The young man's book of amusement

Halifax, 1848

Chemistry

urn:nbn:de:bsz:31-100120

nails, over that part of the table where the magnet is, and requesting the loan of a knife or key, apply it to the filings, and it will have the same effect on the larger ends of these as a magnet would. Then placing your hand as if carelessly on the pin at the bottom of the table, alter the position of the magnet, and giving the key or knife to any one you will disappoint, he will be unable to perform the experiment as you have done; changing the pin's influence again, you may shew that you have these things at command.

CHEMISTRY.

For many of the experiments mentioned in this book, useful apparatus may be made with a common Florence oil-flask, divided into two parts by means of a thread, previously dipped in oil of turpentine, tied round the middle and ignited; the upper part will make a good funnel, the other will contain chemical ingredients, which may require to be held over a flame.

To Procure Hydrogen Gas.

Provide a phial with a cork stopper, through which is thrust a piece of tobacco-pipe. Into the phial put

a few pieces of zinc, or small iron nails; on this pour a mixture, of equal parts of sulphuric acid, (oil of vitriol), and water, previously mixed in a tea-cup, to prevent accidents. Replace the cork stopper, with the piece of tobacco-pipe in it; the hydrogen gas will then be liberated through the pipe into a small stream. Apply the flame of a candle or taper to this stream, and it will immediately take fire, and burn with a clear flame until the hydrogen in the phial be exhausted. In the experiment, the zinc or iron, by the action of the acid becomes oxygenised, and is dissolved, thus taking the oxygen from the sulphuric acid and water; the hydrogen (the other constituent part of the water) is therefore liberated and ascends.

To Fill a Bladder with Hydrogen Gas.

Apply a bladder, previously wetted and compressed, in order to squeeze out all the common air, to the piece of tobacco-pipe inserted in the cork stopper of the phial, (as described in the experiment above). The bladder will thus be filled with hydrogen gas.

Pure Flame.

Hydrogen gas furnishes the purest flame that can be exhibited; for the flame of bodies that emit much light derive that power from solid bodies intensely

ignited, and diffused through them, and which, in ordinary flames, as of gas, tallow, wax, oil, &c. consists of finely divided charcoal.

Inflamed Soap Bubbles.

With a pair of bellows, half fill a bladder, having a stop-cock, with common air, and fill the other half with hydrogen gas: screw a brass tobacco-pipe to the stop-cock, and dip it into a basin of soap-lather. When the bladder is pressed, bubbles will rush out, to which apply the flame of a candle; and they will explode with great violence. Let the bubbles be detached from the bowl of the pipe, before they are inflamed, or else the flame may rush into the pipe, and burst the bladder.

Exploding Gas Bubbles.

Put a small quantity of phosphorus and some potash, dissolved in water, into a retort; apply the flame of a candle or lamp to the bottom of the retort, until the contents boil. The phosphuretted hydrogen gas will then rise, and may be collected in receivers. But if instead of receiving the gas into a jar, you let it simply ascend into water, the bubbles of gas will then explode in succession, as they reach the surface of the water, and a beautiful white smoke will be formed,

which rises slowly and majestically to the ceiling. If bits of phosphorus are kept some hours in hydrogen gas, phosphorized hydrogen gas is produced; and if bubbles of this gas are thrown up into the receiver of an air pump, previously filled with oxygen gas, a brilliant blueish flame will immediately fill the jar.

To Procure Oxygen Gas.

Put a small quantity of the black oxide of manganese into a tubulated retort, and pour upon it as much strong sulphuric acid as will convert it into a thin paste. Support the retort upon a wire stand, and let the open end of it dip under the edge of the glass vessel which is placed on the shelf of the pneumatic-trough full of water to receive the gas; then apply the heat of a lamp to the retort, and the gas will continue to form as long as the manganese contains any of it.

To Exhibit the Combustion of Charcoal in Oxygen Gas.

Take a small piece of red-hot charcoal, and fasten it to the end of a copper wire, then let it down in a jar of oxygen gas, and the appearance will be very beautiful; for the charcoal burns with great splendour and throws out sparks in all directions.

To Exhibit the Combustion of Phosphorus in Oxygen Gas.

