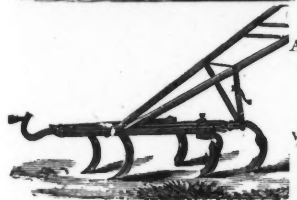
"Planet, Jr." No. 2 Seed Drill, \$9. Dis. 30%.  
Combined Drill Cultivator Rake, Plow, etc., \$12. Dis. 30%.



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



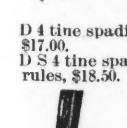
All Steel Horse Hoe and Cultivator combined, with wheel, \$6 75-100 net.



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



**HAY FORKS.**  
Standard Spading Forks. Solid Steel Stanks, Gold Bronze Finish, Patent Overcaps, Per doz.  
8 D 4 light angular tine, iron D, plain ferrules, \$17.00.  
8 D S 4 light angular tine, iron D, strapped ferrules, \$18.50.  
11 D 4 light angular tine, iron D, plain ferrules, blue, half polished, \$16.00.  
13 D 4 light angular tine, iron D, strapped ferrules, blue, half polished, \$17.50.  
15 D 5 tine, angular tine, iron D, plain ferrules, \$24.00.  
17 D 5 tine, angular tine, iron D, strapped ferrules, \$25.50.



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



**Manure Forks.**  
7 4 D, oval, 4 tine, 13 in. tine, iron D, plain ferrules, \$13.50.  
4 D S, oval, 4 tine, 13 in. tine, iron D, strapped ferrules, \$15.00.  
5 D, oval, 5 tine, 13 in. tine, iron D, plain ferrules, \$20.50.  
5 D S, oval, 5 tine, 13 in. tine, iron D, strapped ferrules, \$22.00.  
6 D, oval, 6 tine, 13 in. tine, iron D, plain ferrules, \$23.50.  
6 D S, oval, 6 tine, 13 in. tine, iron D, strapped ferrules, \$25.00.  
Dis., 65 and 5% and 2 1/2%.

**PLOWS.**



Reversible Oneonta Clipper.  
16. Oneonta Clipper, Reversible, Iron beam Cutter, \$14.  
" Oneonta Clipper, Reversible, Iron Wheel and Cutter, \$15.  
18. Oneonta Clipper, Reversible, Iron Beam Cutter, \$15.  
" Oneonta Clipper, Reversible, Iron Beam Wheel and Cutter, \$16.  
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, Wheel and Jointer, \$16.
- 20. Steel Mould Board, Reversible, Wood Beam Cutter and Cutter, \$15.

- 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.
- Hitecock's Potato Digger and Shovel Plow, 7.00.
- Improved adjustable handle shovel plow, 8.00.
- Hitecock's Potato Digger, and shovel plow, 10.50.

- Blade Solid Shank Hoes.
- Field, 7 x 5 in., selected handles, \$8.00.
- " 7 1/2 x 4 1/2 " " " " 8.00.
- " 8 x 4 1/2 " " " " 8.00.
- " 8 1/2 x 4 1/2 " " " " 8.00.
- " 8 x 5 " " " " 8.00.

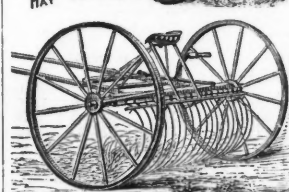


Field Socket Hoes, \$9.00.

Dis., 65% and 5%.



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



**HAY TEDDER.**  
Chieftain Lock Lever No. 1, \$16.90.  
No. 2, 16.00.  
No. 3, 15.00.  
Iron wheels, \$1 extra.  
With Pole, Double Tree and Neck Yoke, \$1 extra.  
22 cubic feet packed, 400 lbs. gro., 225 lbs. net.

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

- RAKES (GARDEN).**  
Malleable Iron Garden Rakes, Per Doz.  
Plain.  
8 teeth, 6 ft. handles, straight shank \$5.00.  
10 " " " " 5.50.  
12 " " " " 6.00.  
14 " " " " 6.50.  
16 " " " " 7.00.

- For braced goods, add 50 cents per dozen to list.
- Cast Steel Garden Rakes, Per Doz.**  
Plain. Braaced.  
8 teeth, 6-ft. handles, \$8.00 \$9.50.  
10 " " " " 9.00 10.50.  
12 " " " " 10.00 11.50.  
14 " " " " 11.00 12.50.  
16 " " " " 12.00 13.50.

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

- SCYTHES (GRASS).**  
Waldron's pattern, oiled, \$3.50.  
Silver steel, painted, 2.50.  
Western dutchman, bronzed and painted, .00.  
Clipper, polished web, 9.00.  
Fine cutlery steel, full polished, 10.00.  
All steel, full polished, 11.00.

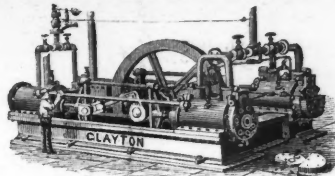
- Grain Scythes.**  
Waldron's pattern, oiled, 11.25.  
Silver steel, painted, 11.25.  
Clover, oiled, 11.25.  
Clipper, bronzed and painted, 11.50.

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



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

**Air Compressors.**



Special design for export. Shipping weight, 8,000 lbs. No one piece weighing over 300 to 400 lbs. Size No. 34c. Steam cylinders, each 12 in. diameter; air cylinders, each 12 in. diameter, and stroke, 13 in.; capacity, six 3 in. rock crills. Price, \$3,000 f.o.b. New York. Dis., 20%.

**Anvils.**

No.	Weight about	Price	No.	Weight about	Price
No. 000	1/2 lb.	\$1.00	No. 4	40 lbs.	\$4.25
" 00	4 "	1.75	" 5	50 "	5.75
" 0	10 "	2.25	" 6	60 "	6.40
" 1	15 "	2.75	" 7	70 "	6.90
" 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 15 and 10%.

- Arms and Ammunition.**  
Wood Powder. 1/4 kegs. 1 lb. 6 1/4. 1 lb. 5.00.  
Trap for first quality arms \$19.50. 9.85 trap. 8.69 let'd grades.

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

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



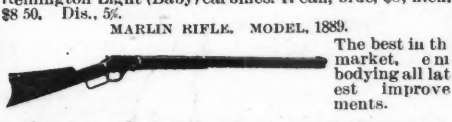
- Gatling Cartridges, 25 special.
- Primed Shells and Bullets, 20 10.
- Friction Cannon Primers, 20 10.
- Primers, 10 10.
- Percussion Caps, F. C., per M., 33c.
- U. M. C., 42 1/2c.
- Musket, 45c.
- Brass Shot Shells, U. M. C., 1st qual., 60 10.
- Club brand, 65 10.



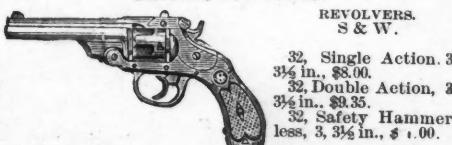
- 14, 16 and 20 ga. Club brand, 30, 10 and 10 per cent.
- 10 and 12 ga. Club brand, 33 1/2, 10 and 10 per cent.
- Gun Wads, 20 and 10 per cent.

- RIFLES.**  
Colts' Lightning Magazine.

- 40/60 and 45/60 calibre octagon barrel, 10 lbs., \$15.30.
- " " " round " " 9 1/4 " 14.25.
- " " " carbine " " 9 " 14.25.
- 32, 38, and 44 calibres, octagon " " 7 1/4 " 13.50.
- " " " round " " 6 3/4 " 12.38.
- " " " carbine " " 6 1/4 " 12.38.
- " " " baby carbine " " 5 1/4 " 12.38.
- 22 calibre, rim fire, octagon barrel, 15.38.
- " " round, 14.25.
- Remington Light (Baby) carbines, 44 cal., blue, \$8; nick., \$8.50. Dis., 5%.



- 58 and 44 calibres, using the same cartridges as Winchester rifles of the respective sizes.
- Octagon barrel, 24 inch, 6 1/4 lbs., \$19.50.
- " " " " 26 " 6 3/4 " 21.50.
- " " " " 28 " 7 " 23.50.
- Round " " 24 " 6 1/4 " 18.50.
- Carbine " " 20 " 5 1/4 " 17.50.
- Discount, 25, 10 and 10%.




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

\$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, 6 1/4 in., 12.00; 44, Double Action, 4 in., \$12.50; 44, Double Action, 5 in., \$12.75; 44, Double Action, 6 1/4 in., \$13.00; 44, Double Action Favorite, 5 in., \$12.75.

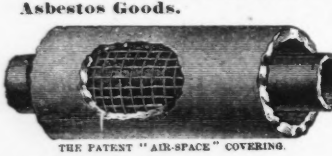
 **Colts.**  
Discount, 10 per cent from following prices.



Double Action Army, 44 and 45 calibre, 4 1/4, 5 1/4, 7 1/4 inch bbl., \$13.00.  
Double Action, 41 calibre, 2 1/4 to 6 inch bbl., \$11.20.  
Single " Army, 45 calibre, 4 1/4, 5 1/4, and 7 1/4 inch bbl., \$12.00.  
Single Action Army, 44 calibre, "Frontier," 4 1/4, 5 1/4, and 7 1/4 inch bbl., \$12.00.  
New Line 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.  
National Deringers, 41 calibre, per pair, half or full plate, \$4.00.  
New Police, 38, 4 1/4 in., nickled, \$6.66.


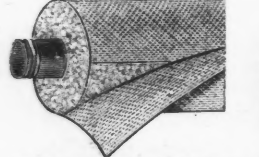
 **American Bull Dog**  
Double Action 32, 38 and 44 calibre, 2 1/4 inch barrel, \$1.60;  
Double Action 32, 38 and 44 calibre, 4 1/4 inch barrel, \$1.85;  
Double Action 32, 38 and 44 calibre, 6 inch barrel, \$2.10 net.

F. & W. British Bull Dog revolvers, 32 and 38 calibre 2 1/4 inch bbl., \$1.85 net.  
F. & W. Automatic revolver, 32 and 38 calibre, 3 1/4 inch bbl., \$4.00 net.  
H. & R. Automatic revolver, 32 and 38 calibre, 3 1/4 inch bbl., \$3.75 net.


**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, 5/4 inch barrel, \$8.50.  
Remington Army revolver, Single Action, 44 cal., frontier cartridge, 7/4 inch barrel, \$6.00.  
Remington Double Deringers, 41 cal., rim fire, \$4.05.

**Asbestos Goods.**  
 Patent air-space coverings, Per sq. ft., 25c. Discount, 20%.

 Wick packing, per pound, 45c. Discount, 10%.  
 Removable pipe coverings. See list. Sq. ft. 20c. Disc., 25%.

 Tube cleaner, "The National," Per inch, \$1. Discount, 60%.  
 Fire felt covering for steam Piston Packing. Per pipe, Per sq. ft., 25c. See list. pound, 45c. Discount, 25%.

**Assay Furnace.**  
Hydro-Carbon Blow-Pipe Assay Furnace.  
No. 2, Muffle Furnace taking C Battersea Muffle 3x4 1/2 x 3 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. 5 1/2 deep, 4.00.  
No. 2, taking Batter-



As K. round, 5 in. dia., 6 1/2 deep, \$5.00  
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. 2, Muffle Furnace No. 2, and Crucible Furnace No. 1, 37.00  
Blow-Pipe No. 3, Muffle Furnace No. 3, and Crucible Furnace No. 2, 46.00  
25% f. o. b. New York on wholesale orders.

**Axes, e. c.**  
Axes, Handled.  
Brands, Collins, Sharp, Pecks.  
Dis., % doz. doz. doz. Net  
3 1/2 @ 4 1/2 lbs. \$10.75 \$15.00 9.50  
4 1/2 @ 5 1/2 lbs. 11.00 15.50 9.50  
4 1/2 @ 6 lbs. 11.50 16.00 10.00  
5 @ 7 lbs. 12.50 17.50 11.00

**Brands, Hurd, Blair, Free-**  
doz. doz. doz. man.  
Net Net Net Net  
3 1/2 @ 4 1/2 lbs. \$8.50 \$11.00 \$8.00 \$6.50  
4 1/2 @ 5 1/2 lbs. 8.50 11.00 8.00 7.00  
4 1/2 @ 6 lbs. 8.75 11.25 8.25 7.00  
5 @ 7 lbs. 9.00 11.50 8.50 7.50

**Brands, Collins, Sharp, Pecks.**  
Dis., % doz. doz. doz. 50 & 5  
Three-quarter axe \$8.00 \$13.50 \$13.50 \$13.50  
Boys' axe, No. 2 8.00 13.50 13.50 13.50  
Half axe 7.00 12.50 12.50 13.00  
Quarter axe 6.50 10.00 10.00 11.00

**Brands, Collins, Hurd, Free-**  
doz. doz. doz. man.  
Dis., % Net Net Net Net  
Three-quarter axe \$13.50 \$13.50 \$7.50 \$7.50  
Boys' axe, No. 2 13.50 13.50 7.50 7.50  
Half axe 12.50 12.50 6.50 6.50  
Quarter axe 12.00 12.00 6.00 6.00  
Hatchets, with handles.

 **AXE PATTERN.** Both patterns, same price.  
 **HUNTER'S.**

**Collins, Sharp, Pecks, Sim-**  
doz. doz. doz. mons.  
Dis., % 10 50 50 & 5 50  
Dozen \$6.00 \$10.00 \$9.00 \$9.00

 **SHINGLING.**  
 **CLAW.**


**Brands, Collins, Sharp, Pecks, Mann**  
Dis., % 10 50, 5 50 & 5, 50, 5  
No. 1 Doz. \$4.75 \$8.00 \$8.00 \$8.00  
No. 2 " 5.25 8.50 8.50 8.50  
No. 3 " 5.75 9.00 9.00 9.00

**Brands, Collins, Sharp, Blair, Mann**  
Dis., % 10 50, 5 60, 5 50, 5  
No. 1 Doz. \$5.25 \$9.00 \$9.00 \$9.00  
No. 2 " 5.75 9.50 9.50 9.50  
No. 3 " 6.25 10.00 10.00 10.00

 **LATHING.**  
 **BROAD.**

**Brands, Collins, Sharp, Pecks, Blair.**  
Dis., % 10 50, 5 50 & 5 60, 5  
No. 1 Doz. \$4.75 \$8.00 \$8.00 \$8.00  
No. 2 " 5.25 8.50 8.50 8.50  
No. 3 " 5.75 9.00 9.00 9.00

**Brands, Collins, Sharp, Pecks, Blair.**  
Dis., % 10 50 50 60, 5  
No. 2 Doz. \$11.50 \$11.00 \$11.50  
No. 3 " 7.50 13.00 13.00  
No. 4 " 8.00 14.50 14.50  
No. 5 " 9.0 16.50 16.50  
No. 6 " 10.00 18.00 18.00  
Broad Axes. Steel polls.


