For the Scientific American.

Artificial Gems.

False Pearls are made by dissolving the scales of small river fish in water of ammonia, which solution is dropped into the inside of hollow glass beads, and then allowed to dry. These are called paste beads, but the French have a way of counterfeiting the real pearl, so skilfully as almost to deceive a *connoiseur*. The basis of all artificial gems is a fusible glass called Strass paste. It is made of rock crystal six ounces, red lead nine ounces, pearl ash three ounces, boracic acid half an ounce, and arsenic five grains This is mixed (being first ground) then fused in a Hessian crucible and kept fused for 24 hours, and then left to cool gradually. The following artificial gems are made of this Strass paste combined with different substances for the various colors.

For Amethyst.—Strass paste one pound, oxide of manganese 24 grains, cobalt 1 grain, fuse together. By the addition of a grain of cassius purple, a more beautiful gem will be made.

Beryl.—9 ounces Strass paste, antimony 24 grains, cobalt one and a half grains. Fuse them together in a crucible.

Red Cornelian.—Strass paste 2 pounds, glass of antimony one pound, calcined peroxide of iron two ounces, and one drachm of oxide of manganese.

White Cornelian.—Strass paste 2 pounds, burned bones one ounce, and a mite of washed yellow ochre.

Emerald.—Strass paste 1 pound 6½ ounces, acetate of copper 72 grains and 1½ grains peroxide of iron.

Another emerald may be made by 9 ounces of Strass paste, oxide of copper 39 grains, oxide of chrome two grains.

Garnet.—Strass paste 1 ounce, glass of antimony 210 grains, and oxide of antimony 2 grains. By adding 2 grains of cassius purple a more beautiful garnet is produced.

Opal.—Strass paste 10 lbs., burned bones half a pound

Ruby.—Strass paste 16 ounces, cassius purple 168 grains, the same amount each of peroxide of iron, and of golden sulphuret of antimony, and of manganese burned with nitre, along with two ounces of rock crystal. A A small amount of manganese with 5 ounces of Strass paste makes a very fine ruby.

Sapphire.—Strass paste 1 ounce, cobalt 68 grains. Fuse for 30 hours. By adding a few grains of manganese a different shade is produced. This mixture must be carefully mixed before fusion and left 30 hours in the fire.

All these artificial gems are fused in luted Hessian crucibles and kept in the fire from 25 to 30 hours. They are then suffered to cool gradually.

Hydrogen.

No. 1.

Hydrogen is a gas and is the lightest of all known substances, a cubic inch at mean temperature and pressure, weighing only 0.0213 of a grain; compared with atmospheric air its weight is as 1 to 15 2. In consequence of this extreme lightness it was used formerly for inflating balloons, but, on account of the expense of obtaining it in sufficient quanty, coal gas (a compound of carbon, or charcoal, and hydrogen) is now substituted for pure hydrogen; much more of this gas, however, is required to carry a given weight for it is much heavier than pure hydrogen.

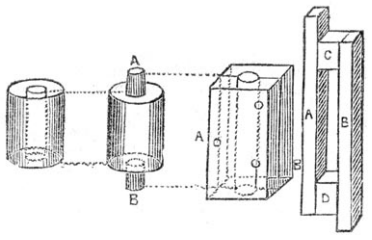
Dry hydrogen gas when it comes into contact with the oxides of many of the metals at a high temperature, decomposes them; the hydrogen uniting with the oxygen to form water which passes off as steam; and the oxides being reduced to metallic state.

