

2nd February 1962
"Dennistoun"
Bothwell, Tasmania
Australia

Dr. Seth B. Nicholson
Carnegie Institution of Washington
813 Santa Barbara St.
Pasadena, California

Dear Dr. Nicholson:

Thank you for your letter of the 18th January. A fairly complete description of my activities 1937-1947 is given in Proc. IRE, Jan 1958, page 15.

1948-51 was spent at NBS. My Wheaton, Illinois radio telescope was moved to Sterling, Virginia. I secured the pieces of three German Giant Wurzburg radar dishes each 24 feet diameter. The mountings were revised to provide equatorial motion. These became solar radiometers at frequencies of 51, 162, 465 megacycles. The main results were a study of the fine structure of solar transients (*Nature*, 15 Jan. 1955, page 132) showing a duration in seconds proportional to wavelength in meters; and a series of observations which demonstrated motion of material out thru the solar corona and then falling back in again before final dispersal (*Science*, September 1950, page 312). I participated in an eclipse expedition to Attu which is the most westerly of the Aleutian Islands (*Sky & Telescope*, March 1951, page 111). Considerable effort was spent on the design of a large radio telescope. A picture of the model and some discussion appears in Proc. IRE, Jan 1958, page 29. This obsolete design seems to have been the inspiration of the Sugar Grove installation!

1952-4 & 8 were spent on Maui, Hawaii. A sea surface radio interferometer was constructed atop Haleakala at an altitude of 10,020 feet. It was essentially an instrument where the base line changes progressively in a smooth manner from zero to four miles in a half hour as a source rises from the sea. Observations were made at 20, 30, 50

and 100 megacycles. The results (JGR, March 1959, page 287) were quite meager. However Cygnus A was confirmed to be a very small pair with spacing of about a minute of arc. Cassiopeia A was found to contain a ring about a half minute of arc thick and slightly larger than the optical ring. The unexpected difficulty was great scattering of the radio waves due to a band of electrified particles around the equator of the earth (Nature, 8 Jan 1955, page 78). This obscured the sources to east and west. It was worse near solar activity ~~maximum~~ than at ~~minimum~~ and not correlated with roughness in the F region of the ionosphere. Prediscovery radiation from Jupiter were stumbled on at 30 megacycles.

1955-7 were spent in Tasmania. Observations at wavelengths on the order of hundreds of meters were made possible by the invention and application of a minimum reading circuit between detector and recorder. This effectively eliminated the terrestrial atmospherics which are so prominent at these wavelengths. The first results (JGR, March 1956, page 1) demonstrated the existence and gave the approximate magnitude of galactic radiation at a wavelength of 141 meters. Observations of galactic radiation at declination $\nearrow 40^\circ$ at a wavelength of 576 meters were possible using the extraordinary longitudinal mode of transmission thru the ionosphere (JGR, March 1958; and Earth-Sun Environment, March 1960, Ottawa, DRTE Pub. no.1025, page 243). Observations at 2100 meters confirmed theory that the hole is closed at least during that epoch and at that position. The charged particles were independently encountered and explained as the source of Cerenkov radiation measured at 576 meters. Evidence was secured to support the idea that the false zodiacal light is a stream of material blown away from the sunset side of the earth.

1959 was spent at Green Bank, West Virginia. The main project was reconstruction of my Wheaton, Illinois radio telescope. Studies were continued on a new and advanced design for a large radio telescope to supersede the type at Arecibo, Puerto Rico.

1960 a trip was made to Macquarie Island at 55° south, below Tasmania. The purpose was to survey Green Gorge and Sawyer Valley as a possible place for measurements of cosmic static at kilometer wavelengths using the extraordinary longitudinal mode. Theory indicates such observations might be successful near solar activity minimum at a place

where the earth field is stronger, more vertical and the outer atmosphere thinner, less electrified. The valley is suitable and has been put on the list of unfinished business.

1961 to date I have been in Tasmania organizing the construction of a steerable array for operation at 141 meters wavelength. It will be in operation for the observing season of 1962.

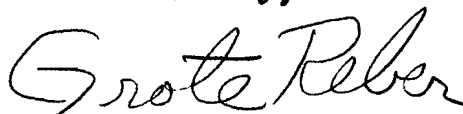
In addition to the above, I have an assortment of papers on subjects relating to engineering, meteorology, ionosphere, geology, botany and history.

The above seems to be the type of material you are probably looking for. It has been interesting to write because, up to now, I have never had occasion to give a condensed summary of my activities. No recent picture is available. However, one will be made and sent in a month or so.

I plan to be in U.S.A. from about 22nd August to the end of September. If your society meets during this period, I can be in San Francisco at the appointed time and will be happy to receive the Bruce Medal in person.

I am,

Yours faithfully,


Grote Reber