An Important Discovery.

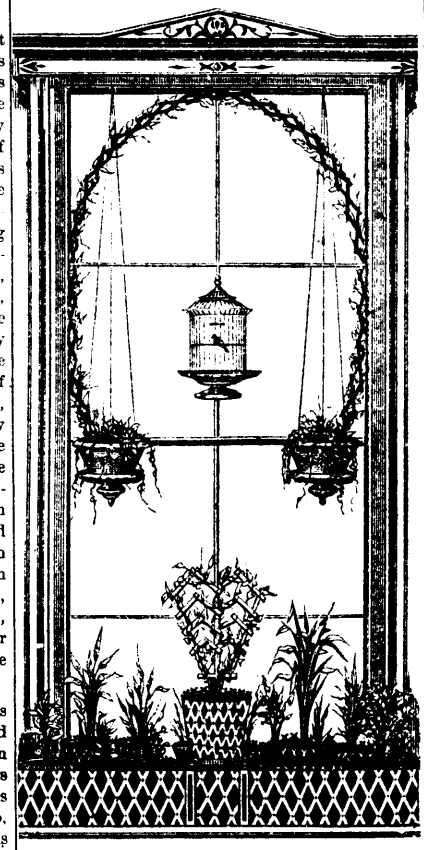
One of the most important discoveries of recent date is that of a method of protecting iron surfaces from injury by oxidation. If the discovery is as stated by Prof. Barff in a lecture delivered before the Society of Arts, London, its value can hardly be estimated in any hasty view of the matter. If the means are afforded us of rendering all kinds of iron work, however much exposed to the weather or to corrosive vapors and liquids, practically indestructible and permanent at trifling expense, it is one of the greatest triumphs of modern chemical research. It is well known that iron, when exposed to the action of water or moist air, begins to rust, a film of ferrous oxide being in the first place found upon its surface; this rapidly takes up more oxide from the air, and sesquioxide is formed; the latter compound gives up some of the oxygen to the unchanged metal beneath it, and the fresh ferrous oxide thus produced slowly unites with more oxygen, which traverses the layer of sesquioxide overlying it, and thus in time the whole mass of iron crumbles to a reddish-brown powder, the sesquioxide of the metal. In this way the iron utensils and implements found in ancient buried cities have been destroyed. In most instances not a particle of unchanged iron remains when these implements are discovered, but the mass of adherent oxide retains the form, and with careful handling may be preserved for years, as has been done with those taken from the buildings of Pompeii.

The great disadvantage in the use of iron has been its appetite, so to speak, for oxygen; and now if this disadvantage is removed, if its open mouth is closed, the economic and sanitary benefits resulting will be very great. Professor Barff's method is not of the nature so often resorted to, namely, the use of paints, varnishes, etc., but is based on the principle of producing such chemical changes on the surface of the metal as will prevent the ingress of free oxygen to the mass. He covers the surface with a layer of ferroso-ferric or magnetic oxide of iron, which is intermediate in composition between the two oxides mentioned above. This he accomplishes by exposing the metal to the action of intensely superheated steam. By this action it becomes covered with a black film of magnetic oxide which adheres to it even more firmly than the metallic particles adhere to each other, and is sufficiently hard to resist a file. Iron thus protected has been long exposed to the action of moisture and corrosive acids without change, and is practically unoxidizable by any agent. The process is cheap and can be conducted to any desired extent.

By this invention the use of iron for many applications must be greatly increased. It does away with the enameled iron culinary utensils, so liable to be poisonous, and also "tin ware," so called. Iron plates protected by the magnetic oxide will be used for a large number of purposes where the more costly copper is now used. Perhaps more important than all, the discovery will break up the use of "galvanized iron" water pipes, by which so many individuals and families have been poisoned. It gives us a cheap, safe, water conduit pipe, which has long been needed and sought for. If no practical difficulties arise in the manufacture—and none are anticipated—it cannot be long before the great benefits of this discovery will be realized by every community in the civilized world.—*Journal of Chemistry.*

Rapidity of a Pigeon's Flight.

