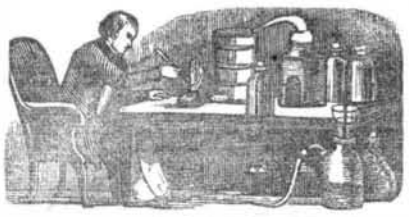


Hydrogen Gas.—No. 2.

In our last, it was stated that water was a compound of hydrogen and oxygen. To form water from these two elements it is not sufficient to raise the gases; for the mixed gases might be kept for any length of time without any union taking place between them; but if two volumes or measure of hydrogen be mixed with one volume or measure of oxygen, and then a light from any flaming body be applied to the gases, &c., mixed, an explosion immediately takes place—the gases combine, and water or steam is the result of this combination. The explosion in this case is very violent; and great caution should be observed in performing this experiment. The gases should be mixed only in small quantities at a time, and the containing vessel should be of sufficient strength to resist the force of the explosion.

Pure water, when required, is obtained by distillation from impure river or well water. For this purpose the water is put into a large still, and maintained at a boiling heat; the steam that passes off first generally contains a small quantity of ammonia—this is allowed to escape for a few minutes—the steam is then caused to pass through a long length of metallic pipe surrounded with cold water, which condenses it; it will then be in a state of purity sufficient for most purposes, but not be absolutely pure. Filtering water does not render it pure; it merely separates from the water those insoluble matters *floating* in it—the water still retaining all the matters that were *dissolved* in it before being filtered. Water dissolves, not only solid substances, but also matters in a gaseous state; 100 cubic inches of water at 60° Fah, when the barometer stands at 30 inches, will absorb of

Sulphurated Hydrogen	100	cubic inches.
Carbonic Acid	100	"
Nitrous Oxide Gas	60	"
Olefient Gas	13	"
Oxygen	4	"
Carbonic Oxide	2	"
Nitrogen	1½	"
Hydrogen	1	"

These gaseous substances are all expelled by boiling the water; but the solid substances dissolved in the water are gradually precipitated or deposited, as the water is evaporated—because the water can only dissolve a certain quantity of each solid substance contained in it; when, therefore, a portion of the water has been evaporated, the portion of solid matter, previously held in solution by the portion evaporated, cannot be taken up or dissolved by the water remaining in the vessel that is already saturated; it therefore remains as a solid deposit, which is generally denominated *fur*. Sometimes this deposition of solid matter is observed to take place before scarcely any of the water has evaporated, indeed before the water boils; this is particularly the case with water containing carbonate of lime, and depends upon the fact, that carbonate of lime (chalk) is not soluble in water, but is soluble in carbonic acid, while in solution in water; when the carbonic acid is expelled by heat, the carbonate falls as an insoluble powder, as there is no longer present any substance that has the power of dissolving it. To render these deposits soluble in a small quantity of water is an object of great importance to engineers, and has been the subject of several patents.

Silver Fire.

Place a piece of burning charcoal, a morsel of dried crystals of nitrate of silver, (not the lunar caustic,) and it will immediately throw out the most beautiful sparks that can be imagined, while the surface of the charcoal will be coated with silver.

There will be a total eclipse of the sun on the 17th prox., and an eclipse of the moon on the 2nd Sept., both visible in the United States.

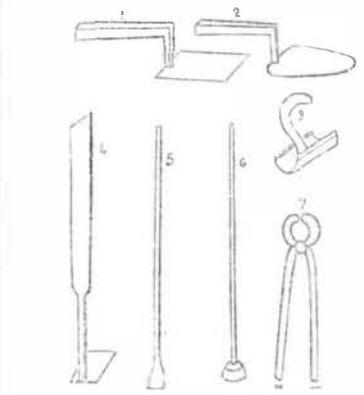
Iron Moulding.

Continued from page 384.

MATERIALS USED.

The *principal* materials used in our moulding, are sand of various kinds, clay and charcoal dust. Sand is superior to all other substances as a material for forming moulds generally. Hot iron has no chemical action upon it, although it has upon the coal dust. Sand is a fine medium to conduct the air which is expelled from the space in the mould filled with the molten iron, and also for the other gases, generated by the heated iron coming in contact with the coal dust. It also possesses considerable adhesiveness when pressed together to make it retain its form against the pressure of the molten metal, and it conforms itself very accurately to the surface of the pattern imbedded in it. For long cores, the more free the sand is, so much the better, if it has adhesiveness. but as it wants this, it must be tempered with clay, yeast, molasses, or meal made from ground peas. Clay mixed with sand is used for what is termed loam moulding. They are mixed at the rate of nine parts of sand to one of clay, ground together with a little water. This, with a handful of hair and a little saw dust added, forms core loam. Loam moulding is executed without the common patterns. There are various kinds of sand use for moulding. Free argilicious sand, ground along with one twelfth part of the best bituminous coal, makes a good sand for common purposes. The use of dry sand core is to allow the air to escape freely from the inside of the casting, and also to have a core that will not crush with the weight of metal.

Were the melted iron allowed to come in free contact with sand of the mould, it would enter its minutest interstices, and thus produce a rough surface. To avoid this, ground charcoal dust (some say oak is best,) is dusted over the surface of the mould and pressed and smoothed down. The way by which it protects the sand is by its inflammability If liquid iron is poured on a smooth surface of wood, it rolls about like mercury. This is caused by the gases arising from the combustion of the wood, raising the iron off the surface. The use of the coal dust that is ground along with the same, is for the purpose of keeping the metal from running into the sand pores, when the metal is too powerful for the dusting powder. Many moulders do not know the philosophical use of the black dust.