 **Brands, Collins, Hunt, Sharp, Pecks.**  
Dis., % 10 45 50 50 & 5  
Dozen \$20.00 \$30.00 \$29.00 \$32.00

**YANKEE, OR OHIO, PENNSYLVANIA, NEW ORLEANS.**  
Brands, Collins, Sharp, Pecks, Blair, Mann.  
Dis., % 10 50 50 & 5 60, 10 50  
Dozen \$19.00 \$32.00 \$32.00 \$32.00  
Handled, extra, \$4.

**Adzes.**  
  

**RAILROAD. SQUARE HEAD. SHIP CARPENTER'S**  
Brands, Collins, Hunt, Sharp, Pecks, Hurd  
Dis., % 10 45 50 50 50, 50  
Rail'd, heavy, doz. \$14.00 \$26.00 \$26.00 \$26.00 \$26.00  
Flat head " 15.00 24.00 24.00 24.00 24.00  
Brands, Collins, Hunt, Sharp, Pecks, Hurd.  
Dis., % 10 45 50 50 50, 100  
Square head, doz. \$12.50 \$24.00 \$24.00 \$24.00 \$24.00  
Brands, Collins, Hunt, Sharp, Pecks, Hurd.  
Dis., % 10 45 50 50 50  
Ship Carpenter's or Spur  
Head, doz. \$13.00 \$25.00 \$25.00 \$25.00

 **Brands, Collins, Hunt, Sharp.**  
Dis., % 10 45 50  
Cooper's, handled and bolted, doz. \$16.00 \$27.00 \$25.00


**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  
See Oils, page 10.

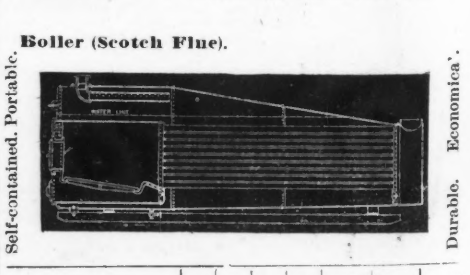
**Bellows.**  
Miner's Bellows: 24 in., \$8.50; 26 in., \$9.75; 28 in., \$11.00; 30 in., \$11.25; 32 in., \$13.50.  
60 and 50 dis.  
Standard, each: 18 to 24 in., \$10; 28 in., \$12; 32 in., \$14; 34 in., \$16; 36 in., \$18; 38 in., \$20; 40 in., \$23; 42 in., \$27; 44 in., \$32.  
60 and 50 dis.  
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.

 **MINERS**  
 **HAND**

**Beltlug. LEATHER BELTS.**  
Standard Manufacturers List. Single belts per foot.  
Width. Width. Width.  
1 inch..... 10 6 inch..... 76 20 inch..... 284  
1 1/4 "..... 13 7 "..... 90 21 "..... 302  
1 1/2 "..... 17 8 "..... 102 22 "..... 320  
1 3/4 "..... 20 9 "..... 115 23 "..... 337  
2 "..... 23 10 "..... 129 24 "..... 354  
2 1/4 "..... 26 11 "..... 142 26 "..... 392  
2 1/2 "..... 30 12 "..... 155 28 "..... 430  
2 3/4 "..... 33 13 "..... 168 30 "..... 464  
3 "..... 36 14 "..... 182 32 "..... 500  
3 1/2 "..... 43 15 "..... 198 34 "..... 535  
4 "..... 50 16 "..... 214 36 "..... 570  
4 1/2 "..... 56 17 "..... 231 40 "..... 640  
5 "..... 63 18 "..... 249 44 "..... 710  
5 1/2 "..... 70 19 "..... 266 48 "..... 780

Double belts twice the price of single.  
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%.

**Blowers and Disc Fans.**  
 12 inches... \$30 42 inches... \$105  
18 "..... 40 48 "..... 125  
24 "..... 50 54 "..... 160  
30 "..... 65 60 "..... 200  
36 "..... 85  
Discount 35% and 2 1/2% for cash.

**Boiler (Scotch Flue).**  
 Self-contained, Portable. Economical. Durable.

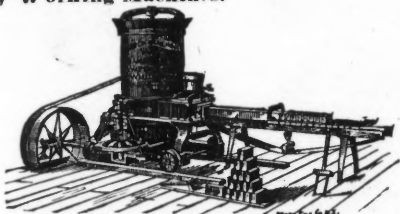
Horse power.....	8	10	15	20	25	30	35
Diameter.....	28"	32"	32"	36"	40"	40"	44"
Length, feet.....	9 1/2	10	12 1/2	13 1/2	14 1/2	16 1/2	16 1/2
Weight, pounds.....	3500	4000	4500	5000	6500	6900	7500
Price, \$.....	387	487	587	687	887	987	1087

Discount, 15%

Brick Machinery.

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

Day Working Machines.



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

Brushes.

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

No.	4.	2.	0.	3-0.	5-0.	7-0.	Dis.
X.....	\$1.15	\$1.80	\$2.50	\$3.15	\$4.00	\$5.25	\$6.75 25%
Atlantic.....	1.25	2.15	3.80	5.25	7.00	10.00	13.00 25%
Standard.....	1.60	2.60	4.00	6.00	8.00	11.00	16.00 25%

VARNISH OVAL.

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

VARNISH FLAT.

No.	1.	1 1/2.	2.	2 1/2.	3.	Dis.
X.....	\$0.48	\$0.72	\$0.93	\$1.20	\$1.40	25%

SASH BRUSH.

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

WHITE-WASH.

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

SHOE.

No.	8.	9.	15.	26.	Dis.
10.....	\$11.50	\$12.50	\$15	\$18	25%
Per gross dis., 25%.	27.	32.	29.	35.	
	\$20.00	\$24.00	\$28.00	\$30.00	

HORSE.

No.	Patent.	Dis.	
18.00	\$20.00	\$24.00	\$30.00

Per gross, dis., 25%.	Wood back ... \$12	\$15	\$18	\$24
Per gross, dis., 25%.	Leather back. \$21	\$31.50	\$42	\$54

SCRUB.

No.	Patent.	Dis.	
12.00	\$12.00	\$16.00	\$18.00

No.	Dis.			
\$3.50	\$3.50	\$12	\$14	
\$18	\$18	\$1.00	\$1.50	\$2.50

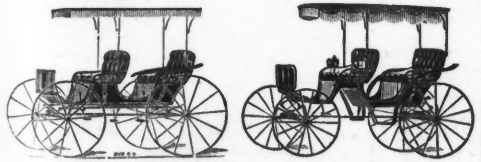
SHAVING.

No.	Dis.			
\$0.36	\$0.60	\$1.00	\$1.50	\$2.50

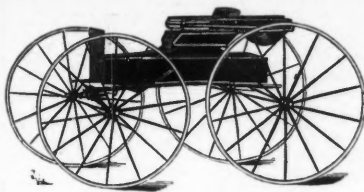
COUNTER.

No.	Dis.		
\$3.00	\$3.00	\$1.00	\$5.00

Carriages, Etc.



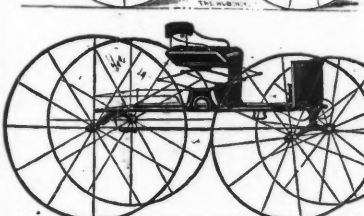
Windsor Surrey.	Open, \$120.
Canopy top, \$145.	Leather extension top, \$185.
Pole or shafts.	Leather extension top, \$220.



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



Runabout, \$65.



Buckboard, \$30; shafts.



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

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

Crucibles.

Battersea Crucibles, Triangular.	Height.	Width.	Crucibles, Covers.	Per doz.	Per doz.
No.	Inches.	Inches.			
S.....	4 1/2	4 1/2	\$1.00	\$0.50	\$0.50
T.....	4	3 3/4		0.80	0.56
U.....	3 1/2	3 1/4		0.60	0.4
V.....	3 1/4	2 3/4		0.45	0.4
W.....	2 3/4	2 1/4		0.35	0.3
X.....	2 1/2	2 1/4		0.30	0.3
Y.....	2 1/4	2 1/4		0.25	0.3
Z.....	1 3/4	1 3/4		0.20	0.30

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

No.	Long.	Wide.	High.	Price.
	Inches.	Inches.	Inches.	Each.
A.....	7	3 1/2	2 1/2	\$ .04
B.....	7 1/2	4 1/2	2 1/2	.7
C.....	8	4 1/2	3	.85
D.....	8 1/2	5	3 1/4	1.00
E.....	9	5 1/2	3 3/4	1.1
F.....	10	6	4	1.2
G.....	11	6 1/2	4 1/4	1.0
H.....	10 1/2	5 1/4	3 3/4	1.0
J.....	12	6	4	1.25
K.....	14	8	5	1.75
L.....	15	9	6	2.00

Export discount 15 %.

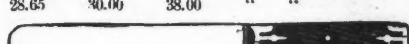
Cutlery.

KNIVES-TABLE.

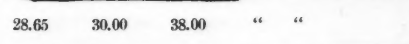
Japanned iron handles, \$10.70 per gross pairs.				
Cocobola Ebony Bone handles, handles, handles. gross pairs.				
10.70	12.00	15.35		
14.70	16.00	18.70	"	" medium size.
17.35	18.70	24.00	"	" full size.
17.35	18.70	21.35	"	" medium.
20.00	21.35	26.70	"	" full size.
22.70	24.00	29.35	"	
27.35	28.70	36.00	"	" medium.
Cocobola Ebony Bone handles, handles, handles. gross pairs.				
28.00	29.35	38.00	"	"



28.65 30.00 38.00 " "



28.65 30.00 38.00 " "



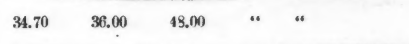
32.00 33.35 38.00 " "



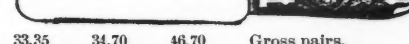
34.70 36.00 49.00 " "



33.35 34.70 46.70 Gross pairs.



37.35 38.70 50.70 " "



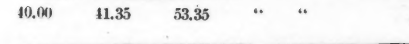
40.00 41.35 53.35 " "



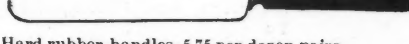
Hard rubber handles, 5.75 per dozen pairs.



Solid bone handles, 4.80 per dozen pairs.



Celluloid handles, 7.5 per dozen pairs.



Forks are made to match all above patterns, with either three or four prongs.



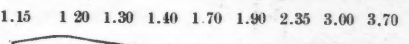
Discount 25 %.

BUTCHERS'- COCOBOLA HANDLES.

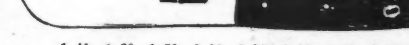
Per dozen.	1 and 1 1/2 in.	5 in.	5 1/2 in.	6 in.	6 1/2 in.	7 in.	8 in.	9 in.	10 in.
1.15	1.15	1.20							



1.15 1.20 1.30 1.40 1.70 1.90 2.35 3.00 3.70 5.00



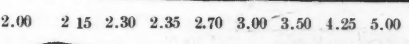
1.15 1.20 1.30 1.40 1.70 1.90 2.35 3.00 3.70 5.00



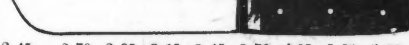
1.15 1.20 1.30 1.40 1.70 1.90 2.35 3.00 3.70 5.00



2.00 2.15 2.30 2.35 2.70 3.00 3.50 4.25 5.00 7.50



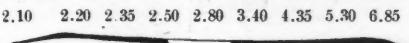
2.45 2.70 2.95 3.15 3.45 3.70 4.35 5.00 6.00



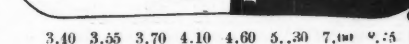
2.10 2.20 2.35 2.50 2.80 3.40 4.35 5.30 6.85



3.40 3.55 3.70 4.10 4.60 5.30 7.00 9.5 11.0



4.10 4.25 4.40 4.80 5.30 6.00 7.75 9.50 12.50



2.00 2.15 2.30 2.35 2.70 3.00 3.50

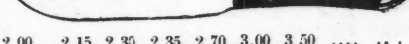


Discount 25 and 10 %.

HUNTING-EBONY HANDLES.

5 1/2 in. 6 in. 6 1/2 in. 7 in. 8 in. 9 in.

Per Dozen.



2.55 2.70 3.00 3.50 3.55 4.00 5.00

2.55 2.70 3.00 3.30 3.50 4.00 5.00  
Discount, 25 and 10%  
Per Dozen.  
Putty knives, cocobola handles..... \$1.30@1.50



**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  
15 in..... 12.00 | 16 in..... 14.00  
Discount, japanned, 60%; nickel, 45%.

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

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

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

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

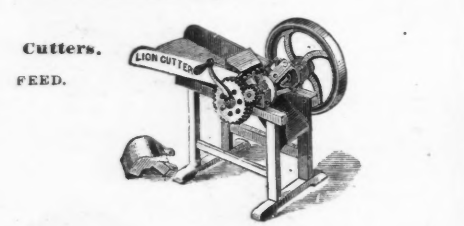
**BARBERS—Per dozen.**  
7½ in..... 15.00 | 9 in..... 18.00  
8 in..... 16.00 | 9½ in..... 20.00  
8½ in..... 17.00

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

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

**PRUNING SHEARS FOR LONG HANDLES.**  
No. 1, \$36 per dozen; No. 2, \$30 per dozen.  
Discount, 40 and 5%.

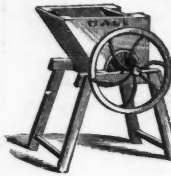
**Cutters.**  
LION CUTTER  
F.E.E.D.



