Int. J. Heat Mass Transfer. Vol. 13, p. 1067. Pergamon Press 1970. Printed in Great Britain

ADDENDUM

M. ROBINSON, Convective heat transfer at the surface of a corona electrode, *Int. J. Heat Mass Transfer* **13**, 263–274 (1970).

SINCE completing this paper the author has discovered a number of earlier studies involving the cooling of a hot wire by a corona discharge:

20. W. M. THORNTON, The ignition of gases by hot wires, *Phil. Mag.* **38**, 613–633 (1919).
21. S. R. PARSONS, The effect of corona current in the cooling of a hot wire, *Phys. Rev.* **33**, 75–80 (1929).
22. W. M. THORNTON, M. WATERS and W. G. THOMPSON, The ionic wind voltmeter and thermo-electrostatic relay, *J. Inst. Elec. Engrs (London)* **69**, 533–544 (1931).
23. W. M. THORNTON, The comparison of molecular ionizing potentials in an alternating electric wind, *Phil. Mag.* **10**, 1052–1063 (1931).

The observation that corona will cool a hot wire dates back at least to 1919 when Thornton [20] measured the magnitude of the effect in suppressing the ignition of combustible gases by hot wires in strong electric fields. With the application of the field, the wire was visibly cooled and ignition retarded. The effect of superimposing a magnetic field on the corona was also examined.

Working over narrower ranges of wire temperature, corona current and air velocity than in the present paper, Parsons [21] obtained a few somewhat similar results, but did not quantitatively correlate his idea.

In the course of their development of an ionic-wind voltmeter, Thornton *et al.* [22] investigated corona cooling for several gases over a range of pressures. Of special interest is their Fig. 3 in which they plot $P_h - P_0$ (= their $\dot{W}$) vs. *a–c* corona voltage. The curves show distinct cooling regimes suggestive of Fig. 5 of this paper.

In related work, Thornton [23] took the initial decrease of the wire temperature due to corona cooling to be proportional to the local electric field, and used this relation to measure molecular ionizing potentials in various gases.

The activities of Thornton and Parsons seem each to have gone unnoticed by the other.