Assuming that this lining completely absorbed the secondary radiation from the lead walls of the vessels, which is probable as the secondary rays from lead are easily absorbed, and neglecting the absorption of the gamma rays by the aluminium lining, since from the numbers given in Table III. it must necessarily have been less than one half of one per cent., it follows that the difference between the readings "*c*" and "*a*" represents the ionization produced in the unlined lead cylinder by the radium; while the difference between the readings "*d*" and "*b*" represents the ionization produced in the lined cylinder by the same cause. The excess of this first difference over the second may then be taken without appreciable error as a measure of the excess of the ionization produced by the secondary rays in the respective cylinders when unlined over that produced by the secondary rays with the lining inserted. In other words, it may be taken as proportional to the difference between the ionizing powers, in so far as the air in the cylinders is concerned, of the secondary rays excited in lead and aluminium by the penetrating rays which entered the cylinders.

Or taking I_{ls} and I_{as} as proportional to the ionizations produced in one of the cylinders by the secondary rays excited in lead and aluminium respectively by the gamma rays which entered it, we have

$$I_{ls} - I_{as} = (\text{Reading "}c\text{"} - \text{Reading "}a\text{"}) - (\text{Reading "}d\text{"} - \text{Reading "}b\text{"}). \quad \text{(i.)}$$

Further, it is known from an investigation by Eve* that the ionizing power of the secondary rays excited in aluminium by a gamma radiation is 28·6 per cent. of that possessed by the secondary rays excited in lead by the same rays.

We have then this equation

$$I_{ls} = \frac{100}{28{\cdot}6} \cdot I_{as}. \quad \text{(ii.)}$$

Again, denoting by I_{lp} the ionization produced in the lead cylinder under examination by the gamma rays from the radium alone, we have

$$I_{lp} + I_{ls} = \text{The difference between readings "}c\text{" and "}a\text{" with this cylinder.} \quad \text{(iii.)}$$

From equations (i.), (ii.), and (iii.) it is possible then to

* Eve, Phil. Mag. Dec. 1904.