



# Wrest Point Riviera Hotel

(Proprietors: Australian National Hotels Ltd.)

HOBART, TASMANIA

July 31st, 1955

Mr. Charles H. Schauer  
Director of Grants  
Research Corporation  
405 Lexington Avenue  
New York 17, New York

Dear Hap:

Many thanks for your letter of June 27th and enclosed large mirror specification. Quite obviously there are no takers as that spec is merely pleasant thoughts. Before any bidders will appear someone will have to figure out how many pieces of iron and how long and how big, where the holes go plus provide an index of how the puzzle goes together.

Observations here are about finished for this year. The ionosphere critical frequencies are rising fast and the celestial sources have moved forward to early evening so they are nearly out of range. Now Ellis and I have to collect our thoughts and try to understand what has been caught. We intend to send a short paper to the radio astronomy conference at Manchester late in August and write a synopsis for Nature.

An electromagnetic wave may have right hand or left hand circular polarization corresponding to the ordinary and extraordinary ray in the southern hemisphere. The direction of travel may be dominantly across or parallel to the earths magnetic field corresponding to transverse or longitudinal propagation. Thus there are four possible modes; Ordinary Transverse O, Extraordinary Transverse X, Ordinary Longitudinal Z and Extraordinary Longitudinal L modes. Each of these modes may traverse the entire ionosphere if proper conditions exist. The O hole is the one all our success has been had with. It forms a thin slit along the magnetic meridian which opens each evening and closes at dawn. The Z hole is the small hole about a degree in diameter I referred to in a previous letter. Presently the most suitable frequencies fall in the broadcast band at night, so no results have been secured. The X hole is a rather wide ellipse perpindicular to the magnetic meridian. It depends upon ionosphere critical frequencies and strength of the earths field. Not much has been done on this. However the necessary conditions have been observed on old ionosphere records so it does exist. The L hole is a rather larger round hole probably existant down to very low frequencies where the earths field is strong and nearly vertical.

Fortunately it is independent of critical frequencies, so it is not affected by the solar activity cycle. We have a few measurements but rather inconclusive as our antennas are too poor.

The solar activity cycle appears to be starting to rise, so the auspicious circumstances of the past few months may not be repeated for several years. However the L mode is independent of solar activity, so it seems a suitable subject to continue these studies upon. Presently, I am investigating the possibility of getting very much larger antennas setup at Seven Mile Beach. If this can be done in time, I expect to return here next year for additional studies. The O, X and Z holes will continue to be present. However with a rising period of criticals it is unwise to start building anything because by the time the installation is completed the ionosphere conditions may be such as to make the installation inoperative. These holes can best be studied on a large scale during a period of decreasing solar activity. Thus it is well to pass them up for the next few years.

Enclosed is a financial statement. The second item is a reasonable estimate of part of my expenses. Living is not so cheap here as in Hawaii. If possible, I would appreciate an additional 3500 dollars (this machine has no dollar sign), which should be ample funds to continue this year and perhaps provide a down payment on a more elaborate installation at Seven Mile Beach.

Word has arrived here about the small artificial moon project. I will be much interested to learn what the trajectory is near the equator as I have a hunch there is much more atmosphere out there than is commonly supposed. Enclosed are a few more reprints on this subject in case you wish to pass them around. Incidentally, it must have been a good one as I received several requests from Europe for copies.

Best regards,

Grote Reber

Synopsis of Expenses

October 12, 1954 thru July 31, 1955

Reimburse advance of Grote Reber	201.47
Personnel Maintenance	1350.00
Transportation of goods and people	685.64
Special Band Pass Filters from Mullard	828.93
Esterline Angus Recorder	365.00
Oscilloscope Camera by Cossor	203.16
Small Radio parts	328.40
Batteries	88.10
Postage, stationery, etc.	51.74
Scientific Literature	<u>32.85</u>
<b>Total</b>	<b>4135.29</b>
<b>Less Grant from Research Corporation</b>	<b><u>3000.00</u></b>
<b>Advances by Grote Reber</b>	<b>1135.29</b>

Grote Reber

31st July 1955