tained without loss during the passage of the discharge in the upper chamber.

Now it is known from Lenard's[1] experiments that when cathode rays impinge upon one face of an aluminium disc ·004 millimetres in thickness a pencil of similar rays issues from the opposite face of the disc. In the experiments just cited one would then have expected at low pressures, especially when A was the negative terminal, that some indication would have been given by the electrometer of the presence of Lenard rays within the cylinder.

But the lowest pressures attainable with this form of tube only permitted the cathode dark space to extend about one half the distance across the bulb from the disc *A* to the end of the cylinder. The cathode rays could, therefore, not reach the disc *d*; no cathode rays could then be produced within the cylinder, and, as a consequence, no electrical conductivity be impressed upon the gas surrounding the exploring electrode.

While this form of tube was thus of great service in locating the cause of the effect observed by Professor Thomson it was not suitable for the production of the lowest pressures on account of the large amount of metal which it contained.

A third form of tube was then devised in order to examine the screening action of Faraday cylinders at very low pressures.

3. Penetrating Power of Cathode Rays.

In this tube, Fig. IV., the electric screening was partly brought about by the use of mercury. The tube itself consisted of two parts, which were united by a carefully ground joint, and the cylinder *D* was made from a steel tube held in position by fitting tightly to a plug of ebonite *b*. This plug also fitted tightly to a central glass tube, and was pierced, as shown in the figure, by a small hole which permitted the pressures inside and outside the cylinder to be equalised when the mercury was lowered.

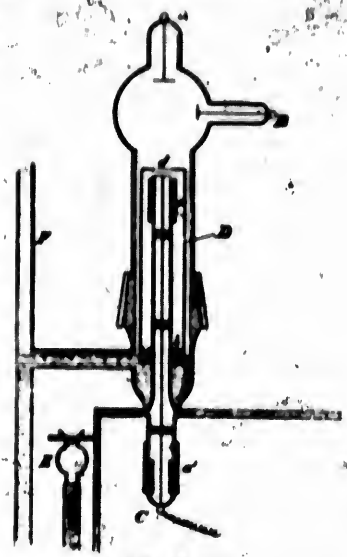

Fig. IV.

[1] Lenard Wied., Ann., p. 51, 225, 1894.