No. of cutter.	No. of knives.	Length in inches of knives.	Length in inches of feed cut.	Price.
1	2	6½	½, ¾ and 1	\$18.00
2	1	7½	¾, 1 and 1½	21.00
2½	1	7½	¾, 1 and 1½	21.00
3	1	7½	¾, 1 and 1½	23.00
3	2	8	¾, 1 and 1½	25.00
4	1	8½	¾, 1 and 1½	27.00
4	1	10	¾, 1 and 1½	30.00
4	2	10	¾, 1 and 1½	33.00
5	2	10	¾, 1 and 1½	35.00
6	2	11	¾, 1 and 1½	45.00
6½	2	11	¾, 1 and 1½	45.00
7	2	13	¾, 1 and 1½	60.00
7½	2	13	¾, 1 and 1½	60.00
10	2	16	¾, 1 and 1½	80.00
12	2	20	¾, 1 and 1½	100.00
11	2	11	¾, 1 and 1½	45.00
13	2	13	¾, 1 and 1½	60.00
16	2	16	¾, 1 and 1½	80.00
20	2	20	¾, 1 and 1½	100.00

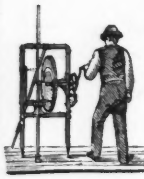
The knife arbors for all sizes are made of machinery steel. 30 per cent. dis.

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	42	1,700	15
No. 4	42	2,000	18
No. 5	50	3,000	25
No 10	65	8,000	35

30% dis.

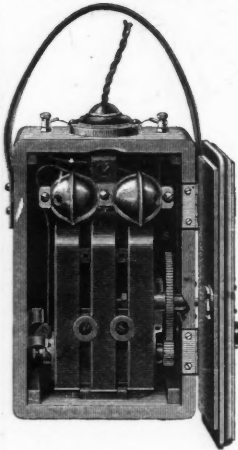


Drill—Portable Hand Rock.

Price, \$225.

Dis., 25 and 2½%.

Electrical Appliances.



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

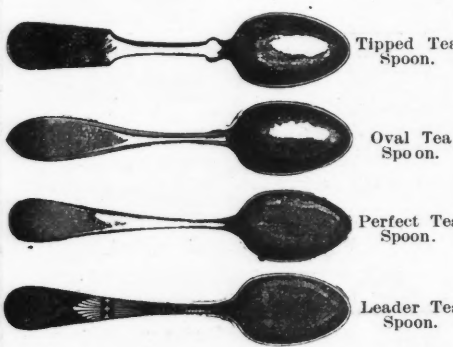
Electroplate.

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

Dis. 60 and 2%. Aesthetic medium fork.  
Tea spoons. 7.50  
Table spoons. 15.00  
Medium forks. 15.00 per gross.  
Discount, 30 and 5%.

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

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



5 oz. or extra plate—Perfect and Tipped Oval. Leader.  
Tea spoons.... 4.25 4.50 4.75 per doz  
Dessert spoons... 7.50 8.00 8.50 " " " "  
Table spoons... 8.50 9.00 9.50 " " " "  
Coffee spoons... 4.25 4.50 4.75 " " " "  
Dessert forks... 7.50 8.00 8.50 " " " "  
Medium forks... 8.50 9.00 9.50 " " " "  
Discount, 60 and 5%.  
Spoons and forks, German silver, tipped pattern.  
Tea spoons. Table spoons. Medium forks.  
22.50 45.00 45.00 per gross.  
Discount, 60 and 2½%.  
Spoons and forks, made from brass, and silver plated or a coating of hard, white nickel.

CASTERS.



1,200—Dinner.



232—Breakfast.



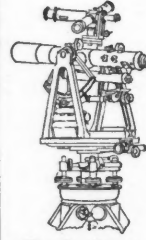
**PICKLE DISHS**  
No. 144. 12 in. high, \$3.50  
No. 66. 10½ in. high, \$2; as sorted colored glass.  
No. 155. 12 in. high, \$4; as sorted colored glass.  
No. 146. 12½ in. high, \$9; hand decorated glass.  
No. 156. 12½ in. high, \$6; hand decorated glass.



**TEA SETS.**  
No. 255. 6 pieces, \$35, quad-ruple plate.  
No. 301. 4 pieces, \$23, quad-ruple plate.  
No. 1847. 6 pieces, \$42, quad-ruple plate.  
Dis., 60 and 5%.

No. 255.

Engineering Instruments.



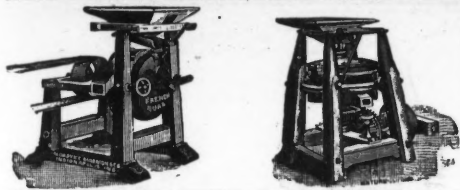
Full Engineer's Standard Transit.  
7 in. graduated circle..... \$255  
6 in. " " " " " " 245  
5 in. " " " " " " 235  
4 in. " " " " " " 225  
Standard Engineer's Level, im-proved centre and seat attach-ment, 18 in. telescope ..... 140  
Plain railroad level, 18 in. tele-scope..... 125  
Dis., 5%.

**Explosives.**  
Dynamite, 75% Nitro-Glycine, per lb..... .32  
" 60% " " " " " " .25  
" 40% " " " " " " .20  
Blasting powder A, per keg 25 lbs..... \$2.40  
" B, " " " " " " 1.90  
Sporting powder, standard brands, per keg 25 lbs... 5.40  
" " " " " " 12½ lbs. 2.75  
" " " " " " 6¼ lbs. 1.50  
" " " " " " 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... 3.85 " " "  
" " double tape " " " " 4.85 " " "  
" " triple tape " " " " 5.60 " " "  
Discount 17½%.  
Detonating caps, triple force, 25 M. in case... \$5.00 per M.  
" " quintuple force, 25 M. in case..... 7.50 per M.  
Electrical exploders, 4 ft. wires..... \$3.00 per 100  
" " " " " " 6 " " " " 3.54 " " "  
" " " " " " 8 " " " " 4.08 " " "  
" " " " " " 10 " " " " 4.62 " " "  
Discount 15%. Long lengths to order.  
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.



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



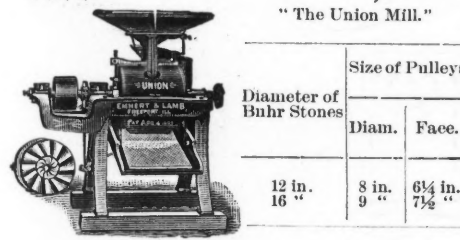
Diameter of burrs.	Power to drive.	Size of pulley.	Capacity per hour.	Revolutions per minute.	Weight.	Price.
14 in.	2 to 4 H. P.	9x5 1/2	4 to 14 bushels	630 to 1200	870 lbs.	\$100
18 in.	4 to 10 H. P.	11x6 1/2	8 to 40 bushels	400 to 700	600 lbs.	130

The Dixey Mill—Stiff Spindle Style.

Size.	Power.	Capacity.	Weight.		Pulley.	Iron gear.	Mortise gear.
			Pulley.	Gear.			
18	4 to 6 H.P.	8 to 25 bu	560 lbs	650	130	165	
22	6 to 8 "	12 to 30 "	800 "	1000	165	200	
26	8 to 12 "	16 to 40 "	1100 "	1500	185	220	
30	10 to 15 "	25 to 60 "	1300 "	1700	215	255	

GRINDING MILLS.

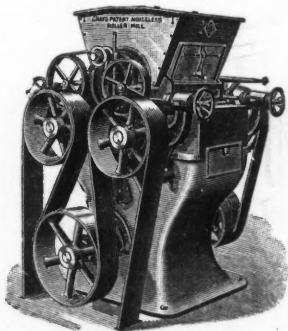
“Daisy,” without Shaking Bolt, 170 pounds, 9 cubic feet, \$40.  
 “Daisy,” with Shaking Bolt, 185 pounds, 9 cubic feet, \$48.  
 Discount 25 per cent.



“The Union Mill.”

Horse Power	Capacity in Bushels	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 "

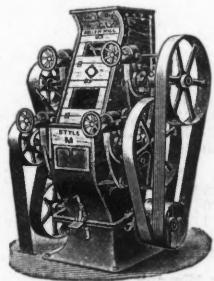
NOISELESS ROLLER MILLS FOR FLOUR MILL USE.



4-roll or double machines.

Size, incl es.	Weight, lbs.	Price in New York, net.		
		All smooth.	1 pair corrugated.	All corrugated.
6x12	1,480	\$302	\$307	\$312
6x16	1,680	334	339	344
6x20	1,860	377	372	377
9x14	2,800	377	383	380
9x18	3,500	406	414	422
9x24	4,150	455	465	477
9x30	5,850	510	525	530

NOISELESS ROLLER MILLS FOR CORN-GRINDING ONLY.



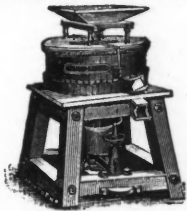
Size inches.	Weight lbs.	Capacity per hour bushels.	Price in New York.
9 x 14	2,600	20 to 35	\$390.
9 x 18	3,050	30 " 50	422.
9 x 24	3,350	40 " 80	477.

6 x 8 Corn Meal Roller Mill.....\$85.  
 COMPLETE FLOUR MILLS ON MILLSTONE SYSTEM.

Size of stone ins.	Power needed.	Capacity flour per hour.	Weight boxed.	Price net in New York.
20	6 h. p.	200	4,500 lbs.	\$550.
26	7 " "	250	4,500 "	650.
30	10 " "	300	5,500 "	750.
36	11 " "	375	6,500 "	850.
42	12 " "	450	8,000 "	950.

COMPLETE FLOUR MILLS ON THE ROLLER PROCESS.  
 Capacity in flour 24 hours. Power needed approx. Weight in estimate. No. of Net price in hours. New York.

The Nordyke Bradford Portable Mill.



Size of stones, in.	Grinding capacity.		Weights.		Geared mills.	
	Corn, bu. per hour.	Wheat, bu. per hour.	Sing'l gear.	Double gear.	Iron wh'ls.	Mortise wh'ls.
18	8 to 10	4	550	625	\$130	\$165
20	10 to 12	5	600	700	140	175
22	12 to 15	5	700	850	160	190
24	15 to 18	6	900	1050	175	210
26	18 to 20	8 to 10	1200	1400	185	225
30	20 to 25	10 to 12	1500	1700	225	265
36	25 to 30	14 to 17	1800	2100	315	355
42	35 to 40	19 to 21	2000	2300	390	435

Driving pulley.	Revolutions per minute.	Length of belt above floor.	Approximate shipping weight.	Price.
10" x 5 1/4"	400 to 500	14'	.....	\$500.00
14" x 6 3/4"	350 to 450	18'	2600 lb.	600.00
14" x 7 3/4"	350 to 450	18'	3050 lb.	650.00
14" x 8 3/4"	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.....	1 1/2 to 2	\$5.00	1/4, 95 cents	3/4, 67 cents.
2.....	2 to 2 1/2	6.25	1/4, 95 cents	3/4, 67 cents.
3.....	2 1/2 to 3	7.50	3/8, 1.30	3/4, 67 cents.
4.....	3 to 3 1/2	8.75	1, 1.75	1 1/4, 83 cents.
5.....	3 1/2 to 4 1/2	10.00	1 1/4, 2.90	1 1/4, \$1.04

Dis. on flue cleaners, 60 and 1.70%.  
 Dis. on steam hose, 50%, good to 90 lbs steam.

**Forges (Portable).**  
 No. 2e, weight, 155 lbs. 21x27 hearth ..\$42.00  
 3a, " 80 " 18 in. diam. hearth..... 27.00  
 3b, " 75 " 18 " " " " " " " " " " 24.00  
 3c, " 85 " 18 " " " " " " " " " " 30.00  
 No. 6a, weight 45 lbs., 14 in. diam. hearth..... 18.00  
 No. 6B, weight 45 lbs. 14 in. diam. hearth..... 16.00  
 Dis. 60%

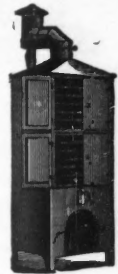
Light work, 12 x 17; height, 15 in., \$16.00.  
 Same, with Hood, 12 x 17; height, 23 in., \$20.00.  
 Bridge, Boiler or Railroad work, Pan, 17 x 19; height, 29 in.; Fan, 8 in., \$27.00.  
 Same, with Hood, \$30.00.  
 Water Tank, \$4.00 extra.  
 Iron Fire Ring Round Tuyere, \$1.00 extra.

Riveting Forges.  
 Bellows, 18 in., 20 in., 22 in., 24 in.  
 \$8.00, \$10.00, \$13.00, \$17.0  
 20% 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, 5 1/2 ft. high; 12 trays, 22 x 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.....	165
Dis., Nos. 1 and 2 = 25%. Nos. 3-4 = 20%.	

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.



One Arm Carries Rotary Cutter Price, \$2.50 each.

**Glassware.** Dis. 5%  
 6-in. bowl and cover, per doz.....\$2.75  
 7-in. " " " " " " " " " " 3.75  
 8-in. " " " " " " " " " " 5.00  
 9-in. " " " " " " " " " " 7.00  
 10-in. " " " " " " " " " " 9.00



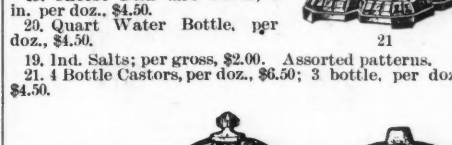
13. Nappy, 4 1/2-men., per doz., 50c.; 6-inen., per doz., \$2; 8-inch., per doz., \$4.  
 14. Cream Pitcher, 1 pint, per doz., \$1.25; one quart, per doz., \$2.75; 3 pints, per doz., \$4.00.  
 15. Pint Pitcher, per doz., \$1.50; quart pitcher, per doz., \$3; 3 pint pitcher, per doz., \$3.00.



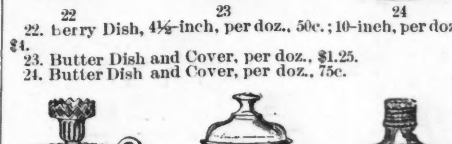
16. Flange Butter and Cover, per doz., \$1.50.  
 17. Water Set, per doz., sets of 60 pieces, \$7.50.



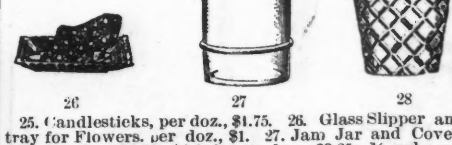
18. Cheese Dish and Cover, 8 in. per doz., \$4.50.  
 20. Quart Water Bottle, per doz., \$4.50.



19. Ind. Salts; per gross, \$2.00. Assorted patterns.  
 21. 4 Bottle Castors, per doz., \$6.50; 3 bottle, per doz., \$4.50.