Hydrogen is most easily obtained by the decomposition of water. This decomposition may be effected in many different ways; for instance, by passing steam through a pipe containing clean iron turnings, and heated to a bright red heat, the water or steam is decomposed, the oxygen uniting with the iron turnings and forming oxide of iron, while the hydrogen passes off at the orifice of the pipe, and may be collected there. This may appear strange but many cases of a like description fall under the observation of the chemist, indeed it appears, that, under certain circumstances, chemical action will assuredly take place, whether causing the decomposition of a compound or the union of simple elements; so, if steam be passed through a pipe as above described, hydrogen may be collected, and oxide of iron will be formed; but, if the hydrogen be then passed back again over the oxide of iron, the heat being still kept up, steam will issue from the orifice, and, if condensed, will be found to be the exact amount of water previously decomposed; the oxide of iron, also, will be found again reduced to the metallic state, not indeed as at first, with bright surfaces, but covered with a black powder, from its very fine state of division. There are many other modes of decomposing water, for the purpose of obtaining hydrogen; cuttings of zinc, and sulphuric acid, put in water, decompose the water, the zinc becoming sulphate of zinc, and hydrogen passing off as a gas. This is attributable to the fact that zinc has a greater affinity or tendency to unite with oxygen than hydrogen has at ordinary temperatures.

Hydrogen gas when allowed to come in contact with the oxides or salts of some of the metals, reduces the salt or oxide to the metallic state. This is a fact requiring the particular attention of artists; as nearly all the colours used in painting are metallic oxides—and will, therefore, if exposed to free hydrogen gas (even though in small quantity—such as in a smoky room) become reduced to the metallic state on the surface. This effect will assuredly take place if the colors are preparations of lead, silver or mercury,—such as white lead chromate of lead (chrome yellow), chromate of silver, or sulphurate of mercury (vermillion); the whole of these colors will become more or less blackened in a short time, if not properly protected by good varnishes, &c.

Iron Moulding.

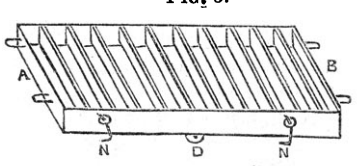
Figs. 1. 2. 3. 4.



The effect of heat upon the most fractious and hard of all the products of nature and art, are truly wonderful. The stubborn iron which can by a blow sever the flinty rock, can by the action of simple heat (but how complex too,) be made to flow like water from the fountain. Taking advantage of this law, and of its solidifying when cold, the founder pours his liquid metal into moulds and allowing it to cool therein, it comes out in every variety of form, according to the patterns used. The first patterns are made of wood. Pattern making forms a branch of business by itself and the operatives generally are men of ingenuity and intelligence. White pine is the wood that is commonly used for the pattern. It is cheap and easily worked. Mahogany is used for making patterns of fine work, such as bushes for journals, pinions and small wheels. It cuts very clean, and has a fine close grain. Maple, although not used in the trade, is very suitable for sharp, well defined patterns intended for constant use. For stove patterns, some parts, such as a border, are sometimes made of a soft metal of lead and tin, transferred from a plaster of Paris mould. After an original wood pattern is made, for light flat moulding, an iron pattern is cast by it, and this is used afterwards for all the moulds. To preserve wood patterns, some cover them with a coat of paint to keep them from being injured by the damp sand, but a varnish made of shellac dissolved in alcohol is much better.

Patterns must be made in such a way, and in such parts as to render the moulding of them practicable, such as the making of the cores, for holes or openings in the castings. For example, were it required to cast a coupling for shafts of a cylindrical form 12 inches deep by 8 inches diameter outside and 4 inside, like fig. 1, a pattern of the same size, fig. 2, is made and two core prints A B, are put on in the proper position to support the core, which is made of sand in a box made of two pieces, fig. 3, held together by pins. Into each piece of the box, half the core hole is cut, to take out the core easily, when it is formed in it.—

Fig. 5.



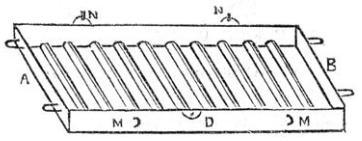
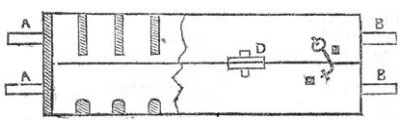


Fig. 6.

