

March 17, 1952

Dr. Seth B. Nicholson  
Mount Wilson Observatory  
815 Santa Barbara Street  
Pasadena 4, California

Dear Mr. Nicholson:

Since our very interesting conversation of a few weeks ago I have been thinking about the Solar Hydrogen Bomb business and why the photosphere is what it is. Unquestionably the increased limb darkening at the shorter wavelengths is due to scattering. This phenomenon exists when the opacity of the medium is low so that the wave may travel many wavelengths before it becomes absorbed.

I am not so sure this idea is entirely valid at regions just below the photosphere. Here the density is higher and the opacity very much higher. Consequently the wave can only travel a few wavelengths before it is lost altogether and so we cannot see into the sun any farther. Furthermore, the material is highly ionized and this complicates the situation. Thus the 19th century concept of a myriad of little round scatterers may not be entirely correct.

The next time a fair size spot crosses near the center of the solar disk I wonder if you could do a small experiment. Please make three spectroheliograms of the spot with the slit not on a line but on a clear place in the continuum between the lines. First, make one run as far as possible in the red, say 7800 angstrom. Second, make one run as far as possible in the violet say 3900 angstrom. Third, make another run at 7800. The third run is to check the first and make sure the spot hasn't changed during the period of observation. Any differences observed in the spot at 3900 compared to 7800 may then be construed as looking into the spot (or photosphere) different distances.

Perhaps this type of thing has already been done and has been written about. If so, please give me a suitable reference in the literature and I will try to learn about it.

Sincerely yours,

*Grote Reber*

Grote Reber,  
c/o Maui Vocational School  
P. O. Box 258, Kahului, Maui