22. Berry Dish, 4 1/2-inch, per doz., 50c.; 10-inch, per doz., \$4.  
 23. Butter Dish and Cover, per doz., \$1.25.  
 24. Butter Dish and Cover, per doz., 75c.



25. Candlesticks, per doz., \$1.75. 26. Glass Slipper and tray for Flowers, per doz., \$1. 27. Jam Jar and Cover, 1 qt., per doz., \$2.50; 1/2 gal., per doz., \$3.25; 3/4 gal., per doz., \$4; 1 gal., per doz., \$5; 1 1/2 gals., \$9; 2 gals., per doz., \$12. 28. Pocket Flask, 1 pint, \$1.

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



9 oz. per doz., \$2.0

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

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

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

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

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

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

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

**Hand Carts**

No. 0 42 wheel in. tread, 1 in. axle-box 48x28x10 deep, \$10.50.  
No. 1, 36 wheel, 1 in. tread, 7/8 in. axle, box 40x23x10 deep, \$9.00.  
No. 2, 30 wheel, 3/4 in. tread, 3/4 in. axle, box 32x20x9 deep, \$8.25.  
With Wagon-Seat Spring.  
No. 6, same sizes as No. 0, \$12.00  
No. 7, same sizes as No. 1, 10.50  
No. 8, " " " " 9.75  
With Third Wheel, Without Springs.  
No. 3, same sizes as No. 0, \$12.00  
No. 4, " " " " 10.50  
No. 5, " " " " 9.50

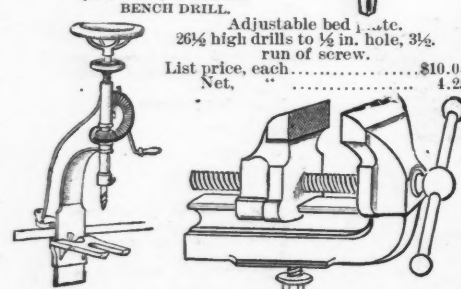
**Hardware Specialties.**

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

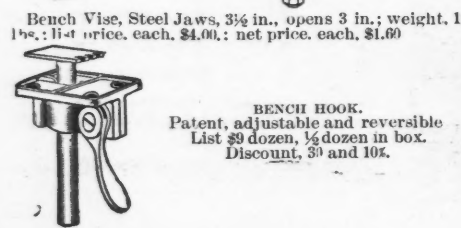
Patent Hollow Auger. No. 6.  
1/2 inch..... 5-16 3/8 7-16 1/2  
With bits..... 12.00 12.00 12.00 12.00  
Without bits 8.00 8.00 8.00 8.00  
9-16 5/8 3/4 1 1/4  
14.00 14.00 14.00 16.00 16.00 20.00  
9.00 9.00 9.00 13.00 13.00 14.00  
1 1/4 1 1/2 1 3/4  
20.00 24.00 24.00  
14.00 16.00 15.00

Discount, 15 and 10%.

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

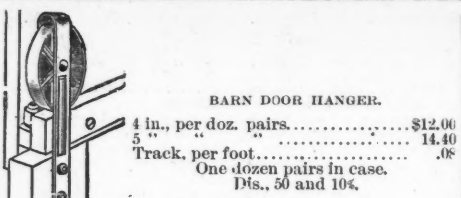


**BENCH VISE, Steel Jaws, 3 1/2 in., opens 3 in.; weight, 12 lbs.; list price, each, \$4.00; net price, each, \$1.60**

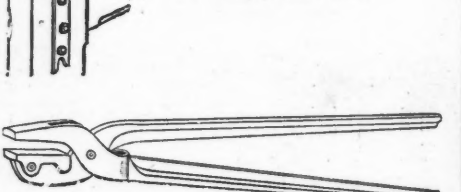


**BENCH HOOK.**  
Patent, adjustable and reversible  
List \$9 dozen, 1/2 dozen in box.  
Discount, 30 and 10%.

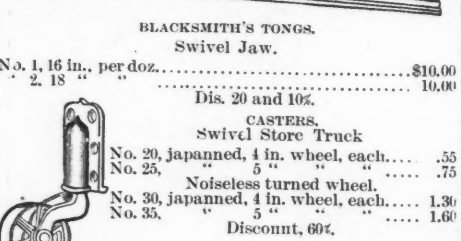
**BARN DOOR HANGER.**  
4 in., per doz. pairs.....\$12.00  
5 " " " " " " " " " " 14.40  
Track, per foot..... .06  
One dozen pairs in case.  
Dis., 50 and 10%.



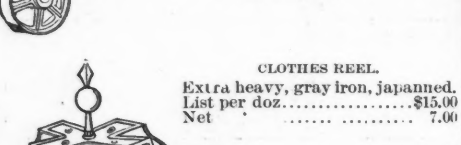
**BLACKSMITH'S TONGS.**  
Swivel Jaw.  
No. 1, 16 in., per doz.....\$10.00  
No. 2, 18 " " " " " " " " " " 10.00  
Dis. 20 and 10%.



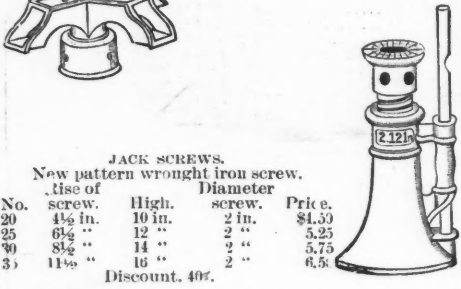
**CASTERS.**  
Swivel Store Truck  
No. 20, japanned, 4 in. wheel, each..... .55  
No. 25, " " " " " " " " " " .75  
Noiseless turned wheel.  
No. 30, japanned, 4 in. wheel, each..... 1.30  
No. 35, " " " " " " " " " " 1.60  
Discount, 60%.



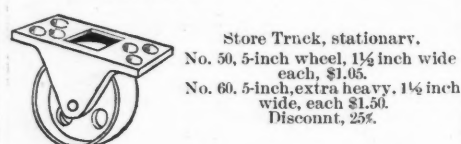
**CLOTHES REEL.**  
Extra heavy, gray iron, japanned.  
List per doz.....\$15.00  
Net " " " " " " " " " " 7.00



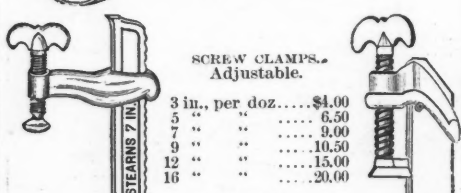
**JACK SCREWS.**  
New pattern wrought iron screw.  
No. of size of High. Diameter. Price.  
20 4 1/2 in. 10 in. 2 in. \$1.50  
25 6 1/4 " 12 " 2 " 5.25  
30 8 3/4 " 14 " 2 " 5.75  
35 11 1/2 " 16 " 2 " 6.50  
Discount, 40%.



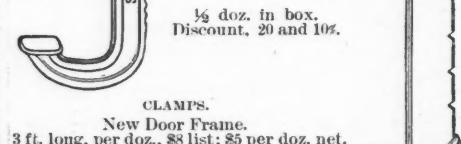
**Store Truck, stationary.**  
No. 50, 5-inch wheel, 1 1/4 inch wide each, \$1.05.  
No. 60, 5-inch, extra heavy, 1 1/4 inch wide, each \$1.50.  
Discount, 25%.



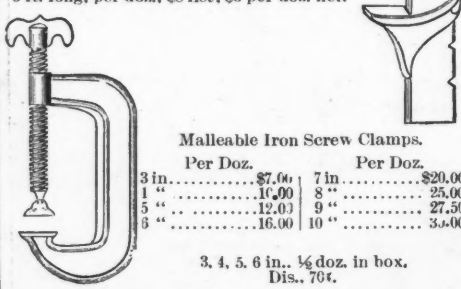
**SCREW CLAMPS.**  
Adjustable.  
3 in., per doz.....\$4.00  
5 " " " " " " " " " " 6.50  
7 " " " " " " " " " " 9.00  
9 " " " " " " " " " " 10.50  
12 " " " " " " " " " " 15.00  
16 " " " " " " " " " " 20.00  
1/2 doz. in box.  
Discount, 20 and 10%.




**CLAMPS.**  
New Door Frame.  
3 ft. long, per doz., \$8 list; \$5 per doz. net.



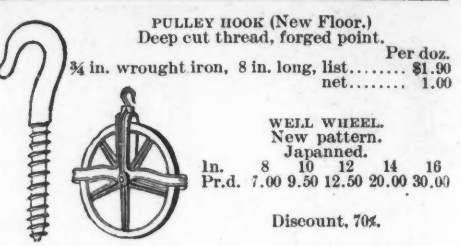
**Malleable Iron Screw Clamps.**  
Per Doz. Per Doz.  
3 in.....\$7.00 7 in.....\$20.00  
1 " " " " " " " " " " 10.00 8 " " " " " " " " " " 25.00  
5 " " " " " " " " " " 12.00 9 " " " " " " " " " " 27.50  
6 " " " " " " " " " " 16.00 10 " " " " " " " " " " 34.00  
3, 4, 5, 6 in., 1/2 doz. in box.  
Dis., 70%.



**WINDOW SCREEN FRAMES.**  
Patent Japanned Corners.  
No. 25, 36 by 36 corners and screws, without bead, per doz., \$2.50.  
No. 25, 36 by 36 corners and screws, with bead, per doz., \$2.90.  
No. 35, 42 by 42 corners and screws, without bead, per doz., \$2.90.  
No. 35, 42 by 42 corners and screws, with bead, per doz., \$3.30.  
Black satin stain, sticks 3/4 by 1 in.  
Dis., 25, 10 and 5%.

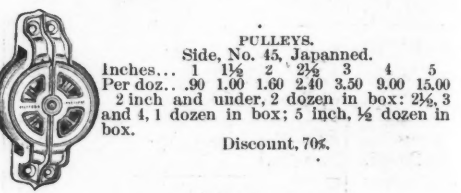


**PULLEY HOOK (New Floor.)**  
Deep cut thread, forged point.  
3/4 in. wrought iron, 8 in. long, list.....\$1.90  
net..... 1.00

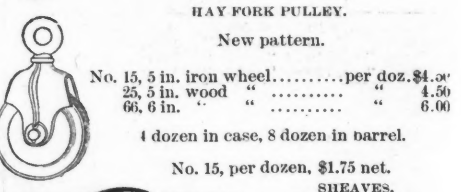


**WELL WHEEL.**  
New pattern.  
Japanned.  
In. 8 10 12 14 16  
Pr.d. 7.00 9.50 12.50 20.00 30.00  
Discount, 70%.

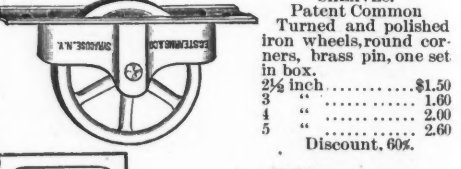
**PULLEYS.**  
Side, No. 45, Japanned.  
Inches... 1 1/2 2 2 1/2 3 4 5  
Per doz. .90 1.00 1.60 2.40 3.50 9.00 15.00  
2 inch and under, 2 dozen in box; 2 1/2, 3 and 4, 1 dozen in box; 5 inch, 1/2 dozen in box.  
Discount, 70%.



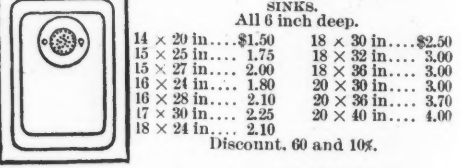
**HAY FORK PULLEY.**  
New pattern.  
No. 15, 5 in. iron wheel.....per doz.\$4.00  
25, 5 in. wood " " " " " " " " " " 4.50  
66, 6 in. " " " " " " " " " " 6.00  
4 dozen in case, 8 dozen in barrel.  
No. 15, per dozen, \$1.75 net.



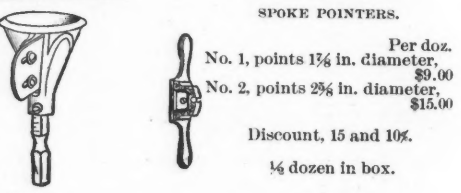
**SHEAVES.**  
Patent Common  
Turned and polished iron wheels, round corners, brass pin, one set in box.  
2 1/2 inch.....\$1.50  
3 " " " " " " " " " " 1.60  
4 " " " " " " " " " " 2.00  
5 " " " " " " " " " " 2.60  
Discount, 60%.



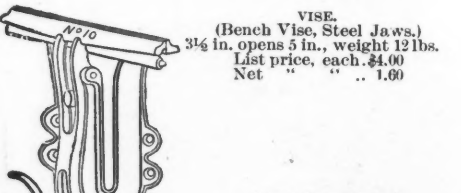
**SINKS.**  
All 6 inch deep.  
14 x 20 in.....\$1.50 18 x 30 in.....\$2.50  
15 x 25 in..... 1.75 18 x 32 in..... 3.00  
15 x 27 in..... 2.00 18 x 36 in..... 3.00  
16 x 24 in..... 1.80 20 x 30 in..... 3.00  
16 x 28 in..... 2.10 20 x 36 in..... 3.70  
17 x 30 in..... 2.25 20 x 40 in..... 4.00  
18 x 24 in..... 2.10  
Discount, 60 and 10%.



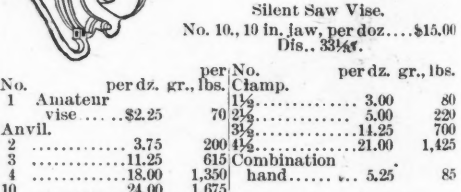
**SPOKE POINTERS.**  
Per doz.  
No. 1, points 1 1/4 in. diameter, \$9.00  
No. 2, points 2 1/2 in. diameter, \$15.00  
Discount, 15 and 10%.  
1/2 dozen in box.



