It was not thought worth the additional trouble to perform a direct test of equation (2). It will be granted at once that a verification of (3) leaves no room to doubt the validity of (2).

Considered as a possible seismographic method, the device presents several interesting features. Two components of motion of a jet are readily registered on one paper through the use of an inclined plane mirror. The apparatus is extremely insensitive to tilts. Its response is to velocity rather than to displacement. The amplitude of the trace may be increased not only by optional magnification but by obtaining a longer time of fall, thus actually increasing the relative movement of the observed mass and its surroundings. As in pendulum instruments, we are dealing here with an inertia seismometer, but it is the inertia of motion rather than of rest which it is now proposed to employ.

When the motion of the source is quite rapid the trace does not obey equation (3), presumably because viscosity prevents the fall from being truly free. Viscosity operates at low speeds too, but without measurable effect on the trace. The traces now in hand were made several months ago. It is thought that the liquid used was unnecessarily viscous (some 300 poises) and the jet unnecessarily coarse. Further work is in progress.

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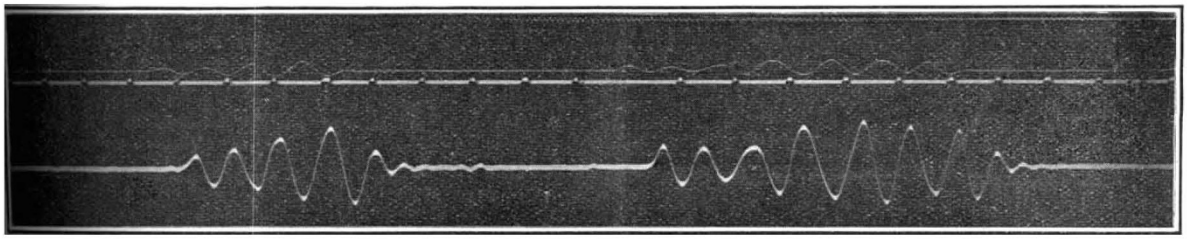

FIG. 1.

The Positive Electrical Drift in the Air.

IF electrostatic measurements are made in the air on a bridge over the permanent way near any railway station, extraordinarily large positive charges given off by steam locomotives will be observed, especially on starting up. These positive charges are carried by the wind for long distances. Under favourable conditions, that is, when the sky was clear and free from interference from clouds, and a stiff steady wind prevailed, I have noticed strong charges down wind a mile away, from a single engine working in a country siding. Scarcely any effect is noticeable in the opposite direction. Similar results, although on a much smaller scale, are observed near steam-driven road engines. They are not noticeable near petrol-driven or electric traction. These charges are presumably similar to those employed in Sir W Armstrong's hydroelectric machine.

Under any of the large spans covering the railway termini in London, the potential gradient is zero when they are unoccupied. When locomotives are present high potentials are observed.

On some of the bridges over the Thames very high potentials may be observed according to the direction of the wind with respect to railway traffic. At Blackfriars, for example, very strong positive charges are carried by east winds from trains passing to and from Ludgate Hill and neighbouring stations.

With a westerly wind the Cannon Street traffic affects London Bridge, and that on Hungerford Bridge can be felt on Westminster or Waterloo Bridges, according to circumstances.

Of the two factors concerned in atmospheric potentials, that is, "the forces of Nature" and the activities of man, the latter appears to me to predominate in the majority of the daily readings in and near the metropolis. To what extent the former intervene can be deduced only from observations conducted many miles from the drift air from locomotives, steamers, road engines, and doubtless other forms of stationary engines. My own measurements point to the sun as the agent in this case.

The presence of these air-borne charges must necessarily affect the readings at Kew Observatory, surrounded as it is by a dozen stations within a radius of about two miles.

Many readers of NATURE will possess copies of the Royal Society's Handbook of the scientific exhibits at Wembley. In Dr. Chree's admirable article there — a model of popular exposition — curves of the potential gradient at Kew are shown. These curves, with their minima during the early hours of the morning, and their maxima at 8-10 A.M. and 7-9 P.M., would almost stand for traffic intensity curves. The gradient here at Upminster, 17 miles E.N.E. of Charing Cross, when the sky is clear and the wind does not set from the local station, appears to depend principally on London drift air, being very strong with W. to S.W. winds and very slight with easterly ones.

In any case, the distribution and influence of these positive charges deserves the careful attention of meteorologists. During hot weather they appear to be dispersed more rapidly than in cold, for a rising barometer and frost result in unusually high concentrations. These drifting positive charges constitute electric currents—in some circumstances these might give rise to compass irregularities. Their irregular distribution may conceivably be connected also with certain kinds of "atmospherics" in wireless.

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"Wharfedale," Upminster,
February 11.

THE phenomena of electrification in connexion with steam, to which Dr. W. C. Reynolds refers, are described by Mr. W. A. Douglas Rudge in a paper read before the Cambridge Philosophical Society (Proc., vol. 18, p. 127), and referred to in NATURE of November 18, 1915 (vol. 96, p. 332). The breaking up of water, whether the act of man or of Nature (as in waterfalls), is a powerful source of electrification, but I am unable to accept Dr. Reynolds's suggestion that railway steam may account to any large extent for the early morning minimum and evening maximum of potential gradient recorded at Kew Observatory. If this were the case, the change from steam to electric traction in the local trains should have had a profound influence, whereas the daily maximum and minimum