SIMPLE EXPERIMENTS IN PHYSICS AND CHEMISTRY.

Experiment in Capillarity.—A crystallizing vessel having been filled with water to a depth of an inch or two, some mercury is allowed to fall into it from such a height that when it strikes the bottom of the vessel it shall rebound in the form of globules. Owing to surface tension, quite a large number of the globules will remain upon the surface of the liquid and will mutually attract each other with great force and at a distance of an inch or more. They will be strongly repelled, also, by any object wet with water that is made to approach them, such as a wooden match, for example.

Soft and Elastic Sulphur.—Some roll sulphur is melted in a Florence flask, with very gentle heat, over a Bunsen burner. It is well to remove the flask from the burner before the complete melting of the brimstone and to stir the latter until the fusion is perfect. The flask will then contain sulphur in a very plastic state.

Then the flask is submitted to heat again and the melted sulphur vigorously stirred. After a while the substance will pass abruptly to a pasty state. Such passage from one state to the other does not take place instantaneously unless the sulphur is vigorously stirred, but occurs gradually.

Experiment with Hydrosulphuric Acid.—Some hydrosulphuric acid is ignited at the extremity of a tapering tube which, through a rubber tube, communicates with a Woolf bottle in which the gas is produced. Upon moving the flame over the surface of some water placed in a pan, sulphur will deposit upon the liquid and thus permit of writing a name, drawing a design, etc.

Phosphureted Hydrogen.—A few fragments of calcium phosphide are allowed to fall into a goblet containing some water, and quite a thick layer of sawdust is immediately spread over the surface of the latter. The bubbles of phosphureted hydrogen accumulate beneath the sawdust in forming one very large bubble, which finally lifts the sawdust, bursts, and forms a series of rings of extraordinary size.

Preparation of Nitrogen.—A bell glass is provided with two metallic combs facing each other and communicating with the poles of a Ruhmkorff coil or a Holtz electrostatic induction machine. Some phosphorus is burned in the bell by the ordinary process. The cupel that contains it is supported by a cork that floats upon the water in which the bell glass rests. As soon as the phosphorus has been completely burned, a silent discharge of electricity is passed through the combs. The electricity immediately precipitates the fumes of phosphoric anhydride, and after this the bell glass will no longer contain anything but pure nitrogen. We would advise the use of a bell glass provided with three apertures, one at the top and two at the sides. The one at the top will serve for collecting the nitrogen when the bell glass is made to descend into the water, and those at the sides will serve for holding the metallic rods of the combs.—A. Bleunard, in La Nature.

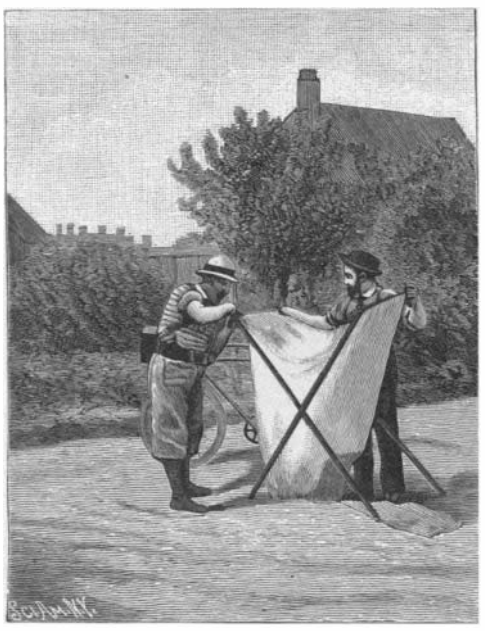

Fig. 1.—MOUNTING THE KITE.