**WISE.**  
(Bench Vise, Steel Jaws.)  
3 1/4 in. opens 5 in., weight 12 lbs.  
List price, each \$4.00  
Net " " " " " " " " " " 1.60



**Silent Saw Vise.**  
No. 10, 10 in. jaw, per doz.....\$15.00  
Dis., 33 1/2%.



Spot cash discount, 33, 20 and 2, f.o.b.  
Nos. 1, 1 1/2, 2 and 2 1/2 are packed in dozens; Nos. 3 and 3 1/2 in half dozens; Nos. 4, 4 1/2 and 10 in quarter dozens, and No. 20 singly. Each hand vise is put up in neat box and packed in half dozen lots.  
1 Hinge pipe vise, 0 to 2 in. pipe..... Each \$10.00  
2 " 20.00  
1 Malleable pipe vise, 0 to 2 in. pipe..... 8.00  
1 Combination pipe and bench vise, 0 to 2 in. pipe... 16.00  
Discount, 50%.

**WRENCHES.**  
Coes Wrenches.



**BLACK.**  
Knife Handle.  
Size. # doz. Size. # do. Size. # doz.  
6 inch.....\$9.00 10 " " " " " " " " " " 15 inch..... 24.00  
8 " 14.00 18 " " " " " " " " " " 30.00  
21 inch..... 36.00

**BRIGHT.**  
Knife Handle.  
4 inch.....\$10.00 10 inch..... 14.00 18 inch..... 32.00  
6 " 10.00 12 " " " " " " " " " " 16.00 21 " " " " " " " " " " 38.00  
8 " 11.00 15 " " " " " " " " " " 26.00  
Discount, 55, 10, 7 1/2 and 3%  
Coes Mechanics' Screw Wrenches, same list, less 50, 10, 10, 7 1/2 and 3%  
Patent Screw Wrench, same list. Dis, 50, 10, 7 1/2 and 3%.



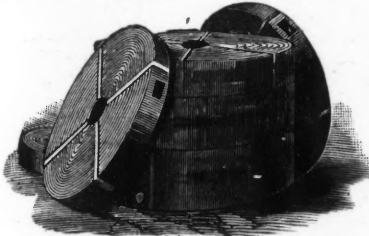
**Ice Machines (Family).**



No. 1, Ice machine, ice and ice cream molds, 1 lb. ice, \$15.00.  
 No. 2, Ice machine, ice and ice cream molds, 1 1/2 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, \$40.00.  
 No. 6, Ice machine, ice and ice cream molds, 4 carafe, 1 bottle holder, 9 lbs. ice, \$46.50.  
 No. 7, Ice machine, ice and ice cream molds, 5 carafe, 1 bottle holder, 12 lbs. ice, \$60.00.  
 Siberia, 18 lbs., \$120. Dis., 20 and 10%.

**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				
1 1/4	0.09				
1 1/2	0.11				
2	0.15	\$0.17	\$0.21		
2 1/4	0.18	0.22	0.26		
3	0.22	0.26	0.31		
3 1/2	0.25	0.30	0.37		
4	0.30	0.34	0.42		
4 1/2	0.33	0.39	0.47		
5	0.36	0.43	0.52		
5 1/2	0.43	0.52	0.62		
6	0.51	0.60	0.73		
7	0.59	0.70	0.84	\$1.05	\$1.25
8	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

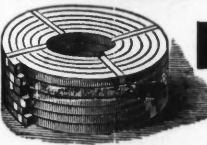
Dis. Reliance, 60 and 5. Dis. Royal, 60, 10 and 10. Dis. Manhattan, 70 and 5. See Leather Belting, page 3; Link Belting, page 9.

**PACKING.**

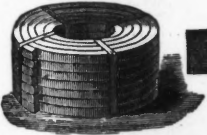
**Piston Packing.**



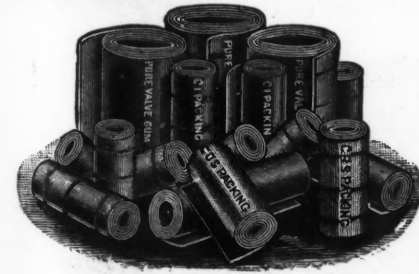
Round Piston Packing Per lb. 85c. Discount, 60, 10 and 5 per cent.



Square Piston Packing. Price same as above. Round and square piston packing is made in lengths of twelve or twenty-four feet.



Square Piston Packing. Rubber back, per pound \$1. Discount 60 per cent. Best only. Square piston packing with rubber back is made in lengths of twenty feet.



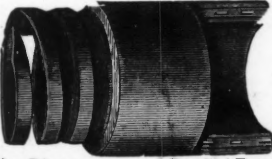
Steam Packing. Cloth Insertion, Rubber Outside, Cloth Insertion, Cloth on one or both sides.

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.	55 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.

**HOSE.**



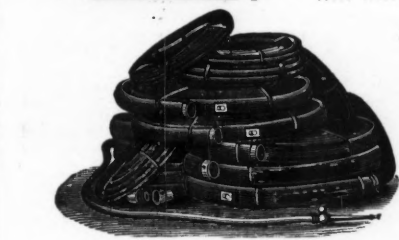
Improved "Smooth Bore" Rubber Suction Hose. On spiral flat or round tinned steel wire. Int. Diam. Per ft. 2 inch \$2.60 2 1/2 " 3.50 3 " 4.00 3 1/2 " 5.50

In. Diam.	Per ft.	Per Diam.	Per ft.
1/2 inch	6.50	7 inch	\$13.50
3/4 "	7.50	7 1/2 "	15.00
5/8 "	8.50	8 "	16.50
3/4 "	9.50	9 "	18.50
6 "	10.50	10 "	22.50
8 1/2 "	12.00	12 "	27.50

Suction hose discount: Reliance, 50 and 10%; Royal, 60, 10 and 5%; Manhattan, 70 and 5%.



On spiral brass or iron wire. Int. Diam. Per ft. 1/2 inch \$0.77 1 " 1.00 1 1/4 " 1.25 1 1/2 " 1.65 1 3/4 " 2.10 2 " 2.50

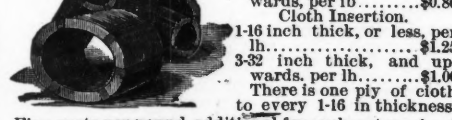


**RUBBER HOSE.**

Conducting Hose—Two-ply.		Hydrant Hose—Three-ply.	
Int. diam.	Per ft.	Int. diam.	Per ft.
1/2 in.	\$0.20	1 1/2 in.	\$0.60
3/4 in.	25	2 in.	75
1 in.	33	2 1/2 in.	83
1 1/4 in.	42	3 in.	92
1 1/2 in.	50	3 1/2 in.	99
1 3/4 in.	58	4 in.	132
2 in.	68	4 1/2 in.	160
2 1/2 in.	78	5 in.	185
3 in.	88	6 in.	231
3 1/2 in.	98	7 in.	261
4 in.	108	8 in.	291
4 1/2 in.	118	9 in.	321
5 in.	128	10 in.	351

Discount—Reliance, 60; Royal, 70; Manhattan, 70 and 10 per cent.

**GASKETS AND RINGS.**



1/2 inch thick, or less, per lb. \$0.90  
 5-32 inch thick, and upwards, per lb. \$0.80  
 Cloth Insertion. 1-16 inch thick, or less, per lb. \$1.25  
 3-32 inch thick, and upwards, per lb. \$1.00  
 There is one ply of cloth to every 1-16 in thickness.

Five cents per pound additional for each extra ply of cloth. Dis., 60, 10 and 5%.

**CORRUGATED RUBBER MATTING.**

Rolls 1 yard wide, 30 yards long, cut to any size required.

**Indurated Fibre Ware.**

SPITTOONS.	
16 in. dia., 8 in. high	Doz. \$24.00
12 1/2 in. dia., 5 1/2 in. high	10.80
9 in. dia., 5 in. high	7.80

**WASH TUBS.**

No. 0, 23 in.	1/2 12	27.00
No. 1, 21 in.	1/2 10 1/2	24.00
No. 2, 19 1/2 in.	1/2 9	21.00
No. 3, 18 1/2 in.	1/2 9	18.00
Nos. 0, 1, 2 and 3, nested	1 in. 3 1/2	7.50
Nos. 1, 2, and 3, nested	1/2 9 1/2	5.25

**CHAMBER PAISLS.**

12 in. dia., 9 in. deep, 3 gal.	16.00
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**WATER COOLERS.**

3 gal.	Doz. \$32.00
4 "	40.00
5 "	44.00
6 "	48.00
8 "	64.00
10 "	80.00
12 "	96.00
15 "	120.00



Dis. on all 40%

**Pails.**

	N. O. doz. in crate.	Cubic feet.	Price per doz.
Ladies' or Weaver's pails, 6 qt.	1	2 1/2	\$5.35
Half or buggy pails, 6 qt.	1	3	4.89
Star pails (standard plain), 12 qt., stenciled "for fire only" without extra charge.	1	3 1/2	5.40
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 stenciled "fire" without extra charge).	1/2	3	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.	1/2	3 1/2	8.40
" 18 "	1/2	3 3/4	10.70
" 20 "	1/2	4	12.00
Covers for fire or star pails.	1	1	3.35



**KEELERS.**

A—20 in. 7 in. deep	Doz. 16.20
B—19 "	15.00
C—18 1/2 "	14.00
1—17 1/2 "	13.20
2—15 1/2 " 6 in.	12.00
3—13 1/2 " 5 in.	10.20
4—12 " 4 in.	9.00



**MILK OR VEGETABLE PANS.**  
 13 1/2 in. dia. 3 1/2 in. deep, 6 quarts, \$3.60 per doz.



**WASH BASINS.**  
 12 1/2 in. Doz. \$3.60

**Lamps.**



1. Drummond Electric Hanging Lamp, 300 candle power, complete, doz., \$42.00.  
 3. 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.  
 4. Lamp chimney patent for Sun burners.  
 Per doz. No. 0, 40 cents. No. 1, 50c. No. 2, 65c.  
 2. Hitchcock nickel table lamp (No. 654), each \$3.25  
 " hanging " 656 " 3.70  
 " bracket " 651 " 3.50  
 " with reflector 653 " 3.75  
 French bronze bracket, with reflector, No. 653, each \$3.75.

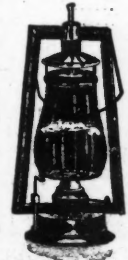


5. Hanging lamp. \$12 per doz.  
 6. Clock night lamp. \$21 per doz.  
 7. Hand lamp. \$1.50 per doz.



**Miners'.**  
 Brass, Collar and Breast in one piece, Spout and Body in one piece.  
 Price, \$8 per gross net.

Demmer Bros. "Cherry" Miners' Lamps, double spout, Doz. \$2.00  
 Drivers' " " single " " " 2.70  
 " " " " " " 2.50  
 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, 3/4 wick, without guards, per doz., \$5.00.  
 876, square safety lifting globe, per doz., \$5.50.  
 877, 1/2 wick, safety lifting globe, per doz., \$6.75.  
 Nickel plated diamond reflector road lamp, 30 candle-power, \$13.50 per doz.  
 Net illuminated night clock, per doz., \$27.



PAPER LAMPS.

Lined with oil proof composition.

No. 0.	Height, 2 1/2 in.	per doz.	\$1.00
No. 1.	" 3	"	.85
No. 2.	" 3 3/4	"	1.25
No. 3.	" 5	"	1.50
No. 4.	" 6 1/2	"	1.75



Laundry Appliances.



Washing Machine.

THE CATARACT.

All Metal.

Cubic Measurement 15 ft.

Price \$20.

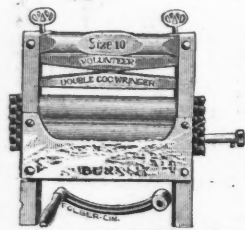
Dis., 25%.

Rolls.

"Volunteer." Length, 10 in. x 1 1/4 in. dia. \$40 per doz.

"Volunteer." Length, 11 in. x 1 1/4 in. dia. \$50 per doz.

"Volunteer." Length, 12 in. x 1 1/4 in. dia. \$60 per doz. Dis., 40%.



"Volunteer." Two independent pressure screws.

"Daisy." Length, 10 in. x 1 1/4 in. dia. \$30 per doz.

"Daisy." Length, 12 in. x 1 1/4 in. dia. \$18 per doz. Dis., 40%.

"Empire." Length, 10 in. x 1 1/4 in. dia. \$63 per doz.

"Empire." Length, 11 in. x 1 1/4 in. dia. \$74 per doz.

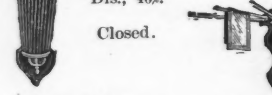
"Empire." Length, 12 in. x 1 1/4 in. dia. \$84 per doz.

"Empire." Length, 12 in. x 1 1/4 in. dia. \$87 per doz.

"Empire." Length, 14 in. x 2 1/4 in. dia. \$156 per doz.

"Empire." Length, 14 in. x 2 1/4 in. dia. \$220 per doz.

EMPIRE CLOTHES DRYING BARS. \$10 per doz. Dis., 40%.



Closed.

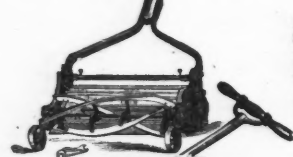
Open for use.

Lawn Mowers.

Forward Cut Mowers.

n.	Lbs.	In.	Lbs.	
0	Weight, 30 3/4	13.00	16 Weight, 38	\$19.00
2	" 31 1/4	15.00	" 41	21.00
4	" 36	17.00	" 21	34.00

Dis. 60 and 5%.

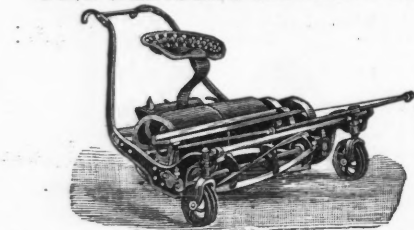


10 in.	12 in.	14 in.
\$13.00	\$15.00	\$17.00
16 in.	18 in.	20 in.
\$19.00	\$21.00	\$23.00

24 in., \$30.00.  
Geared at both ends.  
Dis. 60 and 10 and 5 and 5%.

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

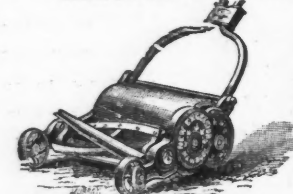
D s., 60 % and 10% and 5% cash f.o.b. New York.



New Excelsior Horse Lawn Mower.

in. cut, without shafts or seat.	\$65.00
" " with shaft and seat.	110.00
" " " " " " " "	135.00
" " " " " " " "	170.00
boots, per set.	12.00

Dis. 50%.



Excelsior Three-Blade Mower and Roller.

