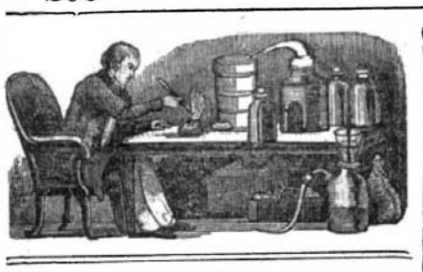


For the Scientific American.

Poisonous Metals.—Mercury.

This metal in its metallic form is not possessed of noxious properties, but its compounds are nearly as dangerous as arsenic. *Corrosive sublimate* is the most dangerous salt of mercury—it is something like arsenious acid in its effects—three grains of it having been known to destroy the life of an adult. Corrosive sublimate is generally found in the form of a heavy white powder, or in heavy crystalline cakes. Its taste is metallic and acrid, and can easily be detected in the mouth—being very different from arsenic in this respect. It is very soluble in water—and it faintly reddens litmus paper

When sulphuretted hydrogen gas is passed through a solution of corrosive sublimate, the sulphurett of mercury in the form of a dark brown powder is precipitated. According to Dr. Christisson sulphuretted hydrogen detects corrosive sublimate, where its proportion does not exceed a 35,000th of the whole solution. The sulphuret of mercury when dried and heated with carbonate of soda, readily furnishes a ring of pure metallic mercury. Protochloride of tin precipitates corrosive sublimate in solution in the form of a white powder, which afterwards becomes grey, and finally blackish and is said by eminent chemists to be an infallible test, affecting solutions which contain only an 80,000th part of the salt.

By immersing a polished plate of copper in a solution of corrosive sublimate acidulated with hydrochloric acid, it soon becomes coated with the reduced mercury, and it may be obtained in globules by heating the copper in a reduction tube.

Iodide of potassium causes a beautiful scarlet precipitate when introduced into a solution of corrosive sublimate. By placing a drop of strong solution of the corrosive sublimate on a gold coin, and touching the gold through the solution with an iron point, the mercury will be deposited on the coin, in the form of a bright silvery spot. This is really a beautiful test, called "the galvanic," and there are several modifications of it, but Orfila takes an exception to it and says, that "if the fluid mercury cannot be afterwards obtained in distinct globules, the evidence of it must be doubted, for tin solution can also be precipitated on gold. Dr. Taylor says it is easy to detect corrosive sublimate in organic solids by simply boiling them with copper gauze and a few drops of hydrochloric acid.

Professor Teider of Florence, says that gluten possesses the property of decomposing corrosive sublimate and therefore glue is a very convenient antidote to the poison, and the white of eggs likewise. Vegetable principles such as albumen and gelatine, possess the same properties. It is therefore plain that it acts upon the system by combining with its organic principles. Orfila states that the proper antidote to corrosive sublimate, is the white of eggs or albumen, and that corrosive sublimate digested for some time with albumen, forms an insoluble compound that may be taken into the stomach with impunity, but in cases of poisoning the stomach pump and emetics should, where it is possible, be the first applied remedies.

For the Scientific American.

Refining Gold and Silver by Quicksilver.

It is well known that quicksilver unites readily with almost all metals, and whenever added in considerable quantity, forms a paste which is called an amalgum. On the other hand, as it does not unite with the earth, it is an excellent medium for separating gold and silver from other substances with which they may be mixed. When quicksilver forms an amalgum with the precious metals, the two are separated by squeezing the mercury thro' the pores of a piece of leather, when the precious metal is left behind. There is still, however, a portion of the metal left behind, which is only driven off by heat. The amalgum of quicksilver with gold has been employed for gilding metals by rubbing the amalgum over them and afterwards heating it, till the quicksilver is driven off. The principle of separating gold from other bodies by quicksilver was known to the ancients in the days of Pliny, although some have pretended that it was a modern discovery. Vitruvius describes the whole process exactly as it is now known and practised, with the exception of distilling the quicksilver and losing none of it, a fact witb which the ancients seem not to have been acquainted. Modern mineralogists expose the amalgum to heat in a retort and collect the quicksilver in a receiver. The quicksilver becomes a vapor at a certain heat and the worm or pipe of the retort is conducted through water which condenses the quicksilver to a liquid when it is received, as already described, in a proper vessel. Quicksilver is employed in all the South American mines, to separate the silver from the earths. There are very extensive quicksilver mines near Guamanga in Peru, and it is used exclusively for refining. The quicksilver is agitated along with the precious metals in water to produce the amalgamation and the water is afterwards poured off