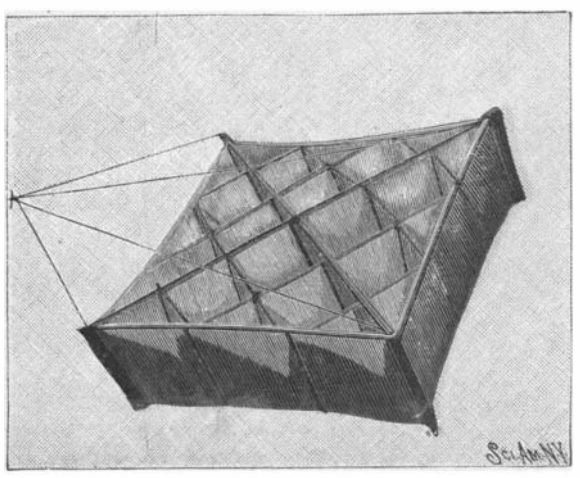

Fig. 2.—THE LECORNU CELLULAR KITE.

Fig. 3.—RAISING THE KITE.

THE LECORNU CELLULAR KITE.

There is no amusement more fascinating, more instructive or more easily engaged in by everybody than kite-flying. Although it is much in favor on the other side of the Atlantic, it is yet too much neglected in France. Almost everywhere in the United States, there are to be found kite clubs analogous to the French bicycle and photographic societies, and which are in the habit of organizing competitions of various kinds. It is a great pity that the sport is not indulged in in France as much as it deserves to be, for the kite is a wonderful apparatus, of which a host of curious and interesting applications may be made. It is almost without a rival for the study of atmospheric electricity and for topographic photography. It may be employed as a life-saving and signaling apparatus, for the practice of wireless telegraphy, for the study of meteorology, and even, as with the balloon, for making ascensions. The ordinary kite is familiar to every one. Whatever be its form, lozenge-shaped, rectangular, elliptical, hexagonal, octagonal, etc., it always consists of a plane surface provided with a bridle to which the string is attached, and with a tail of varying length. This last-named appendage was for a long time looked upon as indispensable, and it seemed as if a tailless kite could not be thought of. But the Oriental kites imported from China and Japan destroyed such an opinion.

If we attentively examine the tailless Japanese and Chinese kites we shall see that they are no longer plane, but either (like the Japanese flies) consist of a plane part and two wings forming pockets and inclined toward the rear, or, (like the Chinese apparatus) present curved surfaces. This, in fact, is because the plane kite is unstable. It is like a plank that we should like to keep in equilibrium in a current of water, and at right angles therewith, in holding it by a single rope. It is evident that however carefully we fixed this rope at the center of the thrust, the board would be in a state of unstable equilibrium and would continually revolve around its point of attachment. It would be entirely different if we should fasten a string to the handle of an umbrella and present the concavity of the latter to the current. When we study the stability of the tailless kite, we are thus led to seek forms that are entirely different from those of the flat kite.

Without extending this brief statement of the question any further, we shall merely say that one of the best forms to adopt for the tailless kite is the cell. We mean by this the form obtained with at least three, but generally four planes intersecting each other in pairs according to parallel straight lines. We thus obtain a sort of bottomless box. The walls are of paper or of some light fabric. To make the matter plain, let us conceive of a cell of square section. This will present itself in the form of a box of which the four sides

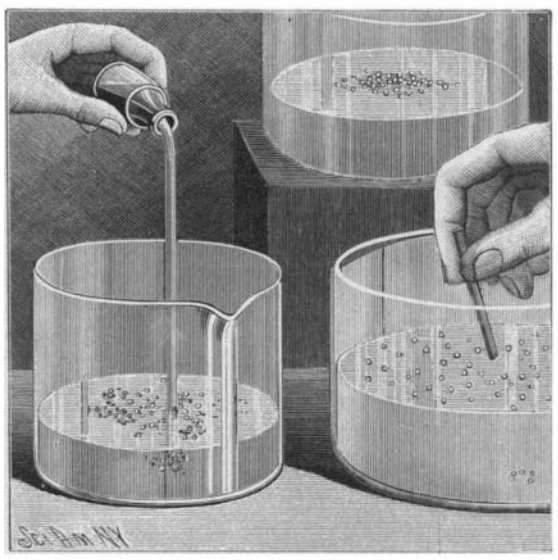

Fig. 1.—EXPERIMENT IN CAPILLARITY.

