Dec. 8, 1938

Dear Schuyler:

I have your letter of the 4th. The thesis of Sloat is not what I thought it was and hasn't any application to this work. Thanks for looking it up anyway.

In regard to the three papers Barrow mentions, I have seen the one by Hansen on "A Type of Electrical Resonator" and will watch for the one on "Radiation from Rectangular Hollow Metal Pipes" in Dec. IRE. The third one on "Design of Metal Horns for Directional Antenna" is of most interest to me. I assume it is by Barrow so perhaps you could go over to M.I.T. and get a little pre-publication information if he will be kind enough to give some out. What I desire to know is; if there is and if so the details of a metal horn of circular crossection with three to one ratio of mouth to throat diameters and working at a frequency 110% of transverse cut off at throat which will produce a radiation pattern sufficiently broad to have 50% or greater intensity at plus or minus 42 degrees from axis.

This fall I have done considerable experimenting with conical horns and have been unable to produce this configuration with reasonable efficiency. This last requirement is that the energy entering (when used as a receiver) mouth of horn all appear at throat with negligible part reflected back out. For 100% efficiency the ratio of intensity at throat to intensity at mouth should be the inverse of throat to mouth diameters. It has been relatively easy to produce over 95% efficiency but then the response pattern sharpens up too greatly. While these combined specifications cannot be met with conical horns it maybe that Barrow has found some other shape of horn that will produce the desired results.

Yours truly,