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Method of Detecting Counterfeit Silver Coin.

If a piece of silver be dipped into a solution of chromate of potash, decomposed by sulphuric acid, (thirty-two parts by weight of water, three of chromate of potash, and four of sulphuric acid), the parts of the silver immersed in the solution quickly assume a purple colour. The colouring is deeper and more lively when the silver is quite pure, and diminishes in proportion to the quantity of alloy mixed with it. Of course this process will not hold good when a coating of silver has been deposited on a piece of white metal, &c.; in such cases as plated or electrotyped articles, for instance, a portion of the coating must be filed off; upon trial by this process, the German silver will remain of a white color. No other metals give the same color as silver when submitted to this test; copper, zinc, &c., are acted upon by the solution, but not colored as in the case of silver.

Sugar of Milk for Invalids.

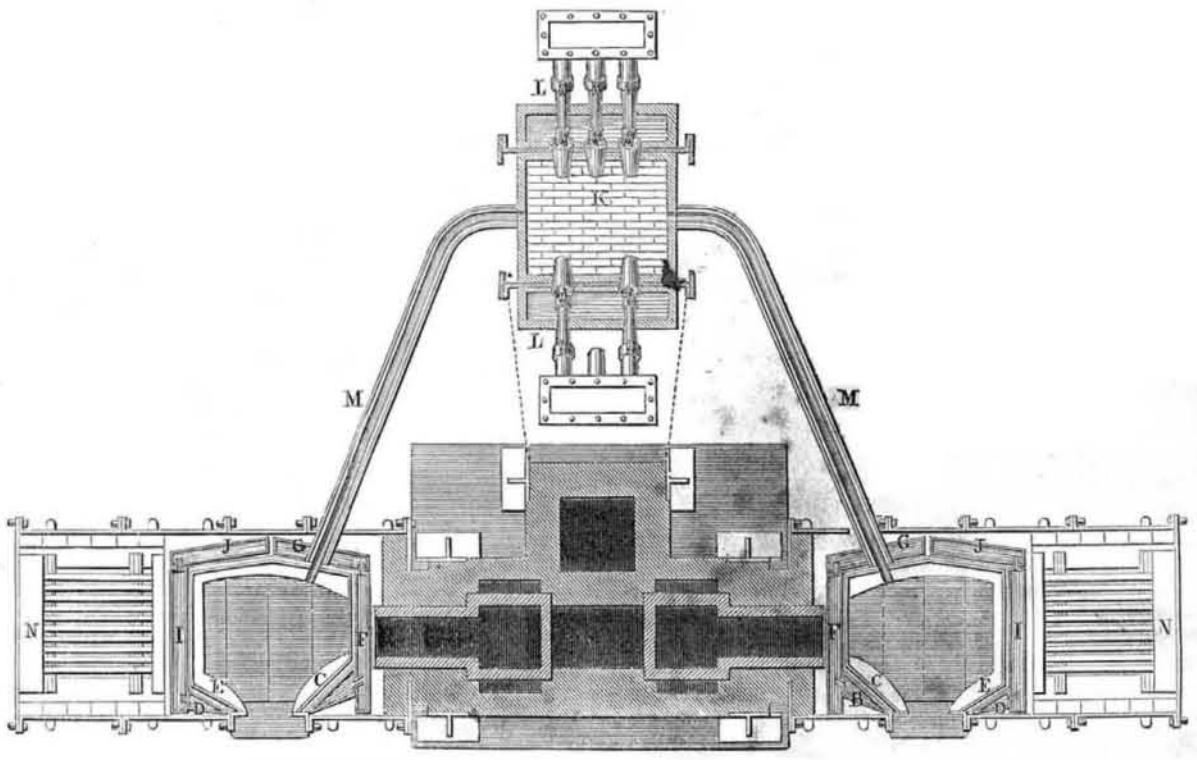
A short time ago Dr. Turnbull, of Liverpool, read to the Literary and Philosophical Society a paper on the use of sugar of milk as an article of food in consumption and other pulmonary diseases. It now appears that whey is coming into extensive use in Germany in the treatment not only of consumption, but also of gout and rheumatism, and that some German physicians entertain opinions as to the beneficial properties of sugar of milk (the ingredient to which whey owes its virtues) similar to those lately put forth by Dr. Turnbull. In the cheese dairies of this country the whey is frequently given to pigs, or otherwise wasted, and the lactine, or sugar of milk, now met with in commerce, is brought entirely from Europe, being prepared chiefly in Switzerland. Its present high price is, however, a great obstacle to its general use as a dietetic remedy; but it is most desirable that so valuable an article of food should no longer be wasted, and that therefore the attention of those engaged in making cheese should be directed to the manufacture of this other product from milk, which must sooner or later become an important article of food and of commerce.