By the accounts we have received from California, it appears that the quicksilver in the form of cinnabar, is abundant. This is a fortunate circumstance, and renders that country doubly valuable as a gold region, inasmuch as it contains not only the precious metals in its bosom, but the means of separating the same by amalgamation. Were this not the case—had our emigrants to purchase their quicksilver in stinted quantities from abroad, the pursuit of gold, unless when it is found in separate and large particles, would not be a profitable occupation.

Ornamental Leather.

Mr. Poynter has read to the Institute of British Architects, a paper on "Ornamental Leather Hangings." He stated that this material was used in a similar way by the Egyptians 900 years B. C. ; but he principally confined his remarks to the use made of it since the 16th century,—as during that and the succeeding century, it was extensively used by the richer classes, its manufacture being principally at Venice and in Flanders. From the latter country it was introduced into France ; but it is doubtful if it was ever manufactured in England. Leather hangings never entirely superseded tapestry or wood panelling.—The best leather was made from goats' or calves' skin, ingeniously connected together ; and the surface was silvered over previously to being painted. The effect of gold was produced by a varnish of yellow color laid on the silver. The embossing was done by the pressure from dies ; the minute ornaments being produced by tools—the method adopted corresponding to that of the bookbinders of the present day. Among the various specimens of this rich style of decoration exhibited, was a large and valuable hanging of the 16th century, representing the meeting of Antony and Cleopatra, richly painted and elaborately finished in all the details of the dresses and other portions of the figures, which are the size of life. Mr. Poynter alluded to fine examples to be seen at Chatsworth, and other mansions in England ; and particularly described a series of leather panels at Rouen, which are perfect.

Treatment of Fruit Trees in Winter.

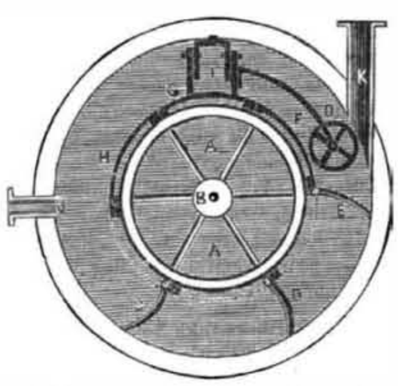
An intelligent writer observes, that to preserve fruit trees from frost, in the spring, farmers should, during the coldest weather, remove the snow from the roots around the tree, and allow the ground to freeze as deep as it will. He can then pack old hay, straw leaves, rotten wood, exhausted tan, or almost any vegetable matter, with snow and dirt, so as to form a heap around the tree of as much as four or five feet at the base, and two or three in height. This forms a temporary ice-house and prevents the premature warm weather from starting the sap, and swelling the buds, until the season is so far advanced that the fruit is not endangered from frost.—This treatment can be applied to all kinds of fruit trees, and by covering the heap with shrub soil and pressing it hard around the tree, the insect about the roots may be effectually expelled. The heap should be allowed to remain until the next autumn, when it can be taken away for the next winter's freezing. Trees treated in this manner are apt to become sward bound, and seldom, or never suffer from drought, as the heap always attracts a plentiful supply of moisture.

History of the Rotary Engine.

Prepared expressly for the Scientific American.

FOREMAN'S ROTARY ENGINE.

FIG. 49.



This is a rotary engine invented by Walter Foreman of Bath, England and patented in 1825. Its operation will be readily understood by the following description, and will just as soon be consigned by the reader to the place where it has been laid to rise no more.

