gas-delivery tube. On the application of heat to the retort, you observe that an active combustion goes on at a comparatively low temperature. The reduction of the copper becomes apparent from the red colour which the mixture assumes; and water collects in the receiver; while from the delivery-tube a considerable quantity of gas escapes, which, producing as it does a dense white precipitate in baryta-water, is at once recognised to be carbonic acid. Now, a perfectly analogous apparatus is used in organic analysis, with this difference only, that, while the contrivance before you was calculated to *exhibit* the products of combustion, the apparatus actually employed admits of *collecting* these products and weighing them.

The arrangement before you presents this apparatus in the simplest form The retort, you observe, is replaced by a long glass tube. Instead of the receiver, we have a tube containing chloride of calcium,—a substance which you probably know, absorbs moisture with the greatest avidity: while, lastly, for the delivery-tube dipping into baryta-water, there is appended a piece of apparatus to which I must call your particular attention It is filled with a concentrated solution of potassa, and serves to arrest the carbonic acid generated during the combustion. This little instrument, known by the title of Liebig's bulb apparatus, was invented by the celebrated chemist whose name it bears. The construction of this apparatus, simple as it may appear to you, has been most signally conducive to the development of the chemistry of carbon; it may be truly said, that this branch of science, as such, dates from the invention of the potash bulbs But let us examine a little more closely the advantages of this instrument, which I am enabled, as you observe, to exhibit to you in rather magnified dimensions. You observe, the gas enters at one end of the tube; it passes into one of the lateral bulbs, where it first meets with the potassa, it is next forced through the liquid column standing between the first and second bulb. In this second bulb, it remains for a moment until the bubble has been sufficiently enlarged to pass through the layer separating the second and third; this third larger than the others, retains it somewhat longer before it passes into the fourth. In this the absorption is generally complete; but, to secure the last traces of carbonic acid, the gas is washed once more by a vertical column filling the second limb and part of the fifth bulb. But I will show you experimentally how well this instrument fulfils its object. It consists of a common apparatus for generating carbonic acid, constructed, as you see, upon the well-known principle of Doebereiner's hydrogen lamp. This generator is connected with a T piece, provided with two stopcocks, which enable us at will to direct the current of carbonic acid, either through this lateral delivery-tube, which discharges into baryta-water, (the white precipitate in which shows you that we have actually carbonic acid), or through the potash apparatus. Now, you observe, we have rather a rapid current of this gas; but scarcely a bubble passes through the bulbs. The gas which passes through is nothing but the air originally contained in the apparatus In order to prove this, we will pass it into baryta-water, and, you observe, not a trace of a precipitate is produced.

But let us return to our combustion apparatus. You will admit, that the arrangement for collecting the products could not be simpler and more effectual. But how is the combustion actually carried out? For this purpose the combustion tube (this is the term used in the laboratory to designate the retort) is carefully filled with a mixture of freshly-ignited oxide of copper, and an accurately-weighed quantity of the substance which it is intended to analyse. This quantity is generally very small; from five to six grains are usually sufficient. We employ, of course, a far larger quantity of oxide of copper than is actually necessary for complete combustion. The mixture being introduced, the tube is laid horizontally on the table, and gently tapped, so as to keep its upper part clear and to allow a free passage to the gases generated during the combustion It is now placed in a furnace of iron plate, with a perforated grating to admit of a regular supply of air The tube is supported at small distances by a series of iron pillars, which prevent it from collapsing, if it should become soft on the application of too