ment depends the success of the operation. The lower one is simply a perforated tube like that of the front division, it is supplied with gas in front, at its left-hand extremity. As the piston stands at present, the gas passes only into the first compartment; and on lighting it over the wire-gauze at the top, we obtain a narrow sheet of flame, corresponding in width with the compartment; but on pushing the piston further along the tube, we allow gas gradually to enter into all the compartments, and increase the flame over the wire-gauze in the same measure as we proceed. As soon as the piston reaches the other extremity of the tube, we produce on the whole extent of the wire-gauze covering the back division of the apparatus, the same kind of air-flame which we originally saw lighted on the wire-gauze top of the front division. The arrangement of the upper pipe is different This pipe is supplied with gas at the opposite, the right-hand extremity. It is provided, moreover, with two rows of straight tubes, of very small bore, similar to those used in Leslie's burner; the open ends of these tubes pass through the meshes of the wire-gauze. As the piston is represented, the gas is supplied only to the two first tubes, (one on each side of the axis of the combustion-tube,) and may be lighted at the ends, forming, according to the quantity admitted, two larger or smaller jets of gas, which may be reduced to mere points of flame. By drawing out the piston I may light one pair after another, until the whole series is in combustion. The upper and lower tubes are perfectly independent of one another.

Now, complicated though this machinery may appear, it works with the greatest facility and precision. Of this I hope to convince you by experiment. Let us perform an actual analysis together. In this case we use a tube, open at both extremities. This tube contains a layer of perfectly pure and unmixed black oxide of copper, corresponding in length to the front division. By exposing this oxide to the air-flame in the latter, while a current of perfectly dry air is forced through it from one of the gas-holders, which, as you observe, may be connected with our apparatus, we expel every trace of moisture which the oxide of copper, may have absorbed during the process of filling. We next introduce the substance which we desire to analyze (I have taken sugar), and which, as you observe, having been put into a little boat of platinum foil, is placed in the combustion-tube; the boat occupies that portion of the tube which is situated over the back division of the combustion furnace. This being accomplished, the combustion-tube is connected in front with the chloride of calcium tube and the potash bulbs; at the back with the system of U-shaped tubes, containing sticks of potassa, and pumice-stone, moistened with sulphuric acid, and ultimately with the two small gas-holders I have already mentioned, and which are filled respectively with common air and oxygen. We now light the air-flame of the whole front division: so soon as the oxide of copper is in a state of full ignition, we open the stop-cock of the air gas-holder, and again force through the apparatus a slow current of air, perfectly dried, and deprived of any trace of carbonic acid it might contain by the system of tubes through which it has to pass. The rate of the current may be ascertained and regulated by the number of bubbles passing through a small bottle filled with sulphuric acid inserted for the purpose. We next begin to work with the back division of our apparatus; we push forward the piston of the lower tube, so as to admit gas to the first compartment, which enables us to expose the very extremity of the tube to an air-flame similar to that to which the oxide of copper is exposed all the while. We now slowly pull the piston of the upper tube, supplied at the time with a very moderate quantity of gas; the several pairs of jets being lighted successfully, we succeed in gradually exposing the boat containing the substance to a slowly increasing temperature. The substance begins to be decomposed, and a portion of its carbon and hydrogen is evolved in the form of volatile products. These vapours are carried by the forward current of atmospheric air towards the red-hot oxide of copper, where they are rapidly converted into water and carbonic acid, which are collected as usual in the chloride of calcium tube and the potash bulbs. These bulbs are in our case connected with an additional little tube, con-