

ASSOCIATED UNIVERSITIES, INC.

BROOKHAVEN NATIONAL LABORATORY

UPTON, L. I., N.Y.

TEL. PATCHOGUE 2600

Xaphank 4-6262

January 6, 1957

MEMO TO: Lloyd V. Berkner  
Lewis R. Burchill  
Franklin J. Gallender  
Richard M. Emerson  
John W. Findlay  
David S. Hoesschen  
Neade L. Westman

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FROM: Charles F. Dunbar *C. F. D.*

SUBJECT: Staff Meeting December 3, 1957

Attached are minutes of the staff meeting held December 3, 1957. There is some disagreement on just what was decided under Item 1.2, but this should be easy to resolve.

Mr. Berkner's instructions with respect to organization will follow in a later communication.

GFD:VN

ENCL.

file  
AUI staff  
meeting

## Agenda

### MRAO Staff Meeting

December 3, 1957

1. Progress Reports
  - 1.1 Local building zoning
  - 1.2 Site acquisition and easements
  - 1.3 Road
  - 1.4 85-foot foundation and control building → weld at reinforcing in bldg  
fin Foundation
  - 1.5 Specifications/bids on electric power
  - 1.6 FCC, CAA, and other protective measures
  - 1.6.1 Monitoring truck
2. 140-foot status
  - 2.1 Models and model testing
  - 2.2 Drive and control
  - 2.3 Contract - provisions for checks and tests
3. Antenna Studies
  - 3.1 Feeds and supports for 85-foot, 140-foot and other paraboloids  
(Don Menzel and Sam Silver letters)
  - 3.2 Large apertures - Heeschen-Lilley proposal
4. Public Relations
  - 4.1 Distribution of program summary
  - 4.2 Distribution of booklet
  - 4.3 Requests for speeches - Jan. 17, Feb. 18, April 21
5. Organization of MRAO
  - 5.1 Corporation for site management
  - 5.2 Staff; weekly employees, permanent appointments
6. Budgets and financing
  - 6.1 Cash requirements for third quarter
  - 6.2 Interim approval by Frank Callender; check signing
7. Miscellaneous
  - 7.1 Paris and Moscow meetings
  - 7.2 date for meeting with NSF staff - Jan 10, D.C.  
maybe Mon Dec 16.
  - 7.3 occupancy of buildings

MINUTES

NATIONAL RADIO ASTRONOMY OBSERVATORY STAFF MEETING

GREEN BANK, WEST VIRGINIA

DECEMBER 3, 1957

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A staff meeting of the National Radio Astronomy Observatory was held in the office at Green Bank, West Virginia on December 3, 1957. The following persons were present:

Lloyd V. Berkner  
Lewis R. Burchill  
Franklin J. Callender  
Charles F. Dunbar  
Richard M. Emberson  
John W. Findlay  
David S. Heeschen  
Meade L. Westman

1. Progress Reports

1.1 Local Building Zoning: The desirability of local zoning of some sort was discussed, and it was agreed that an attempt should be made to obtain adoption of a zoning ordinance which would make Green Bank and environs a residential area only. It was decided that Dunbar should call Porter in Washington and discuss the problem with him. Porter is best situated to handle the matter, either direct or through local representatives.

1.2 Site Acquisition and Easements: Callender reported that there were only three properties on which no action has yet been taken by the Corps of Engineers. The Corps expects to file Notice of Taking in ten more cases during the next two weeks and expects to be able to get possession at whatever time is needed. In the case of the Hill property, it will not be possible to obtain possession until July 1, 1958, but this should not be any impediment to the site development program. It does not seem likely that there will be actual litigation, except possibly with respect to the Arbogast and Brown properties.

A form of agreement of easement has been worked out with Ruttenberg and the attorneys for the Corps of Engineers. Ruttenberg has promised to provide copies. The Corps of Engineers recommends that if easements are to be obtained, no payments be made to the property owners. If this policy is followed, there might be a saving of as much as \$40,000 in the site acquisition program.

Berkner proposed that if any property owner insisted on being paid for an easement, full title to the property in question should be acquired, by condemnation, if necessary. These cases could be left to the end of the site acquisition program, and any money saved used for purchases. He decided that, as a general policy, any balance left in the acquisition fund of \$650,000 be expended for purchasing other land, perhaps on the eastern side of Route 28. The location of any such acquisitions must be carefully considered.