Factory Labor in Rhode Island.

The recent passage of an act by the Rhode Island Legislature, making ten hours a legal day's work, is creating considerable disturbance among the manufacturing villages of that State. Upon the day on which the law went into operation many of the factories were closed the proprietors not being willing to have the law obeyed. A convention of manufacturers has since been held at Providence, and it was decided by them that the operatives should bargain to labor nine hours on Saturdays, and twelve hours during the other working days of the week, or they should not give them employment.

Prof. Silliman, Sen., has resigned his situation in Yale College. His son has been appointed to succeed him. Prof. Silliman has long been a distinguished teacher and writer on scientific subjects. In chemistry he has long held a high place.

IRON REFINING AND PUDDLING FURNACES.---Fig. 1.



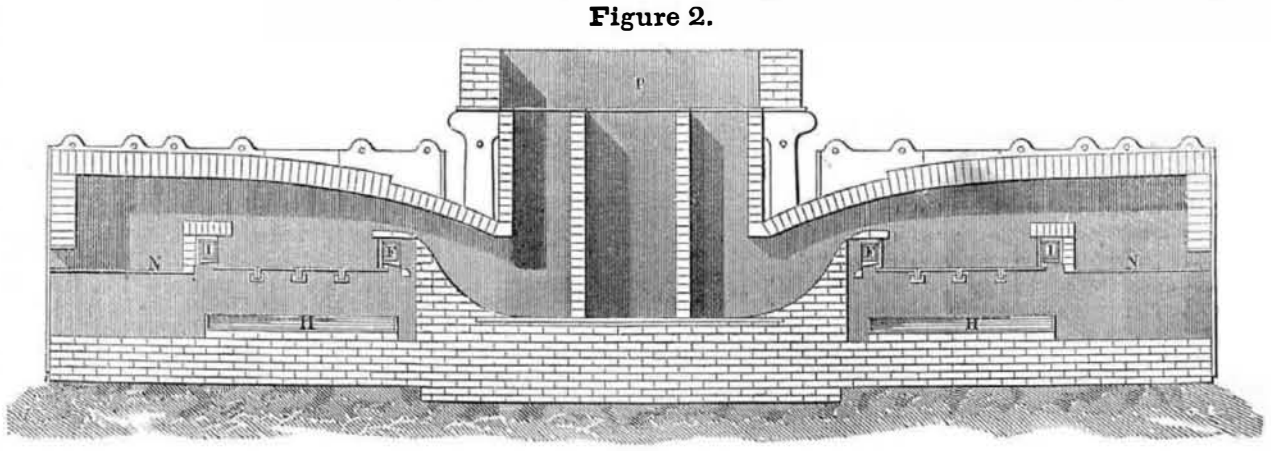
The iron interests of our country are of great and rapidly increasing importance. All information, therefore, relating to improvements, small and great, in the manufacture of iron, is of no small consequence. The iron deposits of our country are on a scale commensurate with its vast extent, and the coal and wood to reduce the ores to metal, are more liberally supplied by the hand of nature than in any other country on the face of this terrestrial ball. The United States of America, are destined to be the greatest iron manufacturing countries in the world, and it is perhaps a great shame to us that they are not so at present. Be that as it may, however, no one can doubt, who is at all acquainted with both the resources and wants of our country. that the day is not far distant when it will be what it now should be.

