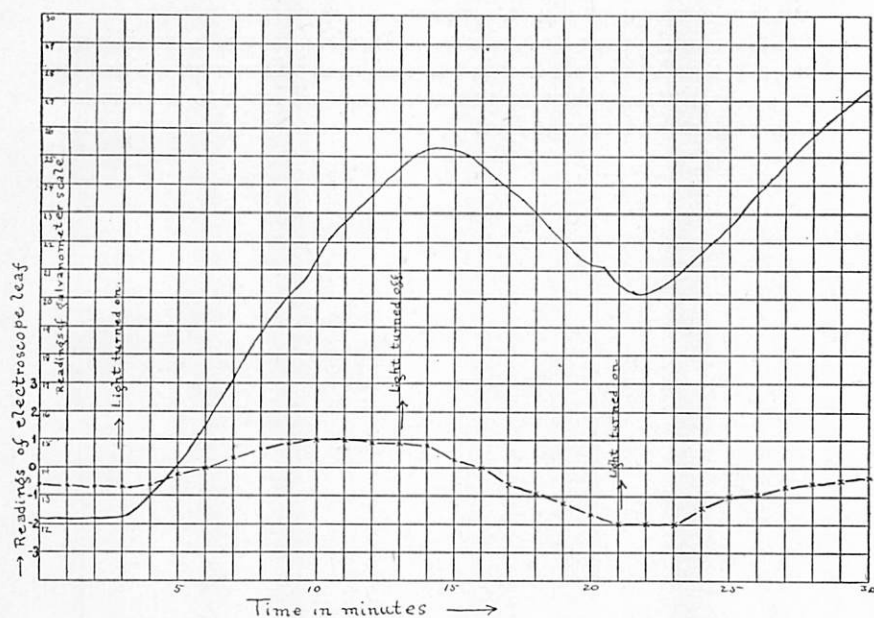


ART. XXVI.—*Note on the Use of the Wilson Tilted Electroscope*; by H. W. FARWELL.

IN using the tilted electroscope I have frequently been annoyed by the lack of steadiness of the zero of the leaf and have found various causes for the wandering. Of these I will mention one which I have not seen described, although very likely many who have used electroscopes adjusted to a position

FIG. 1.



very near to unstable equilibrium may have had the same trouble.

The wandering which had been ascribed to defective insulation began to show some relation to the deflections of a galvanometer connected with a thermocouple placed near the electroscope case, and on making observations with a 16 c. p. carbon lamp as a heater, the disturbance was soon shown to be due to convection currents inside the electroscope. The possibility of such a source of disturbance had been considered far too remote, but the curve given above shows how distinct is the relation. The lamp in this case was placed a short distance above the thick lead box which contained the electroscope.

The top of the box was fully an inch over the heavy brass case of the electroscope.

The galvanometer, of low resistance, was fairly sensitive, about 10^{-9} amperes, and a resistance of 200 ohms was used in series with the iron-constantin thermocouple. The electroscope leaf was not at its most sensitive position in this particular observation, the whole fluctuation being about the same as would be caused by changing the potential of the leaf by about .1 volt.

By moving the position of the lamp to the other end of the electroscope case, the leaf was observed to move down as the temperature increased, showing that the direction of the convection currents had been reversed.

It would appear to be most desirable to use suspensions adjusted as is the gold leaf in this case in a fair vacuum, since it is generally necessary to use some sort of lamp to illuminate the background for the leaf.

Columbia University,
Jan. 29, 1914.