



LX. New outlines of chemical philosophy

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In using the blow-pipe for experiment, a piece of charcoal is generally used to support the subject, and held in the flame of the lamp; the charcoal should be of a close compact grain, and properly burnt; for, if it is too little carbonized, it will flame like a piece of wood, and obscure the object; and if it is too much burnt, it is so quickly consumed, and burnt to ashes, that the object is in danger of being lost in it; the charcoal greatly increases the heat, by reverberating the flame, and by heating the object at the opposite side; itself being converted into fuel, and excited by the blast, and thus creates an atmosphere of flame and heated air around it, which prevents the heat being carried off so fast, or the object being so much cooled, as if it should for an instant be moved out of the cone of the flame, from the unsteadiness of the hand, or from accidental currents of air, which would disturb the flame, and cause such a wavering in the point of the cone, as to divert it in some measure from the object. In order to prevent more tallow than is necessary from being consumed, to produce the intended effect, it is convenient to have several lamps with wicks of different thicknesses, viz. one to hold two flat cottons (such as are used for the Liverpool lamps) of about $1\frac{1}{4}$ inch broad; another to hold four, and a third to hold six, or as much common wick yarn as is equal to those wicks in bulk: glass jets should also be provided of different sized apertures, to suit the greater or lesser sized wicks and flames, and deliver streams of air upon them proportionately, and their jets should point upwards in a small degree: hogs-lard is also equal or perhaps superior to tallow for the lamp.

LX. *New Outlines of Chemical Philosophy.* By EZ. WALKER, Esq. of Lynn, Norfolk.

[Continued from p. 105.]

SIRS,—IN a paper published in the Philosophical Magazine, vol. xlii. p. 161, I described an electrometer, which I had contrived for determining the mechanical forces of the two elements that compose the electric spark. From some experiments made with that instrument it appears that all electrical phænomena are produced by two distinct powers acting in contrary directions, and with equal energy. At that time I had no other way of determining the equality of those forces, than by inspection; but I have since added some improvements to the instrument, which make it more convenient and correct.

The first improvement consists in cutting a hole through the
card,

card, about an inch square, between the two hobs of the pendulums*. A piece of card paper, rather less than an inch square, is inserted into the place where the card was cut out, and between the two ends of the wires, for the electric spark to pass through. As soon as this card has been perforated, it is taken out, and another piece of equal dimensions put into its place; and thus a number of experiments may be made with very little trouble.

The second improvement consists in fixing a thread to each pendulum rod. These threads pass through two separate holes in the card in contrary directions, so that by taking hold of their ends the pendulums may be drawn close to the plane of the instrument.

When an electric charge is passed through the two wires, the pendulums are thrown off in contrary directions, and consequently the threads are drawn through the card, and show the mechanical forces of the two elements.

The length of the thread drawn through the card in eleven experiments by the positive force, thermogen, was 23 inches; and the thread drawn through the card, at the same time, by the other force, improperly called negative electricity, measured 22 inches.

In four of these experiments the mechanical forces were equal: in some of the rest the positive, or thermogen, acted with greater energy than the photogen; in others it acted with less: but these differences were only such as might have been expected from the nature of the elements which were the objects of investigation.

Whence we may infer, notwithstanding this small difference, that the electric spark is composed of two elements passing through each other with *equal forces*, in contrary directions. Consequently, positive and negative are words that have no definite meanings in chemical philosophy; thermogen and photogen are more appropriate; and as I have clearly defined those terms, my meaning cannot be misunderstood by men of science.

Lynn, April 18, 1814.

E. WALKER.

To Messrs. Nicholson and Tilloch.

* See vol. xlii. Plate III. fig. 3.