Fig. 49 is a side view of the steam wheel, with the casing removed to shew the situation and construction of the valves, and their mode of action in the steam-way. A A, is the steam wheel revolving upon its axis B. C D E F G H, are six flap valves, having steam-tight joints, and fixed to six blocks on the periphery of the steam wheel ; three of the valves are shewn open, and three closed. I is a fixed stop for arresting the course of the steam ; it is composed of an upper and lower piece accurately fitting the sides of the chamber, and connected together by means of screw bolts, so contrived as to admit of an easy adjustment when the lower curved surface may become worn, by the friction of the periphery of the steam wheel in its revolutions. O is the anti-friction roller fixed to a springing curved arm, and screwed to the stop I.

FIG 50.

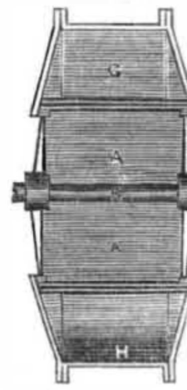


Fig. 50 is a vertical section of fig. 49 through the axis; A A, the steam wheel, B the axis, G H two valves, by which is seen their tapering figure, and the conical form of the casting which encloses them ; the lower valve is shewn as closing the steam-way, and the upper one as leaving it open. It will now be perceived that the valves from this peculiar shade do not, when moving backwards or forwards, even touch the side of the casting, consequently all friction in those parts is obviated ; the dotted lines in the upper valve, are intended to illustrate this observation, as they describe the course of the extreme edge of the valve, when in act of opening or shutting the steam-way.

The mode of operation with this engine is as follows: steam is admitted by the tube J, which immediately fills up the space between the stop I and the valve E, and the latter yielding to the expansive force of the vapour, gives motion to the wheel A A ; when, in the revolution, the valve H takes the place of C, the flap of H (swinging upon its joint) falls by its gravity into the same position ; the steam then acts against it in like manner as C, and successively the valves G F E D, in rotation, as fast as the wheel revolves, the steam finally escaping at the pipe K; the friction-roller O pressing down each flap, as they pass under its operation against the periphery of the steam wheel.

Hydrogen Gas.

This gas, the light inflammable gas of Dr. Priesley, has been chiefly collected during the solution of iron turnings in weak sulphuric acid, made by adding to oil of vitriol about six times its weight of water. An ounce of iron, according to Mr. Cavendish, produces gas equal in measure to 412 ounces of water, but as the solution is of no value, it is preferable to employ zinc, although an ounce does not produce more gas than is equal in measure to 356 ounces of water, or 5 cubic feet ·7 of gas from each avoird. pound ; because the solution being boiled down and crystalized, will yield sulphate of zinc, which is more valuable ; 50 pounds of oil of vitriol will dissolve 36 of iron, or 34 of zinc.

A cubic foot of pure hydrogen gas weighs about 40 grains, and of atmospheric air, about 529 ; but as the hydrogen gas is not aboslutely pure, the buoyancy of each cubic foot of gas in the atmosphere cannot be estimated at more than an avoirdupois ounce, from whence the varnished cloth, cords, valves, and car, must be deducted.

To Make Cloth Water Proof.

Take the purest and best glue ; melt it, and when hot put into it a lump of alum. Stir it until the taste of alum is distinctly perceived. The lump may be taken out, and the size is then ready for use. Sometimes a little soap is added, as this is thought to render the size more flexible.

The above will only answer for cotton or linen cloth—no person would put glue on woolen cloth. Alum is a good substance to make cloth water proof of itself, but the cloth should be dried at a great heat.

Dry Gilding.

This is performed by steeping linen rags in a solution of gold, then burning them, and with a piece of cloth dipped in salt, rub the ashes over the silver intending to be gilt. It is not a durable process, but it does not require either much labor or gold.

Cure for the Piles.

The Salem Observer says that if three ounces of powdered alum be placed in a belt made of cotton drilling, two inches in width, and worn around the body above the loins, next the skin, it will cure the piles.