

27/11/84

Dr. Larkin Kerwin, President
National Research Council
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Ref: Yours of 22/10/84

Dear Dr. Kerwin:

By 1953 my observations atop Mount Haleakala, Maui, Hawaii were coming to an end. I looked around for something else to do. Merle Tuve wanted me to return to Washington and take hold of a big-dish promotion. This developed into NRAO at Green Bank a decade later. Fortunately, I had sense enough to stay out of that affair. Even by then, the great effort was to shorter waves as fast as technology could be provided. The main enticement was greater resolving power. Looking about, the subject seemed to be in good hands. There was little I could add.

Accordingly, I decided to try to measure cosmic static at long waves. The controlling parameter would be the condition of ionosphere. By good fortune, CRPL had an ionosphere station at Kihei, Maui. They received copies of voluminous literature sent out by Washington. The attic of garage had several cases of ionosphere observations tabulated from all over world. Their purpose was to find conditions of maximum ionization. I examined these for minimum ionization, ie, time, season, location and solar activity. The canadian data was enlightening. A band of minimum f_oF_2 started near Prince Rupert, continued east and south to Winnipeg, then toward Lake Superior, then east toward Ottawa, and east by north to Laborador north of StJohn's. At the time, I didn't sense this band or strip is rather concentric with north magnetic pole and probably real. I ignorantly didn't believe it and filed my results away, charging the whole affair to some unknown instrumental effect. I was laboring under some preconceived ideas looking for something else, so I didn't recognize a good thing when I stumbled upon it. Nothing was published. During mid 1960s your people operated a top side ionosonde. They turned up same strip. It is real. Why, I don't know. The people at Shirley Bay can provide you with detailed information. Incidentally, the low frequency data taken by an old mechanical machine using big antennas during late and middle 1940s at Winnipeg are far superior to similar data taken with

modern equipment. The old machine produced sharp clear traces largely free of BC interference. Have the Shirley Bay people get some of these out for comparison.

I then examined ionosphere data from southern hemisphere. There is so much water down here no similar streak can be found. However, one probably runs thru Christchurch and Hobart. The Hobart data was very good, particularly prior to 1953 when a new machine and small antennas degraded the low frequency results. Since the southern sky looks out on center of Milkyway, I decided to have a first try at Hobart. A popular account is given in yellow bulletin No. 9 I sent to you on 30/8/83. Enclosed is a copy of the scientific results from Jnl. Franklin Inst. Jan. 1968. See conclusions on page 12. The microwave people have to put up with signal/noise ratios of 0.1 to 0.01 and even less. At hecto (100) meter waves the ratios are 10 to 100 or more. Input signals of 10 microvolts are easily obtained. A three stage receiver is ample.

I observed at 1155 kc during solar minimum of middle 70s. The results were a failure caused by too high f_oF_2 . The antenna had only one beam, so when ionospheric hole opened wide, most of the auspicious circumstance was not taken advantage of. The beam direction was changed by a complicated system of mechanical taps. All this was a first try circa 1960. Since then I've designed, constructed and tested electronic apparatus to produce a fan shaped fence of 19 beams along the N/S meridian. Similarly, a tightly coupled antenna broad banded at two frequencies having a 3 to 1 ratio, say 6 mc and 2 mc.

My suggestion is that a series of antennas similar to Fig. 1 be constructed along streak described above. They can be used independently, or tied together as an interferometer. I realize my suggestion is not popular. Nobody else is doing it. That doesn't mean it lacks merit. Actually one of its greatest merits is that no one else is doing it. Something new and worthy must turn up if the eyes are kept open. The cost will be trivial compared to CLBA. If enough interest can be found, you may wish to send a representative down here for a few days. I'll be pleased to show him my apparatus and explain its details. Thanking you for your interest, I am

Sincerely yours,
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