selected potential. Attached also to the leaf system was the inner tube of the sliding condenser C, for details of which the reader is referred to the paper by C. S. Wright mentioned above. In the measurements to be described the receiver was charged negatively to about 180 volts, which was found sufficient to insure a saturation current. The small quartz Leyden jar was kept at a negative potential of approximately 50 volts, and the slide tube condenser C to varying negative voltages depending on the sensibility desired.

By moving this condenser any charge acquired by the gold-leaf system through the conductivity of the air enclosed in R could be annulled. In the experiments the condenser was always moved over a standard distance and the time was taken for the conduction current to annul the deflection of the gold-leaf produced by the displacement of the sliding condenser.

The charge annulled per unit voltage applied to the compensator tube was .00501 e.s.u., a number which was determined by using the auxiliary parallel plate condenser supplied with the instrument.

Assuming the charge carried by an ion to be 3.4×10^{-10} e.s.u., it follows when the volume of the receiver is known and also the time required for the conduction current to annul a given quantity of electricity, that the number of ions per cc. per second "q" in the receiver R can be readily found.

III.—EXPERIMENTS.

SERIES I.

In this series of experiments the receiver R was made of sheet zinc. The potentials used were obtained from a set of small dry cells which remained constant over the whole range of measurements.

The receiver R, whose capacity was 31180 cc., was kept at a constant potential of 184.5 volts throughout, the Leyden Jar Q at 51.5 volts and the sliding condenser C at 13.2 volts. In this series of measurements the receiver was not hermetically sealed, so that barometric changes were necessarily followed by changes in the air content of the receiver.

The readings were taken visually and were commenced by a few preliminary observations over periods of from 4 to 6 hours' duration selected from different parts of the day. These were afterwards followed by observations taken continuously over a twenty-four hour period.

In the measurements for the shorter periods the apparatus was set up in a room in the Physical Laboratory and rested on a solid stone table which constituted the sill of one of the windows in the room.