8 in.	\$11.00	10 in.	\$13.00
12 in.	\$15.00	14 in.	\$17.00
18 in.	\$21.00	20 in.	\$23.00

Dis. 60% and 5% cash 30 days f.o.b. New York.

Link Belting.

Price per running foot, net.			
No.	Price.	No.	Price.
25	\$0.13	78	\$0.40
32	.13	83	.45
33	.12	88	.50
34	.13	88	.50
35	.14	95	.60
42	.16	103	.75
5	.16	105	.70
12	.20	106	.90
15	.25	107	.80
16	.22	108	.80
17	.24	109	.90
22	.30	114	1.10
26	.30	122	1.50
27	.30	124	1.30
28	.35	146	1.40
77	.35		

Sprocket wheels..... 25%

Locks.

YALE PATENT RIM STORE LATCH. Per doz.

3 x 5 in., 4 keys.	\$48.00
2 1/2 x 4 in., 3 keys.	39.00

RIM NIGHT LATCH.

Spring lock, 3 keys.	18.00
Dead lock, 3 keys.	25.00

NIGHT LATCH.

Escutcheon.	39.00
"	36.00

MORTISE DEAD LOCK.

4 5/8 x 3 1/2.	45.00
2 3/4 x 3 1/2.	24.00

CUPBOARD LOCKS.

Plated Nose.	13.20
Brass Nose.	12.00

CUPBOARD

Dead Lock.	10.80
Spring Lock.	13.80

CHEST LOCKS.

Plated nose.	19.20
Brass	18.00

DRAWER LOCK.

Plated nose.	10.20
Brass	9.00

KNOB LOCKS.

5 x 3 3/8.	22.50
5 x 3 1/2.	20.00
4 1/4 x 3 1/2.	13.25
3 1/2 x 3 1/2.	10.50

STANDARD LATCHES.

Dead locks.

3 3/4 x 2 3/4.	24.00
2 1/2 x 3 3/8.	14.00
1 3/4 x 2 3/8.	12.00

NIGHT LATCHES.

3 1/4 x 3 3/8.	20.00
2 1/4 x 3 3/4.	18.00

DRAWER LOCKS.

2 x 1 1/2, two tumblers.	7.50
Brass " " " "	6.00

Three tumblers.

Plated nose.	9.00
Brass " " " "	7.50

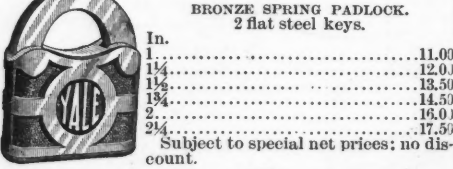
RIM FLUSH DRAWER LOCK.

2 in. diameter, 2 tumblers.	7.50
Brass " " " "	6.00
3 tumblers.	9.00
" " " "	7.50

BRONZE SPRING PADLOCK.

2 flat steel keys.	
In.	
1.	11.00
1 1/4.	12.00
1 1/2.	13.50
1 3/4.	14.50
2.	16.00
2 1/2.	17.50

Subject to special net prices; no discount.



YALE KEYS.

Machinery—Foot Power.

Engine Lathes

8 in. swing, 20 in. bet. centers, 36 in. bed, 240 lbs. weight.	\$60.
8 in. swing, 30 in. bet. centers, 46 in. bed, 260 lbs. weight.	\$70.
8 in. swing, 36 in. bet. centers, 52 in. bed, 280 lbs. weight.	\$75.

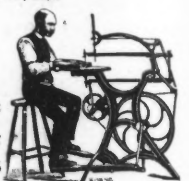
Boxing for export, \$2.50 extra; f.o.b. at Cincinnati, 25% dis.



SAWS AND LATHES

Victor Scroll Saw, Cuts to 3 Inches.

24-inch swing, with 12 saw blades.... \$40  
Dis., 20%.



Empire Scroll Saw, Cuts to 3 Inches.

24-in. swing, drill and tilting table.

Price, boxed..... \$25  
Dis., 20%



The Acme Combination Saw.

Hand or steam power.

Adjustable table and gauges.

Price, boxed.	\$40
Scroll saw attachment.	7
Boring attachment.	10
Moulding attachment.	10

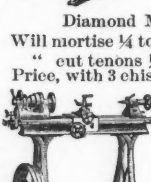
Dis., 20%.



Paragon Self Feed Rip Saw.

Two changes of speed; three changes of feed.

Price, with one 10 in. saw, \$50.00  
Dis., 20%.

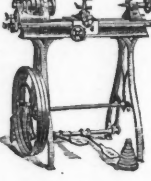


Diamond Mortising Machine.

Will mortise 1/4 to 1 in. wide, 3 in. deep.

" cut tenons 1/4 to 3/4 thick, 3 in. wide.

Price, with 3 chisels..... \$25.00  
Dis., 20%

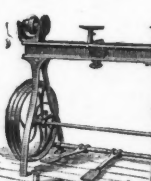


The "Star" Lathe.

Swings 9 x 25 in., back geared screw cutting.

Feeds in or out, right or left. Ad justable Tail Stock for Tapers.

Price, No. 1.....\$75.00  
Dis., 20%.



The Crown Lathe.

Swings 8 x 24 in.

Price, boxed, No. 1.....\$30.00

Compound slide rest... 10.00

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%.

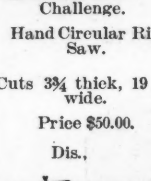


The Challenge Scroll Saw, for shell, bone wood, or metal.

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 3 3/4 thick, 19 in. wide.

Price \$50.00.

Dis.,



Scroll and Circular saw Combined.

Combined Machines.

Combined circular scroll saw and boring attachment—2 circular saws, 12 assorted scroll saws, boring attachment, and self-centering drill chuck.....\$50.00

Combined circular and scroll saw—2 circular and 12 scroll saws..... 40.00

Circular saw—1 extra rip and 1 cross-cut saw..... 35.00

Counter shaft for steam power..... 10.00

Dis., 35%.



Foot Power Former. \$20.00; Knives extra, \$1.00 each. Dis., 35%.



Mortising Machine. \$22.00; Chisels, \$1.00 each.

Blind Slat Chisels, 3 set bits, \$5.00. Dis., 20%.



Tenoning Machine. Price, \$25. Dis., 35%.



Velocipede Scroll Saw.

Without boring attachment, \$30.00. With 1 doz saw blades, } included. Dis., 35%. 1 3-16 bit.

Lathe.

centres, 1 spur, 2 tool rests and sockets, 1 turned face-plate, \$35.

Dis., 30%.

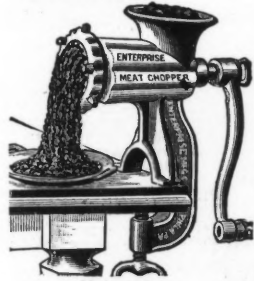


Lathe.

One turned face-plate, two pointed and one spur center, two rests, with sockets and plate for hand tools, slide rest-wrench, belting, etc., \$40.

Dis., 25%.

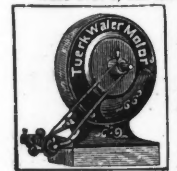
Meat Cutters.



5, each, \$2.00. 10, " 3.00. 22, " 4.00. 41, " 5.00. This is a power machine. Dis., 50%.

Enterprise. Motors (Water).

Size No. 8, for Sewing Machines, etc., \$18 each.



No. 9, 1/2 horse-power (30 lbs. pressure), 3/4 h. p. (50 lbs.), 1 h. p. (100 lbs.), 1 1/2 h. p. (150 lbs.), 2 h. p. (200 lbs.), \$30.

No. 10, 1/2 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), 1 1/2 h. p. (50 lbs.), 3 h. p. (100 lbs.), 4 1/2 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., 30%.

Governors for 11 and 12, \$25 extra; for No. 13, \$35 extra.

Price..... \$120 \$160 \$200 \$250 \$300

MINING WHEELS..... 16 18 20 22 24

Power according to pressure:

3 to 50, 10 to 100, 15 to 150, 20 to 200, 30 to 300 H. P.

Concentrating Machinery.

Blake Improved Crusher: 10x7, weight 7,500; \$410.00.

Blake Improved Crusher: 15x9, weight 9,000; \$580.00.

Discount 25%.

Cornish Crushing Rollers:

20 diameter, 10 face, weight 5,400; \$450.00.

Cornish Crushing Rollers: 20 diameter, 14 face, weight 6,000; \$500.00.

Cornish Crushing Rollers: 22 diameter, 14 face, weight 9,500; \$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, \$600. Discount, 10 per cent.

Automatic working Jig Machines, all complete, woodwork included, with slidemotion: 2 sieves, \$31.0; 3 sieves, \$36.0; 4 sieves, \$45.0.

With Eccentric Motion, all complete, woodwork included: 1 sieve, \$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, \$2.0. Discount, 25 per cent.

Nails and Tacks.

Table with columns for Swedes, Tacks, and various sizes (1/4 doz, 1/2 doz, 1 doz, 2 doz, 3 doz, 4 doz, 5 doz, 6 doz, 8 doz, 10 doz, 12 doz, 14 doz, 16 doz, 18 doz, 20 doz, 24 doz, 28 doz, 30 doz).

Discount, 67 1/2, 10 and 2%.

O. H. Swedes.

Price, same as Swedes. Swedes steel tacks same list price as iron. Upholsterers.

Discounts, 7 1/2, 10 and 2%. Price, same as Swedes.

Cut Tacks. Price per dozen ounces.

Table with columns for 1/4 wt, 1/2 wt, Full wt and various sizes (1, 1 1/2, 2, 2 1/2, 3, 4, 6, 8, 10, 12, 14, 16, 18, 20, 22, 24, 26, 28, 30).

Discount, 70, 10 and 2%.

Carpet Tacks, flat and oval heads.

Table with columns for Blue, doz. oz. and 1/4 wt. ....

Discount, 70, 10 and 2%.

Tinned, doz. 1/4 wt.

Table with columns for 1/4 wt. ....

Discount, 72 1/2, 10 and 2%.

Finishing Nails.

Table with columns for Inch, 3/4, 3/8, 1/2, 3/8, 1/2, 3/4, 1, 1 1/2, 2, 2 1/2, 3, 4, 5, 6, 8, 10.

Discount, 60, 10 and 2%.

Chair Nails.

Doz. 1/2 wt. ; doz. full wt.; pound B. or P.

Table with columns for Inch, 3/4, 3/8, 1/2, 3/8, 1/2, 3/4, 1, 1 1/2, 2, 2 1/2, 3, 4, 5, 6, 8, 10.

Discount, 60, 10 and 2%.

Common and patent brads.

Table with columns for Price per doz. Price per doz. Price per lb. in papers or bulk.

Discount, 60, 10 and 2%.

LUBRICATING.

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 5 gal. extra.

Crescent Axle Grease.—Barrels, 3c per lb; 100-lb. kegs, 3 1/2c lb.; 2-lb. decorated tins, \$12, gross less 5 per cent.

Texas Star Axle Grease.—Barrel, 2 1/2c per lb.; 10 lb. kegs, 3c per lb. See Axle Grease, page 2.

Packing. 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. SELDEN'S PATENT. For Steam, Air, Water and Ammonia.

With Rubber Core, 60 cents per lb. Dis., 25 and 5%. With canvas core, 50 cents per lb. Dis., 30 and 5%.

Paper, Waxed.

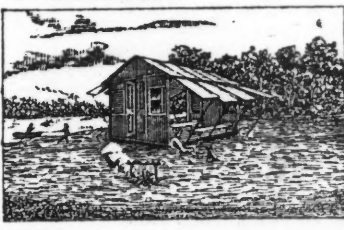
Table with columns for White, Per ream. XX, 24 x 36. \$2.20. "Sparks" A No. 1 Brand, 24 x 36. 2.10. "Progress No. 2," 24 x 36. 1.60. "Climax," 24 x 36. 1.60. 24 x 36. 1.36.

Table with columns for FF, or B. F., 24 x 36. Colored. A, 24 x 36. B, 24 x 36. Manila. A, 24 x 36. "Climax," 24 x 36. Discount, 5%.

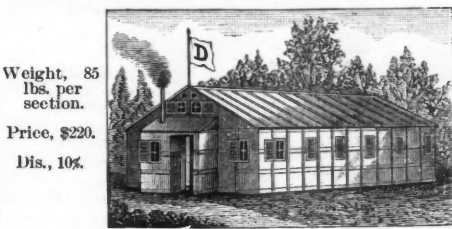
Table with columns for Flat bags, Sq. bags, White. No., Flat bags, Per M., Sq. bags, Per M., No., Flat bags, Per M., Sq. bags, Per M.

Table with columns for No., Mikado, Per M., No., Mikado, Per M.

Discount, 10%. Portable Houses.



Weight, 450 lbs. Price, \$150. Closes securely. Dis., 10%.



Weight, 85 lbs. per section. Price, \$220. Dis., 10%.

No. 10.—26 x 33 ft., including veranda and rear extension. Main part, 19 x 26 ft. \$500.00. Dis., 10%.



F. o. b. Cars Chicago or New York

Table with columns for Size, Doors, Windows, No. porch, End porch, Side porch.

Post Hole Diggers.

Table with columns for Little Giant, Hercules, New Champion, Scheidler. Price per doz.

Dis. 40% f.o.b. New York or Boston.

Presses.

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.

Table with columns for Nominal size of press, Price, including et ceteras, Weight, about, Greatest diameter that can be wired, Greatest depth that can be wired, Hole through bed—circle intersecting, Hole through back—width, Width between die clamps—clear, Distance back from center of slide bar, Height to slide-bar, when up, Stroke of slide-bar, Adjustment of slide-bar, Diameter of fly-wheel, Weight of fly-wheel, about, Speed per minute, about, Cubic feet boxed, about.

**Printers' Sundries.**

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, 3 1/2 in., 75c. each.

**LEAD CUTTER.**  
Curtis' Lead Cutter \$2.00  
PROOF PRESS, "OUR OWN." \$28.00  
× 32, complete, with Brayer

**THE GLOBE PRESS.**  
8 x 12 in. inside clear, with throw-off \$150.00  
9 x 13 in. inside clear, with throw-off 175.00  
10 x 15 in. inside clear, with throw-off 200.00  
11 x 17 in. inside clear, with throw-off 250.00  
Steam fixtures 15.00  
Fountain 12.50  
Dis. 20%.