The annexed engravings are views of improvements in iron furnaces by Joseph Jones, of Bilson, Stafford, in England, an experienced iron maker. They consist, first, of the application of a cooling current of water to a water space, encircling the heated mass in the puddling furnace, to keep cool the materials of which the furnace is composed, and comparatively uninjured during the time it is in operation. Second, the combination of the refining with the puddling furnace by ducts passing between the two, so that the refined metal may flow directly from the chamber on to the puddling hearth, dispensing with the loss of time by removal, &c. Third, connecting the refinery furnace flue with a chimney, to carry off the heated air from the refinery. Fourth, carrying a flue from the refining furnaces into the flues of a stream boiler to use the waste heat of the refinery, and make it available for generating steam for driving an engine.

Figure 1 is a a plan view; fig. 2 is a longitudinal elevation of two furnaces combined together and fitted up on these principles, with the refinery attached. Fig. 3 is a corresponding vertical section of the same.

The water is conducted to the furnace shell by the vertical pipes, A A, fig. 3, which are in communication with a water reservoir conveniently situated for that purpose. The water enters in a cold state into the water space, B, at the back of the flue jamb plates, C, as well as into the water space, D, behind the bridge jamb plates, E. From the space, B, the water passes into the water space, F, between the flue bridge plates, thence into space, G, set near the back wall plate of the furnace, and

Figure 2.

