LIBRARY OF THE UNIVERSITY OF ADELAIDE
10.9.63

THE DIFFUSION OF METEOR TRAILS IN THE EARTH'S MAGNETIC FIELD

JOSEPH LOGAN AYRE FRANCEY B.Sc.

DEPARTMENT OF MATHEMATICAL PHYSICS,

THE UNIVERSITY OF ADELAIDE

DECEMBER 1962

UNIVERSITY OF ADELAIDE

43 Milne Street,
Vale Park.

5.9.63.

Dear Sir,

With reference to your letter dated August 30, 1963 I hereby give to you the authority for loan and photocopying of my thesis "The diffusion of meteor trails in the earth's magnetic field".

Yours faithfully,
(signed) J.L.A. Francey.

COPY:JJ
September 9, 1963.

Contents

Summary

A solution of the diffusion equation as applied to a meteor trail is given. Equations that show the effect of the Earth's magnetic field on the diffusion of the ionized column forming the trail are derived and solved.

The scattering of a radio wave by the trail is considered and formulae are obtained for the power received at a radio receiver on the ground in terms of the power transmitted.

The nonlinearities introduced by the space charges are considered and perturbation calculations made. In order to assess the magnitude of the effect of the space charges, a dimensional analysis is carried out. This shows that the effect is large and the equations for electrons and ions including the non linearities are then solved by numerical methods using a high speed computer.

This thesis contains no material which has been accepted for the award of any other degree or diploma in any University and, to the best of my knowledge, no material previously published or written by another person, except where due reference is made in the text.

Signed