

June 16, 1952  
WAILUKU, MAUI,  
Territory of Hawaii  
U. S. A.

Dear Strand:

The A. A. S. program arrived a few days ago, and I noted with interest your paper #34. This particular problem imposes the final limitation upon the accuracy of the measurements I am undertaking out here. In the case of Cosmic Static the index of refraction of water vapor is so high that most of the variation is due to this cause. Consequently I have been making a study to learn the magnitude of the uncertainty due to variations in bending.

Fortunately there are available many years of radiosonde data taken at Honolulu. One hundred representative days, each in Jan. and July, were chosen from 12 years of soundings. The total bending in milliradians ( $1 \text{ mrad} = 3.44'$ ) was then computed for each day. The method used is quite similar to that published by Schulkin on pages 554-561 of the May 1952 issue of the Proc. I.R.E. These values were then plotted as percent less than ~~versus~~ value. This gives some idea of the dispersion of the phenomenon. Enclosed is a sample set of results for January at 6am with the ray arriving at zero altitude at sea level. Since the points lie on a reasonably straight line the data is essentially statistical.

# The case of more importance is where the ray arrives at an angle of  $1.42^\circ$  altitude at sea level. At such angle the ray in space passes thru the horizontal at the observer. Consequently this is the important timing point. Initial calculations show that under these conditions the mean bending is about half and the dispersion about one eighth the values shown on attached chart. These results are on the pessimistic side, perhaps considerably so. # Honolulu lies between two mountain ranges and the clouds always hang around the

mountains where up drafts occur. Consequently the radiosonde encountered many stratifications of water vapor in its flights. The data I am interested in are really open sea observations, as at the timing point the ray touches the sea about 60 miles out.

Furthermore Kolo Kolo is so high that nearly always the ray will come in over the tops of the local clouds. Thus the dispersion of bending as encountered at Kolo Kolo should be much less than that encountered at Honolulu. All in all, it appears that results accurate to one minute of arc should be possible of attainment.

Perhaps it is worth recalling that this whole business of long-wave celestial radiation is based on an American discovery. Twenty years ago this summer K. G. Jansky first identified the phenomenon for its true worth. Fifteen years ago this summer I undertook construction of my old apparatus at Wheaton. Peculiarly enough, at this late date, I appear to be the only American interested in making Cosmic Static experiments. The few other American investigators all seem satisfied to do more or less routine measurements of solar radio-waves, which incidentally are also an American discovery. By elementary logic I am being stubborn on this subject to the point of being crazy! On the other hand the British, Australians and even the Dutch have substantial and intelligent undertakings in the field. Some of these are undoubtedly partly financed by American money. As things presently stand it appears that the American lead in the field has been lost by default in high places.

When you see Ralph Williamson please remember me to him.

Best regards,

Grote Reber

sent postcards of crater, girl  
with orchids & Waikiki palms.