The accompanying engraving represents different kinds of tools used by moulders for their work; No. 1 is the trowel,—it is much used, and is made of different sizes, from less than half an inch to two inches broad and three inches long. It is used to smooth the surface of the sand, to press down and polish the blackening and repair injured parts of the moulding, &c. No. 2 is another trowel for entering angles of the moulding. No. 3 is used for hollow impressions in the sand. No. 4 is the cleaner for smoothing sunk surfaces in the sand below the reach of the trowel —the lower end goes to the bottom, to take up loose sand, and also to smooth down the surface; the upper end smooths the sides. No. 5 is the first rammer. It is about four feet and a half long. No. 6 is the second rammer for finishing the work commenced by the first. It has a round face, and is about three and a half inches in diameter. No. 7 is a pair of pincers, for grasping and shifting the castings. Shovels are used for working the sand, and serve for sifting it. There are also bellows used to blow loose sand off moulding; pots for holding the packing sand, and the water used in the moulding; swabs for applying the water to the mouldings; and there are bags to hold the black dust to be shaken on the sand; piercers made of thick iron wire, sharpened at one end to a point, are used for piercing the same to let out the air.

(*To be continued.*)

Galvinizing Iron.

If iron plates are well scoured, they can be covered with zinc, by depositing it upon them by means of a galvanic battery. It is done upon the principle of the electrotype. A solution of the chloride of zinc and borax is used, in which to place the plates connected with the wires of the battery, when the zinc will be precipitated on and in union with the iron. A very weak current of electricity is used; zinc, dissolved in hydrochloric acid and ammonia, makes an excellent solution for the purpose. The more simple way, however, is the old plan:—Scour the plates well and dip them into molten zinc, into which is thrown some sal ammoniac. The best way to keep the zinc in the right state, is to have the zinc bath placed in a bath of molten lead. This latter plan has been allowed to be more troublesome in one sense, and not in another, viz., less trouble in the evaporization of the zinc.

Scientific Meeting.

The American Association for the advancement of Science, commenced its second annual meeting, at Harvard Hall, Cambridge, (Mass.) on Tuesday of last week. Professor Henry was elected President for the current year.

The first paper read, was from Professor Secchi, of Georgetown, relative to the causes of the Aurora Borealis. He propounded a theory based upon the powers of moist air as a conductor of Electricity, and gave much interesting information on the subject.

Dr. Hare, of Phila., difiered entirely in opinion, and mentioned experiments, instituted by himself, which proved the position he took. Professor Henry also made some observations, in the course of which he said.

The Smithsonian Institute, in connnection with an extended system of meteorology which it has undertaken to establish, has issued directions for observations of the Aurora. These directions are similar to a set issued by the directors of the observatory at Toronto for observers in Canada. The observations made in the two countries will thus form one extended system. The proprietors of the several telegraph lines have offered to grant us the use of their wires for meteorological purposes, and it is hoped when the lines are completed, and we have established a set of observers extending, for example, from Toronto to Washington, or even farther south, we shall be able to study the phenomenon of the Aurora with more precision than it has ever been studied. On a long line extending north and south, the observer for example, at Toronto, having noticed an Aurora may call the attention to it of all the observers along the line and thus the extent of the visibility, and the simultaneous appearance of any peculiar phase of the meteor, may be readily determined.

Shrinking of Flannel.

Enclose new flannel in a bag; put it into a boiler with cold water, heat and boil it. It will never shrink any more after this operation, and should then be made up into garments.—*Ex.*

[It will shrink though. Just take and rub it, or pound it among some strong soap suds and you will find out.

LITERARY NOTICES.

To say we are glad to welcome upon our table Peterson's National Magazine, would be but a reiteration of what we have said on several previous occasions. We never look in vain for good reading in this Magazine, and we seldom lay it by until we come to that portion which is devoted to the ladies' dressing arrangements. We avoid this portion from our peculiar attachment to Bachelorship. We dare say, however, that Peterson understands their wants in this respect, and with the united aid of Mrs. Stephens, the accomplished Editress, we dare not presume to question their value to the ladies. The engravings are good, the matter equally so. We would remind the ladies that a capital treat is lost by not reading "The Palaces and Prisons." Published in Philadelphia.

Godey's Lady's Book for September, has been received through the politeness of H Long & Bro 43 Ann St. this city. It contains 13 original engravings and 24 extra pages of fine letter press. This number is superb and notwithstanding the publisher has been working as he says, with the thermometer at 99. degrees and upwards, he has really succeeded in producing a highly creditable number, and not inferior to any previous, this is saying considerable, although nothing but truth. The mezzotint of 'Contentment better than Wealth' is finely done, so is also the "The view on the Hudson" and the colored plate of "Paris fashions Americanized." The number throughout is varied and interesting.

It is with pleasure we acknowledge the receipt of the Sept. No. of Sartain's Union Magazine, of Literature and Art, and it is truly what its title indicates. We are indebted to Messrs. Dewitt and Davenport of the Tribune Buildings in this city, for the monthly receipt of this valuable work. The present No. contains four beautiful engravings, besides a number of plates illustrative of the latest fashions for Autumn, and we are confident that its pages will be found highly interesting and instructive, by its fair readers. The leading picture in this No. Christ weeping over Jerusalem, is executed by Mr. J. Sartain who is not excelled probably by any one in this art. The scene represented is very impressive.