COMMONWEALTH OF AUSTRALIA

COMMONWEALTH SCIENTIFIC AND INDUSTRIAL RESEARCH ORGANIZATION

DIVISION OF RADIOPHYSICS

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Our Ref: A.1/3/1a

12th July 1950

Mr. Grote Reber,
P.O. Box 4868,
Cleveland Park Station,
WASHINGTON, D.C.

Dear Reber,

I received the book "Windwaves at Sea etc." a few days ago, and today your letter of July 4th. First, thank you for the book which is very interesting. It is a fascinating subject. I live on an ocean front, and I have never found time before to try to dig out what is known.

I do not know exactly what you propose, so cannot assess your problems too well. Piddington showed me your letter but is away at present and I cannot find if he has replied.

Firstly, with regard to sea-waves, I should like to make the following points.

(1) At 100 and 200 Mc/s, for heights of 250 feet, large waves (large swell or storm) break the evenness of the records (wriggles of 10% of amplitude and 5% of period of interference fringes), especially at higher angles of elevation.

(2) At 10 cm. we have made observations on aircraft echoes which agree with those you quote. These showed that, at the time, the lobes were clearly recognisable but tests were made on about two days only.

(3) Piddington ran into trouble at 25 cm. of which he told you.

Clearly, the utility of the method depends on the sea roughness. We face the open ocean and get moderate seas usually, storms occasionally. The story would be very different in a sheltered inlet.

Secondly, with regard to absorption, will you check from Van Vleck's theory that absorption is really negligible at 25 cm. for the great distance through the atmosphere involved near the horizon.

Thirdly, atmospheric bending is still a mystery. Off the New Zealand coast, for example, Bolton got fluctuations in lobe position from night to night of up to about a lobe width in extreme cases. He is the person with most experience. There were continual minor fluctuations. I presume this was due to atmospheric bending but do not know the relative effects due to ionosphere and lower atmosphere (100 Mc/s). If you read of experiments using microwaves for communication, the observers appear to find fluctuations in vertical angle (including

multiple rays) of several minutes of arc. These are more extreme conditions perhaps than you expect to use, but it is a warning. I agree that no 4/3 factor for earth radius is adequate. I am doubtful if you can get consistency to a minute of arc. Summarising, my reaction is that you cannot predict with certainty what you will get - not to accuracies of a minute of arc. You must try it and see.

I should like to mention that Bolton is in Europe and is hoping to return via the U.S.A. about October. He will do so if he can get the dollars. You and he would find a great deal in common and I should very much like you to meet.

Are you by any chance going to U.R.S.I.? It is in Zurich in September. I hope to and, if you are going, I should be very glad indeed to see you again. We are giving a fairly comprehensive account of our radio astronomy work there. Bolton will be there.

Yours sincerely,

J L Pawsey

(J.L. Pawsey)