Place a piece of phosphorus about the size of a small pea in a copper cup, about the size of a button, fastened to a thick iron wire, the other end of which is fastened to a cork. Take a bottle capable of containing a quart, and after having filled it with oxygen gas, set fire to the phosphorus, and immediately plunge it into the jar, suspending it by the cork; the light will be so excessively brilliant, that it will be impossible to look at it. This is one of the most beautiful experiments it is possible to exhibit, and the light is the most brilliant that can be produced by art.

Interesting Experiment on Glow-Worms.

Place a glow-worm within a jar of oxygen gas in a dark room. The insect will shine with much greater brilliancy than it does in atmospheric air. As the luminous appearance depends on the will of the animal, this experiment probably affords an instance of the stimulus which this gas gives to the animal system.

To Shew the Combustion of Zinc in Oxygen Gas.

Take some turnings of zinc, form a ball of it, and affix it to a wire; insert a small bit of phosphorus

into the ball, set fire to it, and introduce it quickly into the bottle filled with oxygen gas. The zinc will take fire, and burn with a beautiful green flame surrounded by a white one.

Another way.

If a current of oxygen gas be conveyed to filings of the metals, they will burn with great rapidity. For this purpose, fill a large bladder with oxygen gas, and adapt it to a tube; by pressing the bladder, and throwing the gas on a piece of ignited charcoal, on which filings of metal have been put, they will burn rapidly. The filings of metal which exhibit the most brilliant appearances, are those of zinc, copper, antimony, iron, and steel.

Astonishing Heat of the Flame of Oxy-hydrous Gas.

On projecting the flame issuing from the compound blow-pipe, against the outside of a small tinned iron cup, full of cold water, the outside of the cup will become red hot, and at length assume a white heat, not only on its outside, but within, in contact with the water: and in an instant afterwards the flame will break through the side of the cup, and enter the water without being extinguished. The

jet-pipe and flame are plunged under water; with due precautions, the flame will continue to burn with undiminished energy, in actual contact with the water, which latter, in a tumbler holding about half-a-pint, will quickly become heated from about 56 degrees to 170 degrees of Farenheit.

Instantaneous Light Apparatus.

The extremity of a fine platina wire is to be rolled into a spiral form, and then dipped in ammonia-murate, or muriate of platina, until about two grains are taken up; after which it is to be heated red-hot in a spirit lamp. In this way a quantity of spongy platina is formed on the wire so minute, that if put in contact with a mixture of oxygen and hydrogen, it becomes heated, and inflames the glass as rapidly almost as if an electrical spark had passed. Such a wire as this, fixed on the jet pipe, so that the spongy metal shall be exposed to the current of hydrogen, immediately inflames it. It happens that if an instrument of this kind has been exposed for some hours to a humid atmosphere, the inflammation does not take place readily, but in this case, if the top of the platina be touched by the finger or palm of the hand, either before or during the time that the current of hydrogen is passing out, the inflammation immediately takes place. Contact, indeed, is not necessary, for the mere approach of the hand is suf-

ficient to elevate the temperature so much as to cause instant inflammation.

An Apparent Impossibility.

A glass shall be quite filled with rain-water, yet substances shall be added and it shall not run over. Dissolve a portion of salt in the water; after which it will receive a certain quantity of sugar, and after that a certain quantity of alum, and perhaps other dissoluble bodies, and not increase its first dimensions; which proves that fluids have vacuities, or are not perfectly dense.

To Produce a Scarlet Pattern on a Black Ground.

Boil a piece of white muslin, or calico, for a few minutes, in a solution of acetate of iron, and dry it strongly near a fire. Having done this, rinse it in water, and dye it black, by boiling it for a short time with a few chips of logwood and water; and lastly, clear it of the superfluous dye, by rinsing it in water. Then suffer the dyed cloth to dry again, and sprinkle it over with lemon-juice, or dilute muriatic acid. It will then be seen, that, wherever the lemon juice is applied, it will turn the dyed stuff of a scarlet colour; and in this manner any pattern may be produced upon a black ground, upon calico or linen cloth.

Illustration of the Art of Calico Printing.—To Produce White upon a Black Ground.

Boil a piece of white muslin for a few minutes in a solution of sulphate of iron, composed of one part of green sulphate of iron, and eight of water; squeeze it out and dry it. Then imprint upon it spots of any pattern you choose, with lemon-juice; render it dry again, and rinse it well in water. If the stuff now be boiled with logwood chips and water, it will exhibit white spots upon a black ground.