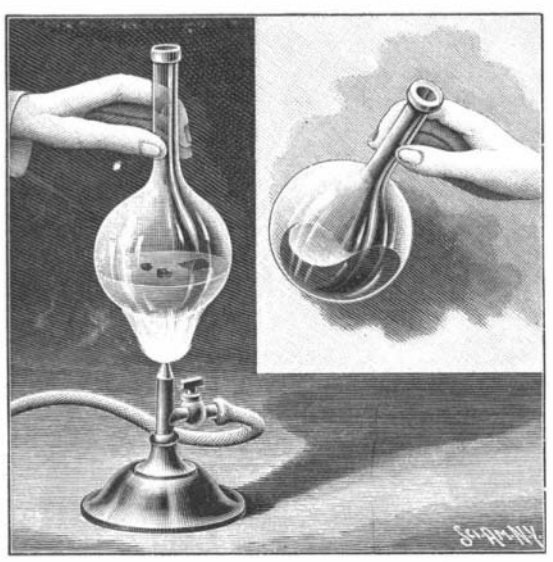

Fig. 2.—EXPERIMENT WITH SULPHUR.

Fig. 3.—WRITING UPON WATER WITH HYDROSULPHURIC ACID.

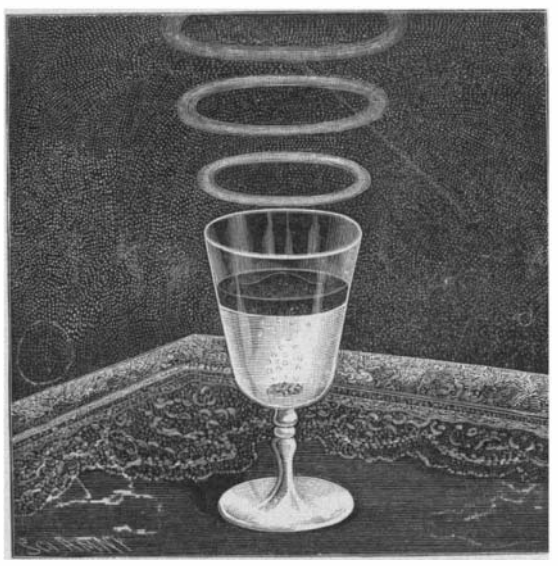

Fig. 4.—RINGS PRODUCED BY PHOSPHURETED HYDROGEN.

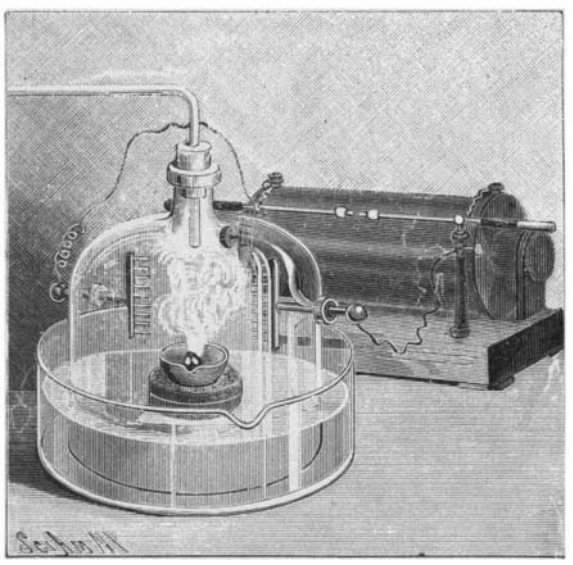

Fig. 5.—PREPARATION OF NITROGEN.