## ROYAL SOCIETY OF CANADA

diation from the insulated system be a strong one the movable system of the electrometer will take up the equilibrium position practically at once for any particular pressure and so the pressure may be lowered by stages and the corresponding scale readings observed. But if the radiation be a weak one it may take the movable system a long time to acquire the equilibrium potential corresponding to any particular pressure, and under these circumstances it is best, if the object of the investigation is to ascertain the character of the excess emitted radiation, to reduce the pressure as rapidly and as low as possible, and then, while maintaining the low pressure, to observe whether a movement occurs in the movable system of the electrometer.

If such a motion occurs, the direction of the motion will indicate the sign of the charge acquired and the rate of movement will give  $\omega$ , measure of the magnitude of the intensity of the charge producing radiation.

## II. CHARGING ACTION OF THE RADIATION FROM POLONIUM.

Some preliminary attempts were made to obtain a charging effect with some potassium salts in a high vacuum, but it was soon found that such charging action was exceedingly small, and it was thought best to carry out a few parallel experiments with some of the better known, radioactive substances, in order to gain some information regarding the pressures at which a charging action would be exhibited by various types of rays from active substances placed in a number of differently shaped vessels.

The first experiment was made with polonium deposited on a strip of copper. The area of this deposit was about 6 sq. cms. The copper strip which carried it was supported by a piece of t ber insulation at the centre of an air-tight brass cylinder 20 cms. long, and about 5 centimetres in diameter. This cylinder was connected to a McLeod Gauge and also to a Gæde mercury exhausting air pump. The insulated copper strip bearing the polonium was also connected to the free quadrants of a Dolazaleck electrometer, which gave about 200 mm. divisions deflection per volt. With this arrangement it was found repeatedly when the carth connection to the free quadrants was broken, that the needle moved slightly in the positive direction and came to rest about three centimetres from the zero reading. This deflection was taken as a measure of the volta effect. As the pressure was lowered no further change occu ed in the electrometer read .g until a pressure of approximately .4 mms. was reached. At this pressure the quadrants always commenced to gain a positive charge, and as the pressure was still further lowered the needle at once moved out and took up a definite position corresponding to cach

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