supposition that no absorption of the rays took place on traversing the walls of the vessel.

If absorption did occur, and the absorption constant for the cylinder was known, the value 36·3 could be modified accordingly, and the ionization produced by the gamma rays alone within the cylinder be deduced.

Suppose, for example, that the cylinder was an aluminium one 0·73 mm. in thickness, the absorption from Table III. could be neglected, and 36·3 would represent the ionization produced by the gamma rays in the air which it enclosed. From the results given in Column 5, Table V. the corresponding ionization due to the secondary radiation excited in the aluminium by the gamma rays would amount to 57 per cent. of 36·3 or 20·7, so that the total ionization within the aluminium cylinder due to the gamma rays from the radium and to the secondary rays which they excited, could be represented by (36·3 + 20·7) or 57 would be the estimated reading.

In an actual experiment with an aluminium cylinder of the dimensions given above, and situated approximately in the position indicated, the reading 62 was obtained as the mean of a number of observations. This difference between the experimental and the calculated values for the ionization is not more than 8 per cent.; and it is not surprising when it is remembered that no special precautions were taken to place the aluminium cylinder exactly in the position occupied by the lead cylinders with which the measurements were made upon which the present calculations are based. It is possible that the aluminium cylinder may have been as much as a centimetre out from the position it was supposed to occupy during the measurements. From the agreement presented by these measurements, it seems warrantable to conclude that the relation which has been established between the relative amounts of ionization produced by primary and secondary radiations within a mass of air confined in lead or aluminium cylindrical vessels with the dimensions described above, is a reliable one.

III. *On the Character of the Radiation from different Metals.*

From the foregoing discussion it is evident that with the cylinders examined, a definite proportion existed between the ionization produced by the gamma rays and that produced by the secondary rays which they excited. With lead cylinders the amount contributed by the secondary rays was, as we have seen, twice that arising from the passage of the gamma rays. But with aluminium cylinders the relation