ELECTRIC RAILWAY DISTURBANCES AND THE DETECTION OF PASSING ELECTRIC TRAINS BY MEANS OF A GALVANOMETER.*

BY

E. S. BIELER, M.Sc.

Exhibition of 1851, Scholar of McGill University, Montreal.

DURING a series of experiments carried out in the Macdonald Physics Building, McGill University, on the currents induced in a conductor by the passage of a sphere of magnetic material over it,[1] considerable trouble was at first experienced due to disturbances apparently connected with the passage of electric cars in the neighborhood.

The apparatus used consisted of a coil of 200 turns of copper wire wound on a square frame of 125 cm. side, and connected to a sensitive reflecting galvanometer of the moving coil type. The galvanometer deflections were registered photographically on a roll of bromide paper actuated by clock-work. With a total external resistance of 224 ohms, equal to the critical damping resistance of the galvanometer, a sensitivity of 1.56 mm. per microvolt was obtained.

When the coil was placed with its plane horizontal, a continual motion of the galvanometer spot was observed. This attained a maximum amplitude at the rush hour on the street car system, and ceased almost completely about 2 A. M., Standard Time, when the street car service is practically suspended (See Fig. 1). On the whole, the disturbances agreed well with the supposition that they were due to currents in some way connected with the operation of the street cars in the neighborhood. These disturbances could be almost completely balanced out by placing in series with the coil a large loop of wire of three turns enclosing a total area equal to the combined area of the turns of the coil. The fact that this was possible indicates that the source of the disturbance must be at a distance from the apparatus, fairly large compared with the linear dimensions of the loop, and shows defi-

* Communicated by Dr. A. S. Eve, C.B.E., F.R.S., Associate Editor, Corresponding Member.

[1] E. S. Bieler, *Proc. Roy. Soc.*, vol. c, p. 50 (1921).