**THE "LIBERTY" CYLINDER PRESS.**  
For Newspaper and Job Printing.  
Bed. Form.  
No. 5-29 x 42 24 x 40 \$1,200  
6-33 x 47 28 1/2 x 45 1,300  
7-37 x 51 33 x 49 1,600  
Dis., 20 and 5%

**THE "LIBERTY" JOB PRINTING PRESS.**  
Size of chase.  
No. 2 - 7 x 11 \$200  
2a - 9 x 13 250  
3 - 10 x 15 300  
3a - 11 x 17 350  
4 - 13 x 19 400  
5 - 14 1/2 x 22 500  
Dis. 12% and 5%

Two sizes built extra strong for boxmakers, embossing, etc.  
No. 3a-11 x 17 \$375  
4 - 13 x 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 x 6 \$10  
7-6 x 9 30  
8-8 x 12 60  
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 x 36 \$24  
2-32 x 48 38  
3-36 x 74 44  
4-36 x 48 48  
Dis., 12% and 5%

Slate Top.  
No. 1-24 x 36 \$18  
-32 x 48 25  
-36 x 74 32  
Dis. 12% and 5%

**Kelsey & Co.,**  
**The Eagle card and Paper Cutter, 24 1/2 inch,**  
\$12 each, \$100 per doz.

TYPE	Num-ber of cases.	CABINETS.		Grained.	
		Stained.	Gal-ley.*	Gal-ley.*	Gal-ley.*
12 1/2	12.00	14.50	14.00	17.00	
16 1/2	15.00	17.50	17.00	20.00	
18 1/2	16.50	19.00	18.50	21.50	
20 1/2	18.00	20.50	20.00	23.00	
12 1/2	15.00	17.50	17.00	20.00	
16 1/2	18.00	20.50	20.00	23.00	
18 1/2	19.50	22.00	21.50	24.50	
20 1/2	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.		Cherry.		Napanoch.		Walnut.	
	Flat.	Gal-ley.*	Flat.	Gal-ley.*	Flat.	Gal-ley.*	Flat.	Gal-ley.*
12 1/2	18.00	21.00	20.00	23.00	22.00	25.00	23.00	26.00
16 1/2	22.00	25.00	24.00	27.00	26.00	29.00	27.00	30.00
18 1/2	24.00	27.00	26.00	29.00	28.00	31.00	29.00	32.00
20 1/2	26.00	29.00	28.00	31.00	30.00	33.00	31.00	34.00
12 1/2	21.00	24.00	23.00	26.00	25.00	28.00	26.00	29.00
16 1/2	25.00	28.00	27.00	30.00	29.00	32.00	30.00	33.00
18 1/2	27.00	30.00	29.00	32.00	31.00	34.00	32.00	35.00
20 1/2	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	32.00	35.00	34.00	37.00	35.00	38.00
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%.

**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 4.2  
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 1/2 cases " 5.25  
" " " 8 full and 8 1/2 cases 5.00  
" " " 8 " " 8 1/2 " 5.25  
" " " 10 " " 12 1/2 " 5.75  
" " " 12 " " 16 1/2 " 5.70  
" " " 12 " " 16 1/2 " 6.05  
Stands with closed ends, extra 2.00  
Extra slides for stands, each .05

**GALLEY RACKS.**  
From \$3 up.

**LEAD CUTTERS,**  
From \$2 up, and 5%.

**THE "LIBERTY" TYPE CASES.**

Name.	Outside Measurements.
Full size	32 1/2 x 16 1/2 x 19-16
Booker size	28 1/2 x 14 1/2 x 19-16
3/4 size	26 x 16 1/2 x 19 1/2
1/2 size	22 1/2 x 16 1/2 x 19 1/2
Enlarged size	32 1/2 x 23 x 2 3-16
Wood type	32 1/2 x 23 x 1 9-16
Mammoth	44 x 23 x 1 9-16

Cabinet case sides extend 1 1/2 to 3 inches. In ordering cabinet cases, state whether high or low fonts are wanted.  
30 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 Vitae, 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	Screw or News	\$ .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 sms pica and under, 25 cents.

**THE "LIBERTY" COMPOSING STICKS.**

Grover.		Yankee.	
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%	

**Pulley Blocks.**  
WESTON DIRECT.  
1 1/2 ton \$10  
1 ton 13  
3/4 ton 15  
1 ton 20  
1 1/2 tons 25  
2 tons 30  
3 tons 40

**Geared.**  
1 ton 45  
2 tons 35  
3 tons 60  
4 tons 80  
5 tons 110  
6 tons 150  
8 tons 210  
10 tons 250

**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 CAN NOT FLY BACK.**  
Each.  
21 \$35.00  
22 45.00  
23 65.00  
25 100.00

**Pumps.**  
Prices on all pumps include cylinders.  
Price

No.	Dia.	Cyl.	Suction.	Cap.	Price	Brass cyl.
0	2	1	1	1-15 gal.	\$3.50	
1	2 1/4	1	1	1-12 "	4.00	\$6.00
2	2 1/2	1 1/4	1	1-11 "	4.50	7.00
3	2 3/4	1 1/2	1	1-10 "	5.00	8.00
4	3	1 3/4	1	1-6 "	5.50	10.00
5	3 1/4	2	1	1-5 "	6.50	14.00
6	3 1/2	2 1/4	1	1-4 "	8.00	18.00
7	4	2 3/4	1	1-3 "	12.00	20.00

Dis., 65%.

Standard and Cylinder for 1 1/2 in. Iron Pipe \$16.00  
Dis., 55%

No. 6 1/2, standard and cylinder, 1 1/4 in pipe, \$13.00.  
No. 7 1/2, standard and cylinder, 1 1/4 in. pipe, \$15.00.  
No. 8 1/2, standard and cylinder, 1 1/2 in. pipe, \$18.00.  
With hose and discharge pipe, add \$3.00 to list price.  
Dis. 55%.

No. 1, diam. cyl., 2 1/2 in.; cap. stroke 1-8 gal.; size pipe, 1 1/4 in. Price, iron, \$12.50; brass cyl., \$17.50.  
No. 2, diam. cyl., 3 in.; cap. stroke, 1-6 gal.; size pipe, 1 1/4 or 1 1/2 in. Price, iron, \$14.50; brass cyl., \$18.50.  
No. 3, diam. cyl., 4 in.; cap. stroke, 2-5 gal.; size pipe, 1 1/2 or 2 in. Price, iron, \$23.50; brass cyl. \$34.50.  
Dis., 55%.

No. 1, diam. cyl., 3 in.; suction, 1 1/4 cap. stroke, 3-10 gal. Price, iron, \$28.00; brass cyl., \$38.00.  
No. 2, diam. cyl., 4 in.; suction, 1 1/2 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, 1 1/2 in.

cap. stroke, 1 1-5 gal. Price, iron, \$45.00; brass cyl. \$120.00.

No.	Diam. cyl.	Cap. stroke.	Stroke.	Pipe.	Price.
0.....	2	1-11	7	1	\$21.50
00.....	2½	1-7	7	1	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	1-5	10	3	50.00

Dis., 45%.

No.	Diam. cyl.	Cap. stroke.	Diam. pipe.	Iron.	Br's cyl.	Price.
1.....	2	1-5	1	\$39	\$51	
2.....	2½	1-3	1½	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.

No. 2, ½ to 2 gal. per min.; length of drive pipe, 25 to 40 ft.; calibre of pipes, drive, ¾ in.; discharge, ¾ in.; price, \$95.  
No. 3, 1 to 4 gal. per min.; length of drive pipe, 25 to 40 ft.; calibre 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 1 in.; price \$140.  
No. 5, 3 to 14 gal. per min.; length of drive pipe, 25 to 40 ft.; calibre of pipes, drive 2 in.; discharge 1 in.; price \$22.

No. 6, 4 to 25 gal. per min.; length of drive pipe, 30 to 40 ft.; calibre of pipes, drive, 2½ in.; discharge, 1¾ in.; price, \$40.

No. 7, 8 to 60 gals. per min.; length of drive pipe, 30 to 40 ft.; calibre of pipes, drive, 4 in.; discharge, 2 in.; price, \$75.  
No. 8, 12 to 120 gal. per min.; length of drive pipe, 30 to 50 ft.; calibre of pipes, drive, 6 in.; discharge, 2½ in.; price, \$125.

railroad Dumping Cars and Carts.



Cars.	Gauge.	Cap. Net	Cap. Net	Cap. Net	Cap. Net
Side Dumping	24"	1 c. y.	\$55	2 c. y.	\$65
End Revolving	"	"	70	"	80
Bottom	"	"	80	"	90
Tunnel	"	"	55	"	65
Mine	"	"	50	"	60
Plantation	30"		43		45
Logging	36"		170		185
	4' 3½"		185		195
Hand	36"		45		50
Push	4' 3½"		40		45
R.R. Construction	36"		60		65
	4' 3½"		65		70
Carts			45		50
Plantation and Railroad			75		80
Wagons					
McEwen Patent Dumping			175 1½"		200

\*These cars built of any gauge from 18" to 56½" and of any capacity from ½ to 6 cu. yd.

Pulsometer Pump.

No.	Height.	Space occupied.	Size of steam pipe.	Size of suction pipe.	Size of discharge pipe.
1...	14 in.	9 × 7	¾ in.	1 in.	1 in.
2...	20 "	15 × 12	1¼ "	1½ "	1½ "
3...	23 "	17 × 14	1½ "	2 "	2 "
4...	30 "	21 × 16	1¾ "	2½ "	2½ "
5...	34 "	24 × 20	2 "	3 "	3 "
6...	40 "	28 × 22	2½ "	3½ "	3½ "
7...	43 "	30 × 24	3 "	4 "	4 "
8...	54 "	33 × 29	3½ "	5 "	5 "
9...	61 "	37 × 31	4 "	6 "	6 "
10...	80 "	52 × 45	5 "	8 "	8 "

Gal. per minute.	Weight.	Net price.	Size boiler.
10	35	\$50	3
20	125	75	5
40	210	100	6
100	355	150	8
175	475	175	8
300	695	225	12
425	850	275	15
700	1,600	400	20
1,000	2,000	500	3
2,000	5,000	1,000	40

No.	High.	Wide.	Deep.	Price.
2.....	41	46	26	\$36.00
6.....	84	46	26	60.00

Mirror 16 by 18 in. Dis., 40 and 2½%.

Hat Traps.



1 doz. in box.  
1 gross in case.  
\$30 per gross.  
Dis. 50 and 10%.

Roofing.

CORRUGATED IRON.  
2½ inch corrugations.

Gauge.	Per square.
No. 18, painted red.....	\$9.10
No. 20, " ".....	7.60
No. 22, " ".....	6.50
No. 24, " ".....	5.35
No. 26, " ".....	4.65
No. 27, " ".....	4.35
No. 28, " ".....	4.00
No. 18, galvanized.....	13.30
No. 20, " ".....	10.00
No. 22, " ".....	9.10
No. 24, " ".....	7.45
No. 26, galvanized.....	7.05
No. 27, " ".....	6.95
No. 28, " ".....	6.75

Dis., 10%. F. o. b. N. Y.

Sash Chains.



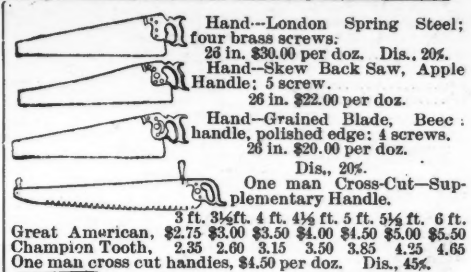
No. A. "Giant" metal, 15c. pr. ft., wts. not over 125 lbs.  
No. 1. "Giant" metal, 12c. pr. ft., wts. not over 75 lbs.  
No. 2. "Giant" metal, 10c. pr. ft., wts. not over 40 lbs.  
No. 0. "Giant" metal, 8c. pr. ft., wts. not over 25 lbs.  
No. 1. Red metal, 10c. pr. ft., wts. not over 40 lbs.  
No. 2. Red metal, 8c. pr. ft., wts. not over 30 lbs.  
No. 0. Red metal, 6c. pr. ft., wts. not over 15 lbs.  
No. 1. Steel, 8c. pr. ft., wts. not over 75 lbs.  
No. 2. Steel, 6c. pr. ft., wts. not over 30 lbs.  
No. 0. Steel, 4c. pr. ft., wts. not over 15 lbs.  
No. 1. Steel, black enameled, 9c. pr. ft., wts. not over 75 lbs.  
No. 2. Steel, black enameled, 7c. pr. ft., wts. not over 30 lbs.  
No. 0. Steel, black ena'd, 5c. pr. ft., wts. not over 15 lbs.  
Fastenings for hanging a window of 2 sashes for Nos. 1 and 2 chains, consisting of 4 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%  
" "Steel "..... 40 10 10%  
" "Fastenings..... 40 10 10%

Saws.

PATENT GROUND AND TEMPERED SOLID TOOTH CIRCULAR SAWS.

Diameter. Inch.	Thickness. Gauge.	Price each.	Price extra for beveling new saws or grinding old saws, extra.
1	24	\$0.50	\$0.01
2	23	.80	.01½
3	21	.70	.02½
4	19	.90	.03
6	18	1.30	.05
8	18	1.75	.08
10	16	2.30	.12
12	15	3.00	.17
16	14	5.50	.25
20	13	8.50	.35
24	11	12.00	.55
28	10	16.00	.80
32	10	20.00	1.00
36	9	25.50	1.40
40	9	35.00	2.00
44	8	52.50	3.00
48	8	70.00	4.00
52	7	90.00	5.00
56	7	115.00	7.00
60	6	145.00	9.00
64	6	180.00	12.00
68	5	225.00	18.00
72	5	290.00	24.00
76	5	375.00	30.00

Circular saws to cut metal or ivory, 50% advance. No extra charge for saws one gauge thicker than list. Circular saws beveled one gauge without extra charge up to 44 inches; 44 inches and larger, beveled two gauges without extra charge. Dis., 45%.



