

13th December, 1966.

Dr. Everett H. Hurlburt,
Department of Astronomy,
National Science Foundation,
WASHINGTON, D.C. 20550,
U.S.A.

Dear Dr. Hurlburt,

Recently I have returned from an extended trip to the mainland where I inspected several radio astronomy installations to see if I could learn anything useful. Aside from social aspects, the trip was a failure.

I spent considerable time both in the laboratory at Sydney and at the Molonglo observatory near Canberra. The particular feature of interest was how the beam is to be adjusted to different angles along the north-south plane. The stepping system I can understand and seems to be alright. It involves putting in suitable delay cables etc. Along the north-south arms of the installation just behind the focal line are 177 modules, each containing 20 dipoles. These dipoles are coupled into a parallel bar line by means of rotating helices, all within the module.

After several explanations and considerable questioning I still failed to understand how the module works. At the time, I just put it down to me being stupid. Later I talked to Max Komosaroff and asked him to explain it to me. He declined, saying he was unable to tell me how the modules worked because he couldn't understand the devices inside. The whole affair seemed sort of odd, but I had a lot of other things to do and places to go, so I dropped the matter.

On the ship coming back I started thinking about the whole peculiar business. Now, I believe I know how these modules operate. It is quite different from what Mills and his associates think. They have worked on these devices so long that they have become lost in the detail. In substance,

P.T.O.

there has been a fundamental engineering error which I cannot explain in this brief letter. Quite a variety of tests have been made on these modules, but not the crucially important test. NSF has put a lot of money into this installation, so they will listen to you when they will not listen to anyone else. In order to protect yourself and the design people on VLA, I suggest that you write to Mills requesting the following:

Polar diagrams of the module acceptance (or radiation) pattern in a plane along axis of module with helices adjusted to provide a maximum at 0° , $\pm 15^\circ$, $\pm 30^\circ$, $\pm 45^\circ$ from normal. The patterns are not to be computed, but measured at a distance ten or more times the length of the module over a clear unobstructed path.

In my opinion, he will be unable to produce these patterns at angles other than the normal.

Yours faithfully,

Grote Reber.

GR:JEG