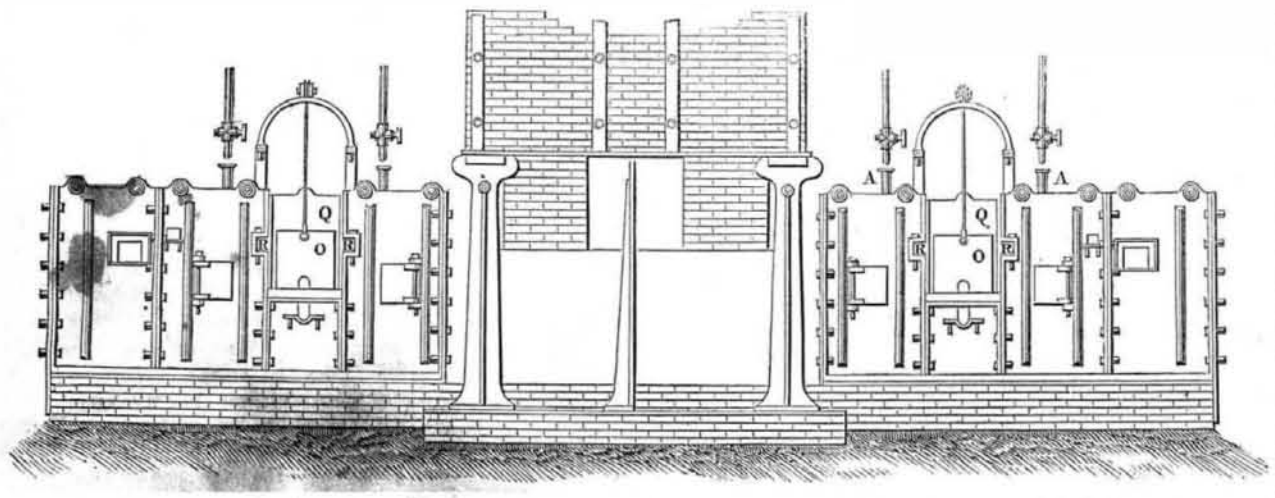


is finally discharged into the tank, H, under the bottom plates of the furnace. The water supplied to the space, D, passes to the space, I, between the fire-bridge plates, and thence into the space, J, near the back wall plates of the furnace. After passing through this course, the heated current is finally received as before, by the bottom tank, H. By this contrivance the whole of the parts exposed to the intense heat of the puddling process, are effectually kept cool, as the passing current of water surrounds every part of the containing shell, and carries off the excess heat, and the warm water can be used as the feed water for the steam engine, or for other purposes. The refinery into which the raw pig iron is put in a broken state for melting, is at K. It is supplied with air blown thrown the tuyeres, L, on two opposite sides in the usual way; and as the metal is melted and refined, it is run out direct into the two puddling furnaces by the inclined pipes or ducts, M M. In this way the metal is at once conveyed to the puddling hearths without any additional trouble. The two puddling furnaces are of the usual reverberating kind, and their grates, N, are supplied with coals in the usual manner, the iron being worked through a side opening, governed by a balanced sliding door, O. The flues from both furnaces pass into the central or intermediate chimney, P, carried on cast-iron framing. The entire furnace is encased in massive iron plates stayed together across the top transversely by tension rods; the fixed guide piece, Q, for operating the door is cast with side lugs, R, which fit into corresponding recesses cast on the main frame plates, a bolt being put through from the upper side, in each case, to bind the whole together. The combination of the refining with an elevated stalk is not represented; neither is the mode of conveying the excess of heat and applying it to a steam boiler; these arrangements and appendages will be easily understood. The application of the waste heated products from smelting furnaces has been applied to steam boilers for a long time, at some of the smelting works in Wales and in Germany, whether many of our iron manufacturing establishments use them or not we do not know—no one that we have visited do so. By the arrangements and construction of furnaces represented, the exposed parts of the furnace are prevented from being rapidly injured by the

intense heat of the puddling process. The improvement has been patented in England, and the "Glasgow Practical Mecbanics' Journal," which illustrates it, speaks of it in very complimentary terms. It says, "these improvements have been in the Monkland Iron Company's Works, in Scotland, for the [redacted] twelve months, and the great economy and ease of working which they have introduced, has led other iron companies to make eager inquiries after the plans."

Owing to the high prices of iron which have prevailed for some time, its manufacture has now become very remunerating when it is conducted with ability and skill. We hope that such prices will soon be reduced without any reduction in the wages of the workmen or fair profits to the manufacturers. Thereason why we entertain such a feeling is, that we believe the progress, prosperity, and happiness of the people depends greatly on the extensive use of iron. It is our great desire therefore, that our country will soon become the greatest, iron manufacturing country in the world, and that its manufacture may be so improved as to reduce its price and allow of its more extensive use. Every improvement in the machinery, furnaces, and processes for manufacturing iron is hailed by us as a means of benefitting our fellow men.

Figure 3.



THE CRYSTAL PALACE

General Remarks—The progress of improvements in the Palace, during the past week, has been quite rapid and visible from day to day; in many quarters of the building the permanent arrangement of the articles is made; especially the Agricultural Department has an air of completeness. The Machine Arcade and Fine Art Gallery will be ready for the reception of their treasures in a few days.

The Exhibition will realize all the reasonable anticipations that have been formed of it. It will be a tolerable exposition of the industrial resources of the world. If the Palace and its contents could be buried out of sight, till some Layard and Champollion of the three thousandth century should dig it up, our descendants of that late day would find enough in the fossil display to satisfy their most eager curiosity about the olden time. There is a great deal at the Palace to be seen, and much worthy of careful study;—less than a whole day's visit should not be thought of. Upon the whole the Exhibition is quite a creditable affair, especially in view of its being an extemporaneous and private speculation. In an enterprise so large, lapses and imperfections that cannot easily be anticipated will of course occur. Constant vigilance of managers is expected and required, and if abuses are not speedily corrected, censures and complaints must come. We desire to speak as we have hitherto,—whether in praise or reproach, plainly, freely, and impartially.

The Official Catalogue—The Catalogue looks very well—promises to be the right thing. We expected to find it a valuable guide in our wandering, but we soon found that we could not rely upon it. Whose fault is it that many numbers of the catalogue do not correspond with the numbers on the articles—and that many of the articles are not ticketed at all? We heard some bitter complaints from gentlemen who came to study and to learn. But there is to be a new edition of the catalogue and all will be right, they say.

Barlow's Planetarium.—Conspicuous among the objects of scientific interest is an improved Planetarium, the invention of Thos. H. Barlow, of Lexington, Ky. The peculiarities of this Planetarium are the amazing ingenuity and perfection of the machinery by which the motion, position, and phases of the planets for all time—past and to come—are shown. Difficult and tedious problems may be solved by a few turns of the machinery, with a surprising accuracy. There is no other single piece of astronomical apparatus which can so readily illustrate and demonstrate so many interesting facts of the sublime science.

