



COMMONWEALTH SCIENTIFIC AND INDUSTRIAL RESEARCH ORGANIZATION

RNB/JG

DIVISION OF RADIOPHYSICS

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REFER TO A.1/3/1

13th January 1954

Mr. Grote Reber,
Wailuki,
MAUI. TERRITORY OF HAWAII.

Dear Reber,

As far as I know only Storey's work on whistlers contains the suggestion that there exist in ionized media propagation modes which are constrained to follow the lines of a steady superimposed magnetic field.

Certainly there are modes which in the presence of a uniform superimposed field can only propagate within a cone of directions about the field, but would they follow the field in the event of its curving or in the presence of refractive index gradients? It remains to be shown that conditions can exist where waves would follow the magnetic field.

Storey's evidence applies to frequencies of a few kilocycles. At these frequencies, if his picture is correct, radiation emitted at 52° latitude returns to earth in the opposite hemisphere. Consequently external radiation could not get down to the earth at these or lower latitudes. Of course this is not what is wanted in the case you propose.

Storey really has no theoretical basis for his conjecture, although he has some experimental evidence, but at a few megacycles there is just no basis for penetration of the extraordinary ray except maybe at the poles. At other places the gradient of refractive index would be expected to bend an upgoing ray towards the vertical and it would have to be shown that propagation remained possible all the way through the ionosphere and that the ray could then break away into space.

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Yours sincerely,

RNB

(R.N. Bracewell)