

may have been due to traces of some foreign active substance.

If one could surround the cylinder with some substance which would act as a screen, and so cut off entirely the earth's penetrating rays, and consequently also the induced secondary radiation, any ionization within the cylinder would then be due to active impurities present in the metals. The difficulty, however, is in finding a suitable screen. In some experiments made in this direction by the writer\* in collaboration with E. F. Burton some years ago, screens of water were used, and with them it was found possible to make a reduction as high as 37 per cent. in the ionization within a closed cylinder. About the same time H. L. Cooke†, in studying the conductivity of air enclosed in a brass vessel, was able to reduce the ionization 30 per cent. by surrounding the brass with a screen of lead. Later still Elster and Geitel‡ observed a fall of 28 per cent. in the conductivity of the air enclosed in an aluminium cylinder on removing the apparatus from the surface of the earth to a closed space in a mine surrounded by a wall of rock salt. But in none of these experiments is there clear evidence that the penetrating radiation was entirely cut off. On the other hand, in several of the experiments which have been made with this object in view, it has been found that active impurities were present in the substances used as screens, and the screens themselves were observed to contribute a penetrating radiation which masked any falling off in the intensity of the external radiation arising from absorption.

Although many of the surface waters of the earth which have been examined, among other substances, by different experimenters, have been shown to contain minute traces of radium, it is possible that such waters as those of the great lakes of Canada might be fairly free from such an impurity, and if so might serve to screen off radiations from an ionization chamber immersed in them. Some experiments made a few years ago by the writer failed to show the existence of any measurable amount of the emanation from radium in the water of Lake Ontario; and from this result it would appear that the water of this lake would seem to afford the substance requisite to carry out an experiment such as that just indicated. The experimental difficulties, however, are considerable, and it is doubtful if they could be overcome in a

\* McLennan and Burton, *Phys. Rev.* no. 3 (1903); Burton, *Phys. Rev.* no. 3 (1904).

† H. L. Cooke, *Phil. Mag.* [6] vi. p. 403 (1903).

‡ Elster and Geitel, *Phys. Zeit.* Nov. 1, 1905, p. 755.