May 20, 1958

Professor Fred T. Haddock
The Observatory
University of Michigan
Ann Arbor, Michigan

Dear Fred:

Your letter to me, dated May 15, arrived while our Trustees' Executive Committee was in session, and I saw the copy sent to Leo Goldberg when we recessed for lunch. Leo and I discussed the matter briefly, and he has perhaps already conveyed to you that I understand your position, but I am also under some pressure to get something started on the Very Large Antenna. I need not recount to you the long and involved steps between an idea and the final Congressional appropriation that permits construction. For something like the Very Large Antenna the minimum time could be five years, but more likely would be eight or ten years. I hope that you are not under the impression that we were seeking a final decision on the performance specifications for a Very Large Antenna. For my own part, I am merely seeking a sufficient toe-hold to permit the initiation of exploratory steps on some of the design features, assuming, of course, that there is acceptance of the basic premise that radio astronomy will require an antenna with much larger resolution and gain than any instrument now in existence or under construction.

On May 13 I talked with Harry Needham by telephone concerning the delivery schedule for the 85-foot telescope, and he agreed to send a confirming letter, a copy of which is enclosed for your information. On the telephone he told me that the schedule given in paragraph 3 is based on two-shift operations. We understand that the plant is now on two shifts, although I am frank to say that when we visited Blaw-Knox on May 7, the amount of work in the shop did not seem to be very great. One other comment which we will clear up in our next discussion is the fact that there are twenty-one forgings to be divided between two identical telescopes. Who gets the odd twenty-first forging?

The last paragraph on page 1 of Harry Needham's letter refers to a section that applies to Green Bank, and not at Michigan. You will recall that we are placing the foundation for the telescope at Green

Bank. The tie-down bolts, which are over four feet long, are placed inside 8-inch diameter steel tubes. These are to be packed with very dense grouting in order to transfer shear loads from the tie-down bolts to a larger area of the concrete foundation. Bob Hall asked that we delay the grouting around the tie-down bolts until the base plates arrive at the site, in order that any errors in placing the holes through the 4-inch thick base plates can be compensated for by shifting the tie-down bolts slightly off center in the steel tubes. The alternative solution would be a rat-tail file in the 4-inch base plates.

Sincerely yours,

Richard M. Emberson
Assistant to the President

RME:mbf
Enc: HTNeedham ltr. cmdy to
cc: NRAO