After pattern fig. 2 has been made, the core formed in the box fig. 3, is inserted in the recesses left for it by the core prints, the casting fig. 1 will be made, which otherwise would be solid. Were a pattern made like fig. 1, with the hole for the core made through it, when the pattern was withdrawn from the sand, it would draw the core away with it, especially would this happen if the core was placed horizontally. Thus by distinct cores formed in boxes, openings are made in the castings, still it is not impossible to form the patterns to make the cores. Square cores are formed by two pieces of wood A B, fig. 4.—They are made of the required thickness and kept apart by two pieces C D, forming the core required, by filling the space within with sand.

Green Sand Moulding, is different from dry sand moulding, because damp sand is used. In green sand moulding boxes are always employed to contain the sand in which the pattern is moulded. These boxes are made of different sizes, and where a number of castings of one form is required, it is best to have boxes expressly for them, that the moulder may not expend labor in raming useless corners. Generally these boxes are made rectangular in two parts, as shown in figs. 5 and 6. This box has no top or bottom. Each box is made of an outside rectangular frame A B, which is about 4 or 5 inches deep, for light flat moulding. They have ribs placed at equal distances apart. The box is open to allow the sand to be rammed down in a close mass. These boxes are roughly made and the rougher the better. As there is no covering, it is named "open sand casting," and is for articles of a rough nature. Fig. 7, is a longitudinal view (part section,) of a pair of boxes

Fig. 7.



which shows that the ribs of the upper box are not so deep as the outside frame. They are generally an inch less in depth, to allow a depth of sand over the pattern that is embedded in the sand of the lower box. The lower box is called the drag box, and its ribs are shorter and thicker than the upper, it allows more available space for the pattern and does not need to be moved and inverted like the upper one. There are two handles at each end to allow the box to be moved by two men.—They have also hooks and eyes N M, generally three, to couple them together, as represented by fig. 7. The drag box has also pins D, cast on ears at the side, which pass through holes in ears made on the upper box, so that the boxes when placed together will always be retained in the same relative position to one another, and they are held tightly to one another by the hooks and eyes.

(*To be continued.*)

Next week, we shall treat of the kinds of sand used and also the tools.

Malt-Dust or "Sprouts."

Barley, in undergoing the process of malting, sprouts, and after the grain or malt is dried, the rootlets are rubbed off. One hundred bushels of barley are said to yield four or five bushels of this dust. It is a very powerful manure, and is used in England as top-dressing to different crops. It is sometimes used in forming composts, owing to the large proportion of nitrogen it contains, its tendency to fermentation is great; and on this account it is valuable to mix with peat or coarse vegetable matters. A small quantity of the dust, say four bushels to a common-cart load of peat, laid up in layers with the peat, will soon reduce it to a good manure. A handful of this dust to a hill of Indian corn, is a strong stimulant to growth.

Precautions against Poison.

In Germany, to prevent poison being obtained for evil purposes, none is allowed to be sold without a written order or certificate from a physician. To prevent rat poison being made a bad use of, or taken by mistake, the arsenic is mixed with tallow and lampblack, which makes a compound that no human beings could partake of. None is allowed to be sold in a pure state

[We would like to see the above practice adopted here.

A Fact to be Remembered.

The recent sudden increase of cholera in Paris, says a French paper, "took place on a Sunday, on a day of general amusement," when there was an enormous consumption of the various preparations of ice, and when other excesses were indulged in. A striking and solemn testimony is thus borne, in a quarter where least expected, as to the evil of turning the holy Sabbath into a season of amusement.

LITERARY NOTICES.

Pictorial National Library, published in monthly numbers by Wm. Simonds 12 School street, Boston. Terms $2 per annum.

The August number of the above Magazine has been received. It contains thirteen original engravings and 53 pages of instructive reading. This publication deservedly sustains a high reputation wherever it is known.

American Phrenological Journal.

This Journal for August contains a likeness and biography of Father Mathew, also a phrenological description of Mr. Fordice Hitchcock, besides a great deal of very interesting and useful matter.

Water Cure Journal.

This Herald of Reforms contains an unusual amount of excellent information, excellent because practical, and practical because truthful and plain.

Banker's Magazine.

This Magazine for August, is a most valuable number Bank robberies, important law cases, circulation of coin in England, capital, its origin, growth and application, are some of the many able and valuable articles in it. It possesses information for every man who can read.