According to the London newspapers, there was lately an amusing experiment to test the flight of carrier-pigeons against the speed of a railway train. The following is the account given of this curious race, which took place on the 13th of July: "The race was from Dover to London, between the continental mail express train and a carrier-pigeon conveying a document of an urgent nature from the French police. The pigeon was of the best breed of homing pigeons, known as "Belgian voyageurs." The bird was tossed through a railway carriage window, by a French official, as the train moved from the Admiralty Pier, the wind being west, and the atmosphere hazy, but with the sun shining. For upwards of a minute the carrier-pigeon circled round to an altitude of about half a mile, and then sailed away towards London. By this time the train, which carried the European mails, and was timed not to stop between Dover and Cannon Street, had got up to full speed, and was proceeding at the rate of sixty miles an hour towards London. The odds at starting seemed against the bird; and the railway officials predicted that the little messenger would be beaten in the race. The pigeon, however, as soon as it ascertained its bearings, took the nearest homeward route, in a direction midway between Maidstone and Sittingbourne, the distance, "as the crow flies" between Dover and London, being seventy miles, and by rail seventy-six and a half miles. When the continental mail express came into Cannon Street station, the bird had been home twenty minutes, having beaten Her Majesty's royal mail by a time allowance representing eighteen miles."



DESIGN FOR WINDOW GARDENING.

Autcmatic Clock.—An automatic clock is described by Herr Helling, in which the winding machinery is operated by the alternate expansion and contraction of glycerine, or other suitable liquid. A piston, on the surface of the glycerine, is so connected with ratchet wheels and toothed racks, that motion in either direction will wind up the weight. The inventor thinks that the contrivance will be especially valuable for self-registering meteorological instruments.

The fact that American manufactures are admitted free into the kingdom of Hawaii, while heavy duties are imposed upon those of Great Britain, would seem to leave no reason why the latter should enjoy an almost undisturbed monopoly, especially in the items of machinery and agricultural implements. The increasing exports of sugar and molasses from Hawaii, a very large proportion of which is received at San Francisco, and the statement by the American minister to Hawaii that America has allowed the great advantages for the introduction of its manufactures to remain unimproved, have directed attention to the subject which may result in the opening up of a flourishing trade there, and the driving of British manufacturers from the field.

English Japanners and the Japanese Goods.

Those English japanners who have always taken an interest in their industry, regarding it much as an art rather than as a trade, have long desired to emulate the Japanese product. They have dissected the article with the keenness of an analytical chemist, and they believe they know pretty much how it has been got up. Their chief difficulty, however, has been the materials with which the Japanese have had to work. The grain, the lightness and the solidity of the wood used, together with the varnishing, the bronze, and the coloring are not known in Europe. The wonderfully polished surface of the Japan goods has evidently been obtained without the costly aid of the delicate hand of the woman-worker, by which alone the best polish upon English goods is secured. The Japanese has only had to apply his beautiful japan and put his blank into the sunlight, and all the resplendent polish, as well on the back as on the front of the tray, would seem to be the result. The raised surface of what looks like solid bronze adornment is believed by the best artists in this country to have a white metalliferous base, secured by a material not available here—the bronze and the coloring, as they appear to the eye, having been subsequently applied, but only lightly. We all know that it was "Foley the Fiddler" who rifled the Swedes of the secret of making slit rods, and that it was another Englishman, now an American ironmaster, and at the present moment in this country, who by a personal visit to iron-mills in Siberia succeeded in obtaining for Transatlantic makers the secret of making Russian sheets. There are japanners now in England who, were they a little younger, would not hesitate to run the risk—for risk it still is—of finding their way into the Japanese manufactories in which these marvels of execution are turned out. The problem, however, still remains unsolved. Even should he succeed in getting all the information which he might desire, could he obtain the materials, and, having obtained them, could he in his ovens make up for the absence of the Eastern sun? However, we are not inclined to despair, for we do not think it improbable that the entire secret will be by-and-by revealed. The Japanese could, perhaps, be prevailed upon to send us shipments of the finest of their timber, got from the maple and the evergreen oak, together with a plentiful supply of their varnish or lac tree; and, seeing that it is now the ambition of almost every Japanese artist to get to Europe, little difficulty would be experienced in enticing Japanese artists over to this country.—*English Exchange.*

Explosions in Coal Mines.—Three papers on the relations of atmospheric pressure and coal dust to explosions of fire-damp, and on the best means of preventing them, are given in a recent number (vol. xi.) of the *Annales des Mines*. The French Academy has appointed a committee consisting of MM. Daubrée, P. Thenard, and Berthelot, to act with a committee of engineers in studying remedial measures.