Hand-London Spring Steel; four brass screws; 26 in. \$30.00 per doz. Dis., 20%.  
Hand-Skew Back Saw, Apple Handle; 5 screw. 26 in. \$22.00 per doz.  
Hand-Grained Blade, Beech handle, polished edge; 4 screws. 26 in. \$20.00 per doz. Dis., 20%.  
One man Cross-Cut-Supplementary Handle.  
3 ft. 3½ ft. 4 ft. 4½ ft. 5 ft. 5½ ft. 6 ft.  
Great American, \$2.75 \$3.00 \$3.50 \$4.00 \$4.50 \$5.00 \$5.50  
Champion Tooth, 2.35 2.60 3.15 3.50 3.85 4.25 4.65  
One man cross cut handles, \$4.50 per doz. Dis., 45%.

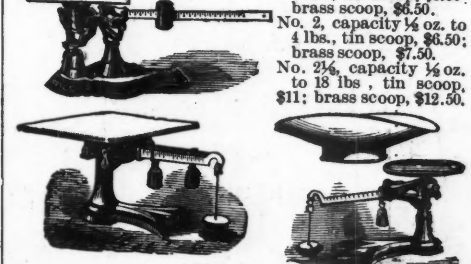
Saw Set.  
Adjustable ball and socket saw clamp, Japanned, \$14 per doz.



Scales.—Discount on scales, 50, 10 and 5 per cent. Postal scales.  
No. 1, capacity ½ to 9 oz. \$3.00.  
No. 2, capacity ¼ to 12 oz. \$4.00.  
No. 3, capacity ¼ to 34 oz. \$6.00.  
No. 4, capacity ¼ oz. to lbs., \$8.00.

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. Scoop.  
¼ oz. to 10 lbs. Tin \$8.00 ¼ oz. to 10 lbs. Brass \$9.00  
Capacity. Scoop. Scoop.  
1-16 oz. to 8 lbs. Tin \$10.00 1-16 oz. to 8 lbs. Brass \$11.00

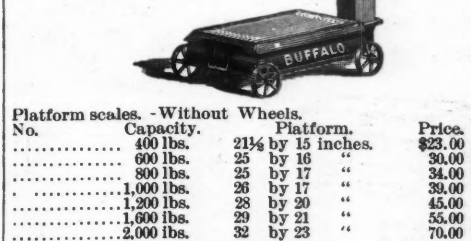


Even balance trip scales, seamless scoop, with weights.  
No. 1, capacity ½ oz. to 2 lbs., tin scoop, \$5.50; brass scoop, \$6.50.  
No. 2, capacity ¼ oz. to 4 lbs., tin scoop, \$6.50; brass scoop, \$7.50.  
No. 2½, capacity ¼ oz. to 18 lbs., tin scoop, \$11; brass scoop, \$12.50.

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.  
¼ oz. to 62 lbs. Tin \$12.00 ¼ 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



60 days, 2% 10 days.

Vise.

No. 1. Solid Box Vises.

Each.		
No. 25, 3 1/2 in. Jaw	.....	\$12.00
" 30, 4 1/2 "	.....	11.00
" 35, 5 1/2 "	.....	10.00
" 40, 6 "	.....	10.50
" 45, 6 1/2 "	.....	11.00
" 50, 7 "	.....	11.50
" 55, 7 1/2 "	.....	12.00
" 60, 8 "	.....	13.00
" 65, 8 1/2 "	.....	14.00
" 70, 9 "	.....	15.00
" 75, 9 1/2 "	.....	16.00
" 80, 10 "	.....	17.50
" 85, 10 1/2 "	.....	18.50
" 90, 11 "	.....	20.00
" 95, 11 1/2 "	.....	21.00
" 100, 12 "	.....	22.00
" 105, 12 1/2 "	.....	23.00
" 110, 13 "	.....	24.00
" 115, 13 1/2 "	.....	25.00
" 120, 14 "	.....	26.00
" 125, 14 1/2 "	.....	27.50
" 130, 15 "	.....	29.00

Each.		
No. 135, 6 3/4 in. Jaw	.....	\$31.50
" 140, 7 "	.....	33.00
" 145, 7 1/2 "	.....	35.00
" 150, 8 "	.....	36.00
" 160, 7 1/4 "	.....	41.50

Each.		
No. 170, 7 1/4 in. Jaw	.....	\$44.50
" 180, 8 "	.....	47.00
" 190, 8 1/2 "	.....	53.00
" 200, 9 "	.....	56.00

Dis., 60 and 10%.

MINERS.

Adze Eye Coal Picks. Same list and dis. as No. 16.

Anthracite Coal Picks. Same list and dis. as No. 16.

Stone Picks, per doz. No. 18, 6 to 7 lbs. \$16.50. No. 18, 7 to 8 lbs. 17.50. No. 18, 8 to 9 lbs. 18.50. Dis., 60 and 10%.

No.	Weight, 2 lbs.	Coal Picks.	Per doz.
16	" 2 1/2 "	.....	\$8.50
16	" 3 "	.....	9.00
16	" 3 1/2 "	.....	9.50
16	" 4 "	.....	10.00
16	" 4 1/2 "	.....	10.50
16	" 5 "	.....	11.00
16	" 5 1/2 "	.....	11.50
16	" 6 "	.....	12.00
16	" 6 1/2 "	.....	12.50
16	" 7 "	.....	13.00
16	" 7 1/2 "	.....	14.00

Packages charged at cost. Dis., 60, 10%.

Adze Eye Miners Picks—Surface, Drifting and Poll.

No.	per doz.	
19, Surface, No. 1, 4 lbs.	.....	\$14.00
19, " No. 2, 4 1/2 "	.....	15.00
19, " No. 3, 5 "	.....	16.00
19, " No. 4, 5 1/2 "	.....	17.00
19, " No. 5, 6 "	.....	18.00
19, " No. 6, 6 1/2 "	.....	19.00
19, " No. 7, 7 "	.....	20.00
20, Drifting, No. 1, 3 "	.....	12.50
20, " No. 2, 4 "	.....	14.00
20, " No. 3, 4 1/2 "	.....	15.00
20, " No. 4, 5 "	.....	16.00
20, " No. 5, 6 "	.....	17.50
21, Poll, No. 1, 3 1/2 "	.....	15.00
21, " No. 2, 4 "	.....	16.00
21, " No. 3, 4 1/2 "	.....	17.00
21, " No. 4, 5 "	.....	18.50
21, " No. 5, 6 "	.....	20.00
21, " No. 6, 6 1/2 "	.....	21.50

Dis., 60, 10 and 5%.

Tamping Picks.

Adze eye, 6 to 7 lbs., per doz.	\$17.
Adze eye, 7 to 8 lbs., per doz.	18.
Adze eye, 8 to 9 lbs., per doz.	19.
Hunt eye, 6 to 7 lbs., per doz.	17.
Hunt eye, 7 to 8 lbs., per doz.	18.
Hunt eye, 8 to 9 lbs., per doz.	19.

Ore Picks.

No.	Ore Picks.	
54	Adze Eye, 5 to 6 lbs.	per doz. \$12.00
54	" 6 to 7 "	" 13.00
54	" 7 to 8 "	" 14.00

56, Steel Lake Superior Mining Pick

(Special Price and Quality.)

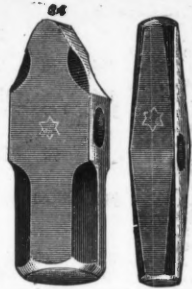
Dis., 60, 10 and 5%.

Steel Face Hammers.

No. 43, hand drilling hammers, 2 to 5 lbs.; No. 45, napping hammers, 2 to 5 lbs.; No. 39, mason hammers, 3 to 8 lbs.; No. 42, smiths' hand hammers, 2 to 5 lbs.; No. 44, smiths' striking hammers, 2 to 5 lbs., all steel face, per lb., 26c. Dis., 70, 10 and 5%.



No. 43, hand drilling hammer, 5 lbs. and over, 30c.; 3 to 4 lbs., 40c.; under 3 lbs., 45c. per lb. Dis., 70, 10 and 5%.



Steel Face Sledges. No. 34, Smiths' sledges, 6 to 30 lbs., steel face, 17c. per lb. No. 35, Stone sledges, 6 to 30 lbs., steel face, 17c. per lb. No. 36, Striking sledges, 6 to 30 lbs., steel face, 17c. per lb. No. 37, Coal sledges, 5 to 10 lbs., steel face, 18c. per lb.

Cast Steel Sledges. No. 34, Blacksmiths' sledge, 5 lbs. and over, 30c.; 3 to 5 lbs., 36c.; under 3 lbs., 45c. per lb. No. 35, Stone sledge, 5 lbs. and over, 30c.; 3 to 5 lbs., 36c.; under 3 lbs., 45c. per lb. No. 36, Striking sledge, 5 lbs. and over, 30c.; 3 to 5 lbs., 36c.; under 3 lbs., 45c. per lb.

No. 37, Coal sledge, 5 lbs. and over, 30c.; 3 to 5 lbs., 36c.; under 3 lbs., 45c. per lb.

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 hammer, 5 lbs. and over, 30c.; 3 to 5 lbs., 35c., under 3 lbs., 45c. per lb. Dis., 70 and 10%, 5.

RAILROADS.

Railway Track Punch



Round Point. 15c. lb. net. Track Wrench. 7 1/2 lb., net.



Ra Fork. 9c. lb. ret.



Crow Bars. Wedge Points. 3 1/2 lb., net. Pinch Point. 3 1/2 lb., net.



65 Tamping Bar, 6c. lb., net.



66 Claw Bar, 7c. lb., net.



Railroad Spike Mauls of 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, 10 and 5%.

Mattocks—Price per doz.

2, Adze Eye, Long Cutter, 6 lbs.	\$16.00
3, Adze Eye, Short Cutter, 5 1/2 lbs.	\$15.50
2, Adze Eye, Long Cutter, Light.	\$15.00
3, Adze Eye, Short Cutter, Light.	\$15.00
4, Hunt Eye, Long Cutter, 6 lbs.	\$16.00
5, Hunt Eye, Short Cutter 5 1/2 lbs.	\$15.50

Adze Eye Pick Mattocks.....\$16.

Hunt Eye Pick Mattocks.....\$16

Dis., 60, 10 and 5%

Grub Hoes. Western Pattern. No. 0, 3 lbs., per doz., \$10.50. Western Pattern. No. 1, 3 1/2 lbs., per doz., \$11. Western Pattern.



No. 2, 4 lbs., per doz., \$11.50. Western Pattern, No. 3, 4 1/2 lbs., per doz., \$12. Baltimore Pattern, No. 1, 3 1/2 lbs., per doz., \$11.

Baltimore Pattern, No. 2, 4 1/2 lbs., per doz., \$11.75. Baltimore Pattern, No. 3, 5 lbs., per doz., \$12.75. Baltimore Pattern, No. 4, 5 1/2 lbs., per doz., \$13.75. Dis., 60 and 10%, 5.

CARPENTERS.

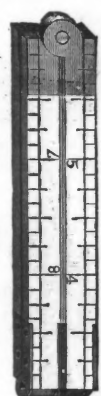
BOXWOOD RULES.

Two feet, four-fold, 1 inch wide.			
Plate.	Middle.	Edge.	Bound.
Round joint.	.....	\$4	.....
Square	.....	5	\$7 \$15
Arch	.....	6	8 16

Two feet, four-fold, 1 1/4 inches wide.			
Plate.	Middle.	Edge.	Bound.
Square joint.	.....	\$7	\$9 \$18
Arch	.....	9	11 20

Two feet, two-fold, 1 1/4 inches wide.			
Square joint.	Arch.	Arch Bound.	
\$5	\$7	\$16	
12	14	24	

Dis. 80, 10 and 10%.



LEVELS.

Arch top plate, 2 side views.	10 to 16 in.	15 to 24 in.
	\$9.00	\$12.00

PLUMBS AND LEVELS.

Arch top plate, 2 side views.	12 to 18 in.	24 to 30 in.
Polished.	\$14.00	\$18.00
Mahogany tip'd and lip'd.	27.00	.....
Polished and lip'd.	.....	24.00
Polished and tipped.	.....	28.00
Polished, lip'd and tip'd.	.....	35.00

Mason's level, 2 plumbs, polished, 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 lip'd.	.....\$27.00
Polished and tipped.	.....30.00
Polished, lip'd and tipped.	.....39.00
Mahogany.	.....27.00
Mahogany, lip'd.	.....33.00
Mahogany, lip'd and tipped.	.....48.00
Polished, triple stock, lip'd and tipped.	.....48.00
Mahogany	.....60.00
Rosewood, lip'd and tipped.	.....90.00

POCKET LEVELS.

Iron top, Japanned.	.....	2 00
Brass top.	.....	3 00

Dis., 70, 10, 10%.

SCREWDRIVERS.

Varnished handles, pat. metallic fastening. Size 1 1/2, \$1 per dozen; 2, \$1.50; 3, \$2; 4, \$2.50; 5, \$3; 6, \$3.50; 7, \$4; 8, \$4.75; 10, \$6; 12, \$8. Dis., 75 %.

BAILEY'S PATENT WOOD PLANES.

Smooth. Handle smooth.	9 x 2 in.	.....
Jack. Fore. Jointer.	15 x 2 1/4 in. 20 x 2 3/8 in. 26 x 2 3/4 in.	.....

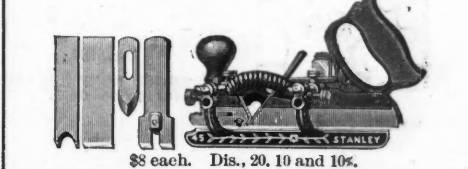
PLANES, BAILEY'S PATENT IRON.

With pat. lateral adjustment.	
Smooth, 8 n. x 1 1/4 in., \$3.	
in. x 2 in., \$3.25; 10 in. x 2 1/2 in., \$3.75 each.	
Jack, 14 in. x 2 in., \$3.75.	
Fore, 18 in. x 2 1/2 in., \$4.75.	
Jointer, 22 n. x 2 3/8 in., \$6.50 each.	

Dis., 40, 10 and 10 %.

STANLEY'S BEADING, RABBET, SLITTING AND MATCHING PLANE.

Eighteen Tools, Bits, etc.



\$8 each. Dis., 20, 10 and 10%.

STANLEY "ODD JOBS."

Embraces in combination with ordinary Carpenters' Rule:

- (1) Try square.
- (2) Mitre square.
- (3) T-square.
- (4) Marking gauge.
- (5) Mortise gauge.
- (6) Depth gauge.
- (7) Mitre level.
- (8) Spirit level and plumb.
- (9) Beam compass.
- (10) Inside square for making boxes and frames.

Price 75 cents. Dis., 20, 10 and 10%