Daguerreotypes—It is generally understood that the best daguerreotypes are produced in the United States: the fame of our operators is world-wide. Orders for American apparatus and American processes are received from all parts of the globe. Even in Paris, the birth-place of the Art, the most extensive and splendid establishment is called "The American Photographic Saloon." The competition on daguerreotypes at the Palace is entirely among our own artists. The number of exhibitors is about forty—all Americans, we believe. The collection of pictures is very extensive, embracing specimens of all the various processes—such as crayon, illuminated, colored, &c. Probably the best daguerreotypes in the world may be found here; and there are many pictures which verify all the extravagancies of those who first described the Daguerrean Art. The beauty and reality of many of these pictures leave nothing more to be desired. Hillotype, even if there were no "stick in the yellow," will be in little demand if operators generally can learn to color with the exquisite taste and skill displayed in the pictures of Gurney and others. There are good pictures by all the exhibitors, but the palm will be borne away by our New York artists. Some of the country gentlemen evidently did not know the men they were to contend with. One of the creditable specimens, worthy of attention, is a panoramic view of Cincinnati, Ohio, from Newport, by A. Bisbee, of Dayton, Ohio, on six extra large plates. Mr. Bisbee has well met the difficulties of the bold experiment, but he should have been more careful in the mercurialization. It is extremely difficult, but not impossible to mercurialize a large plate evenly. The top of the bath should always be considerably larger than the plate. But if the large plates be carefully moved about on the top of the bath during the bringing-out process, we should think the edge might be coated the same as the center portions.

Photographs—Everard Blanquart, of Lille, exhibits "Photographic Illustrations of Various Subjects," in the French Department. These we have not seen, but they are highly spoken of. In the American Department, Whipple, of Boston, exhibits "Crystallotypes;" M. A. Root, of Philadelphia, "Talbotypes," and Hawkins, of Cincinnati, "Solographs." These pictures are produced by substantially the same process. Ample instructions in the art have been published in the Scientific American during the last four or five years. We are surprised that so little attention has been paid to this beautiful art in the United States. On the Continent of Europe Photographs are preferred to Daguerreotypes, and in some cities of Germany Daguerreotypes are almost obsolete. The chief advantages of Photographs are, that they may be easily and cheaply copied, and that there is no disagreeable metallic reflection as in Daguerreotypes. The cost of a single picture is greater than for a Daguerreotype, but when many copies are wanted, they may be afforded at a comparatively small sum. The pictures are bolder and more distinct than Daguerreotypes and may be viewed in any light. Being on paper they may be colored with great facility.

The pictures on exhibition are not the best specimens of the art; some of those we observed are spotted and uneven in tone. But the exhibitors will have the credit of being pioneers of Photography in America. They will introduce it favorably to thousands who have never heard of such a thing. The Messrs. Langenheim, of Philadelphia, were the first to make it a business; their pictures are called "Hyalotypes," and have been exhibited in many parts of the Union in Magic Lantern Exhibitions. Bommer & Rolle, 247 Broadway, are exclusively engaged in the business of Photography, and are preparing some pictures for the Crystal Palace, which will excel anything now on exhibition.

Quackery—In the American Department (where else could we expect it?) we found some very notable contributions to the "Exhibition of the Industry of all Nations;" the names alone, we think, should suggest to our readers, certainly to those who take a country newspaper, or were ever in a flash barber shop, all the needful comments. We took down some of the big words: here they are—"Italian Colornerus," "Chemical Cathairon," "West Indian Tincture and Abification Tooth Powder," "Clierhugh's Tricopherous," "Improved Wahpene," "Anti-Scorbutic Soap Wash," "Rose Bandoline," "Great National Instantaneous Liquid Hair Dye," "Oleophane," &c. &c. The locality is also a depot for distributing the pamphlets describing the magical and all-healing properties of some of them. Supposing the wise Directors had made no narrow restrictions in this branch of industry, we wandered on expecting to behold a gorgeous display of sticking plasters and pills—a mammoth pill—a sixty-four pounder, say—all beautifully gilded, or a pill equestrian statue of General Washington or Daniel Webster. We presume the Directors rejected such articles. What narrow views of things they must take?

