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SYDNEY, N.S.W.

REFER TO A1/3/1

27th February 1961

Dr. Grote Reber,
C/- Tasmanian Regional Laboratory,
C.S.I.R.O.,
Stowell Avenue,
HOBART, Tasmania.

Dear Grote,

Thanks for your letter of January 25th with the 19 Mc/s map.

This looks interesting and the vital thing to check is that the features you show belong to the sky and are not figments of the imagination of a Mills Cross. To look for hints on this I got Eric Hill to compare it with the $3\frac{1}{2}$ m results. He remarked:-

"(a) The radio source marked by the + is almost certainly our 01-217. The RA discrepancy (approximately 3 min. time) is probably a result of refraction at 19 Mc/s. In any case there is no other source on our tracings except 01-315 which is still further away.

(b) Regarding the background at 85 Mc/s, it doesn't look much like Reber's map - although this doesn't mean much.

(c) Neither trough on Reber's map is anywhere near an obvious side-lobe effect."

I should say we can count this as supporting evidence of a sort, but other cross checks you can think up would still be required.

Bernard Mills is also interested and he has written some notes, mainly on the reduction procedure, as follows:-

"The changes suggested by Reber will certainly reduce the time for analysis: they will also reduce the reliability and the amount of data. A sacrifice in the quantity of data is o.k. if it means observations will be done which otherwise would not, but I am unhappy about the reliability sacrifice. However, it seems to me that a few changes in Reber's plan would increase this considerably.

Let us assume we adopt the principle of no scanning as a necessary sacrifice to dispense with a lot of reductions. There is no need, however, to use such a long integrating period as 3 minutes : with about 30^{s}, or at most 1^{m}, averages may be taken by eye just as readily, but the effects of interference are much more easily recognized and allowed for; there would be no change in sensitivity.

The influence of ionospheric refraction, which with this scheme is likely to be very serious, could be reduced substantially by reducing the length of the N-S arm by a factor of 2 or 3. No information will be lost because his projected $2^{o}.2$ separation between scans fixes the resolution of the system and, in fact, the possibility of erroneous interpretation would be reduced. With a $1\frac{1}{2}^{o}$ or 2^{o} beam and scans at 2^{o} spacing, the contours are not unique. Similarly, if he is keen on measuring a scan only at 10^{m} intervals, the E-W arm could well be reduced by the same amount, again reducing the possibility of erroneous drawing of the contours. Here, however, one may simply adjust the rate of sampling to the variability of the record, which would seem the obvious solution.

As far as I can see, reducing the length of the N-S arm will not, on the average, affect the sensitivity under the suggested observing conditions".

My own view on this sort of question is that you need to be on the spot and make deliberate changes to see what happens. The old question of possible low amplitude side lobes is in my mind.

The picture on actual observations is not rosy just now. Peter Scheuer is just in the throes of getting his gear going and needs Charlie Higgins full time until it really works.

Further, after a spell like this the gear is likely to have minor faults and it really needs a very careful re-adjustment. What I think would be best would be for you to wait a while until the stress is over and then come up and give it your personal attention. You could then try to fix an optimum for the observing routine, following your ideas and possible those of Bernard, and also do things which ought to give quite different errors, if these exist.

Yours sincerely,

(J.L. Pawsey)

P.S. I am returning your map .