Method of making a Cheap Aromatic Vinegar, for Purifying large Buildings, or Manufactories, &c.

Take of common vinegar any quantity, mix a sufficient quantity of powdered chalk, or common whiting with it, to destroy the acidity; then let the white matter subside, and pour off the insipid supernatant liquor; afterwards let the white powder be dried, either in the open air, or by the fire. When it is dry, pour upon it sulphuric acid, as long as white acid fumes continue to ascend. Stone vessels are most proper to be used on this occasion, as the acid will not act upon them. This product is the acetic acid known in the shops by the name of aromatic vinegar. The simplicity and cheapness of this process, point it out as a very useful and commodious one, for purifying

prisons, hospitals, ships, and houses, where contagion is presumed or suspected; the white acid fumes diffusing themselves quickly round.

The Mode of Constructing and Filling Balloons.

The best forms for balloons, are those of a globe, and an egg-like figure. Fire-balloons, or those raised by heated air, if very large, may be made of linen, or silk, and must be open at the bottom, having a hoop round the opening, from which is suspended the grate for the fuel, which is best of straw, or other light combustibles. Small balloons of this kind may be made of tissue paper, having a wire round the bottom. Two cross wires may support in the centre of the opening a little cup, with some cotton and spirits of wine, the flame of which will rarefy the air, and raise the machine. Large balloons for inflammable air, must be made of silk, and varnished over, so as to be air-tight. To the upper part of the balloon there should be fitted a valve, opening inwards, to which a string should be fastened, passing through a hole made in a small piece of wood, fixed in the lower part of the balloon; so that the aeronaut may open the valve when he wishes to descend. The action of the valve is effected by a round brass plate, having a hole about two or three inches diameter: on the inside there is a shutter of brass, covered also with leather, which serves to close the hole; it is fastened to the leather of the plate,

and kept against the hole by a spring. To the lower part of the balloon a pipe is fixed, made of the same materials with the balloon, which serves it to fill it by. The car or boat, is made of wickerwork, covered with leather, and well varnished, or painted, and is suspended by ropes proceeding from the net, which goes over the balloon. This netting should cover the upper part, and come down to the middle, with various cords proceeding from it to the circumference of a circle, about two feet below the balloon. From that circle other ropes go to the edge of the boat. This circle may be made of wood, or of several pieces of slender cane, bound together. The meshes of the net should be small at top (against which part of the balloon the inflammable air exerts the greatest force) and increase in size as they recede from the top. The inflammable air for filling the balloon, is procured by putting a quantity of iron-filings, or turnings, with some oil of vitriol diluted with water, into casks lined with lead. From the top of these casks, tin tubes proceed, which unite into one that is connected with the silk tube of the balloon. Balloons cannot be made smaller than six feet in diameter, of oiled silk, as the weight of the material is too great for the air to buoy it up. They may be made smaller, of thin strips of bladder, or other membrane, glued together. The best for this purpose is the allantois of a calf, which is the membrane enclosing the fœtus in the womb. With this they may be made eighteen inches in diameter. Fig. 2, represents the present improved form of the hydrogen gas balloon.

Artificial Volcano.

Mix 28 pounds of sulphur and 28 pounds of iron-filings together, and add as much water as will form the whole into a paste: bury the mass about two feet below the surface of the earth, and in twelve or fourteen hours so much heat will be generated, as to swell the earth, and cause an artificial volcano, throwing up whatever impedes its progress, and scattering round ashes of a yellowish and black colour. To succeed in this experiment, advantage should be taken of warm weather, and after the tenth hour of burying the mass, care should be taken not to approach too near its situation.

To make Beautiful Transparent Coloured Water.

The following liquors, which are coloured, being mixed, produce colours very different from their own. The yellow tincture of saffron, and the red tincture of roses, when mixed, produce a green. Blue tincture of violets, and brown spirit of sulphur, produce a crimson. Red tincture of roses, and brown spirits of hartshorn, make a blue. Blue tincture of violets, and blue solution of copper, give a violet colour. Blue tincture of cyanus, and blue spirit of sal-ammoniac coloured, make green. Blue solution of Hungarian vitriol, and brown ley of potash, make yellow. Blue solution of Hungarian vitriol, and red tincture of roses, make black; and blue tincture of cyanus, and green solution of copper, produce red.