Glass—Glass working is one of the oldest of the arts. It is alluded to in the Old Testament, and was one of the unexpected things discovered by Layard in his explorations about Nineveh.

Some of the finest specimens of stained glass are the product of the Middle Ages. But it is only within about a hundred years that glass has been afforded cheap enough to be used by all. Before this time it was a luxury or an ornament. Among the ancients it was a costly rarity, so that a glass cup was a princely fortune, and descended from generation to generation as an heirloom. Glass was the symbol of brilliancy and splendor with the poets.

Its chemical constitution was not understood till the time of Berzelius "the father of chemistry." It was chiefly by his researches that the theory of glass making was made plain. Glass is now classed with the salts. The acid is silicic acid (sand or flint), and the base is one or more of the alkalies, alkaline earths, or metallic oxydes. Glass is then a silicate of soda, potash, &c. The peculiar properties of any kind of glass will depend, of course, upon the base selected, and experience has determined what base must be used for each property. Potash or soda, or both, is the base of all common glass. Lime increases the hardness; alumina the difficulty of fusion; oxyde of lead renders it much more fusible, and adds greatly to the brilliancy and softness.

Glass is colored or stained by the addition of metallic oxydes. The most brilliant but costly colors are a topaz yellow, produced by the oxyde of uranium, and the ruby red by the oxyde of gold. Oxyde of chromium gives a green; oxyde of cobalt, blue, arsenic, white, &c. The ruby red color is generally only superficial. A mass of colorless glass is dipped into the melted color, and becomes coated or plated with it. When brought into the desirable shape by the workmen,—the cup, or whatever it is, appears to be uniformly colored throughout. By engraving or cutting away the colored film, the vessel may be splendidly ornamented.

Next to iron glass the most important material used in the arts. There is no substance which could supply its place. To the chemist, particularly it is indispensable, and there is no civilized man who would not be much embarrassed on being deprived of its use. In a World's Fair, then, this branch of industry should take a very prominent place. We should expect contributions from all the nations where the article is manufactured.

At the Crystal Palace the show of glass, in respect to quality, is very commendable. The coloring and ornamentation are splendid. Nothing but genius and taste of the highest order could have fashioned and engraved those beautiful vases, bottles, and cups, exhibited in the French and American Departments. Glass staining is not a lost art, as the "fogies" tried to prove to us a few years since. Indeed, we believe the Exhibition will show that there are no lost arts. We were tolerably satisfied with the quality but not with the quantity of glass ware. The chief competitors are France, the United States, and Austria. The amount exhibited is not at all commensurate with the importance and condition of the art. About New York City alone there are eleven factories; in many parts of the United States the materials for the manufacture are found in the greatest purity and abundance. Considering the high and deserved reputation of the New England Glass Company, their display is quite meagre and unsatisfactory; they have presented, perhaps, some of the best specimens of their skill; but why not more? And why did not they arrange their wares in better taste, so that they would be seen and appreciated? We are persuaded that they might have made one of the most attractive and instructive displays in the Palace. We expect soon to meet the ingenious professor, Carling, the skillful fancy glass-worker, who has secured a place in the Palace for the exhibition of his wonderful art. The Brooklyn Flint Glass Co., to whom was awarded the prize medal at the London World's Fair, exhibit an assortment of their ware. Plate glass is exhibited only in the few splendid mirrors which adorn various parts of the building. There is a small display of crown glass from Holland, —and in the United States Department a few boxes from the Baltimore Glass Co. Perhaps the 25,000 square feet inclosing the Palace itself, is sufficient to show what may be done in this line. Bohemian glass, celebrated for its heat-enduring properties, and the beauty of its ornamentation, is exhibited in the Austrian and German Departments.

We wanted to see the workmen's tools and specimens of the ware in the different stages of the manufacture—bottles and tumblers half formed, and the huge cylinders and globes from which window panes are cut. Such a display as this would be eminently curious and instructive to most of the visitors.