

ASSOCIATED UNIVERSITIES, INC.

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January 20, 1956

MEMO FOR RADIO ASTRONOMY FILE

FROM: R. M. Emberson

SUBJECT: Meetings at the NSF on Monday-Tuesday, January 16-17, 1956

1. Prof. Bok called late Tuesday that he had just come from the meeting with instructions to inform me:
 - a) That the NSF approved our meeting with Gov. Marland on Monday, Jan. 23, but on a purely exploratory basis to determine the relative availability of sites 18 and 28;
 - b) That early discussions were desired between NSF and AUI.
2. He then quickly (20 minutes before catching a plane) reviewed the two-day meeting. NSF was represented by Drs. Waterman, Sunderlin, Seeger, Hogg and perhaps others; members of the NSA Advisory Panel on Radio Astronomy were present, including Drs. Bok, Greenstein, Hagen, Kraus, Purcell and Tuve. (I had understood that the Optical Observatory Panel was to take part in the meeting also, but they were not mentioned in the telephone conversation.)
3. Although the agenda reflected many of the issues that had been raised at prior times by Dr. Tuve, at the meeting Dr. Waterman pointedly stated that the agenda had been prepared by his staff because the NSF had not had any experience in the operation of large facilities and wished to discuss with the Panel topics such as: The type of organization desired for the operation of a National Facility; the degree of control the NSF should retain, including such things as the selection of sites, recruitment of a permanent staff, and particularly the appointment of a Director; research objectives, programs, and projects; fiscal matters, particularly the preparation of budgets; a performance review. As the two-day meeting proceeded it became quite evident that the NSF was genuinely concerned about these matters.
4. Throughout the meeting Dr. Tuve presented the strongest criticism of AUI, of what we had accomplished, had under way, and planned to do. Throughout the remainder of this memo no effort will be made to point up his criticisms but will note merely that his opening remarks included the suggestion that cancellation of our grant would be a way out of the present situation.

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5. The matter of sites was thoroughly discussed, including the concept of a central laboratory located in a place such as Washington or Charlottesville with the larger observing instruments at dispersed locations. Agreement was reached that the AUI proposal should be followed, namely, a large properly located site to include the central building and major instruments. This decision was made with full recognition that such an isolated site would require housing and cafeteria arrangements. Dr. Purcell made a strong point that we were establishing an intellectual center, not just a collection of buildings and instruments. Hence there were strong reasons for a permanent staff having a dual role: to give expert assistance to visiting scientists, and to provide continuity for a creative research program at the Facility. The previous week Dr. Bok had visited Green Bank (see file memo on Jan. 11-12 trip) and his maps and snapshots did much to convince most of those present that the right site choice would be a place like Green Bank. The matter of our proposed meeting with Gov. Marland was reviewed; it was agreed that the meeting should proceed, but strictly on an exploratory basis to compare the help that might be expected from West Virginia on #18 to that offered by Virginia on #28.
6. The discussion of Site #18 brought forth the suggestion that the 60-foot telescope be mounted on North-South, East-West rails, thus providing an interferometer of variable rather than fixed separation, when used with the 140-foot telescope.
7. The 140-foot program was examined. I had no record of comment on the equatorial vs alt-azimuth mount, which had been reopened at our December 13 meeting. There was, however, vigorous discussion of the tolerances that had been set for the 140-foot, namely, that the $\pm 1/4$ -inch surface and $10''$ of arc precision in positioning and tracking were approaching the technically impossible, and hence would be extraordinarily costly and wasteful. The present 140-foot specifications were made on the basis of good performance at 3 cm. The suggestion was made that we relax to a 21 cm specification. It may be that the NSF may ask us to obtain estimates of the savings that might be made if we did modify our specifications in this manner.
8. Financial support for the National Radio Astronomy Facility came up at several times during the meeting. For example, there seemed to be some doubts that the entire NSF budget would be appropriated by Congress this year; if there are drastic cuts, plans for radio astronomy will likewise have to be trimmed (which clearly influenced the thinking on the 140-foot program). It was indicated by Dr. Waterman that large National Facilities should not choke the research activities at smaller institutions. On the other hand, once the National Radio Astronomy Facility were established, the NSF would feel obligated to provide at least a minimum operating budget, which was set at about \$130,000 per year. Normal support would be expected to be in the order of \$300,000 per year. Questions were raised, and left unanswered, about the possibility of support from industry or the Department of Defense. It was apparent that there was a real need for raising a private endowment for the Facility.

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9. At some point, the suggestion was made that ionospheric tests be made at prospective sites in view of the possibility of the installation of equipment to work at frequencies of the order of 400 mc/sec.
10. The draft chapters for the AUI Planning Document entered into the discussion of the organization and management of the Facility. Dr. Waterman noted that the draft had been of great service in pointing up the issues that must be faced. He further noted that this was an AUI document; if the NSF were to adopt it, some revisions would have to be made, a few of which would strike at some rather basic concepts in the document. The discussions at this point, as well as earlier in the meeting, left no doubt that the NSF considered AUI to be competent but left open questions such as: too closely identified with the northeastern institutions, particularly through the present Board of Trustees? too much concerned with the atom and the AEC? A point was made (I'm not sure that this was by Dr. Waterman) that it would be a real loss if AUI did not stay in through the establishment phase. This carries the implication that AUI might carry through the work of organizing the Facility and supervising the initial construction, and then the operation would be turned over to some other group.
11. In summary:

These notes are based on a brief and hasty telephone conversation. If and when an official record of the meeting becomes available to us, any conflicts must be resolved in favor of the official record.

The AUI philosophy of a self-contained Facility, at a good observing site and provided with housing and cafeteria arrangements for visiting scientists and the permanent staff, has been adopted.

Sites #18 and #28 were agreed as being the two most promising possibilities, and we are to proceed with inquiries as to their availability.

The NSF will attempt to provide not less than a minimum of \$130,000 per year for the operation of the Facility; there is a real need for a private endowment.

The remaining issue is that of the mechanism for establishing and operating the Facility; an early meeting between AUI and NSF seems to be essential.

cc: G. F. Dunbar
L. R. Burchill