1.3 Road: Westman reported that the road has now been accepted. He does not know what the total cost will be exactly, but thinks it will be in the neighborhood of \$90,000. There may be some credit after all cross sections have been checked. Westman will arrange for snow fences, when, as, and if it seems necessary, and will give consideration to landscaping when the time comes.

Berkner urged that the curves in the road at the entrance from Route 28 be cut back with stone, so that they will be somewhat longer than is now the case.

1.4 85' Telescope Foundation and Control Building: Westman reported that Ivy Construction Corporation, of Charlottesville, is ready to proceed with the 85' Telescope Control Building for \$31,555 and with the Foundation for the 85' Telescope for \$9,853. The combined price is \$41,408.

Berkner considered the various credits which have been negotiated with Ivy, as follows:

(1) Substituting concrete blocks for reinforced concrete foundations .....	\$ 406.00
(2) Omit acoustical tile in control room .....	350.00
(3) Omit ceramic tile in toilet area .....	190.00
(4) Change roof system, window walls, doors, etc. .....	3797.00
(5) Extend completion date to June 1st .....	500.00

As to (1), Berkner approved the use of concrete block, but decided that the reinforcement rods of the footings should be welded and that this practice should be followed in all buildings where there will be receivers. The welding will be an extra, but, in Westman's opinion, not large. As to (2), Westman said the ceiling is an acoustical type and should be sufficient. As to (3), Berkner decided that the tile should be left in.

As to (4), Westman said he thought substantial saving could be effected by using a truss type ceiling instead of reinforced concrete. The trusses will be about 48 inches apart, and an impregnated wood fibre roof will be put on top of them. The acoustic ceiling fits on flanges at the bottom of the trusses, and the trusses can be spot welded to the steel headers at each end. The side panels can also be welded to the headers.

As to (5), Westman said Ivy expects to work through the winter, and both jobs should be completed well before June 1, 1958. It is recognized that the foundation must be completed by May 1, 1958.

Berkner decided that a contract should be awarded to Ivy in the sum of \$36,798 for the Control Building. A change order will then be issued reducing the price by the amounts listed above under (1), (2), (4), and (5), and a supplement will be issued adding the telescope foundation to the work.

1.5 Specifications/Bids on Electric Power: Emberson said he understood the Monongahela Power Company was ready to go out for bids for the electric power installation. Monongahela will be responsible for running a line to the Works Area and for bringing the power from 12,000 down to 4,000 volts. AUI will have to pay an installation charge.

Berkner expressed anxiety about the quality of the cable and the nature of the guarantee. Findlay will check these points with Wardrop, of the Bowman organization, before any contract is signed. Westman is of the opinion that if the conduits are laid in a properly prepared sand bed there will be no risk of cracking, even though the conduits will be in the shoulders of the road and about five feet from the roadway.

In response to a question by Burchill, Emberson said that Bowman had very little left to do beyond certifying the type of cable and providing final inspection of the installation. Westman said he would examine the plans carefully to see that the conduits were adequately protected.

**1.6 Federal Communications Commission:** It was agreed that Findlay and Dunbar would check with Porter in regard to protective measures AUI would like CAA and FCC to take.

Findlay described the need for a monitoring truck to track down local interference. He has discussed the matter with Jansky and Bailey to get their ideas on the type of equipment. In his judgment, a Volkswagen bus with a 30-foot tower, various types of antennas, power supply, instrumentation, etc. would be required. The cost is estimated at \$53,000. \$45,000 represents the vehicle and equipment. The balance is labor.

Berkner decided that at this time \$20,000 was the maximum expenditure which should be made. He recommended acquisition of the vehicle, the tower and the antennas, and purchase of such equipment as possible with whatever remained.

Findlay said he would get a bid from Jansky and Bailey for the engineering, and would then go out for bids on the vehicle and the equipment to be installed in it. Berkner said Jansky and Bailey should provide specifications, etc. suitable for bidding. The need for NSF approval of the acquisition of the vehicle will have to be considered.

## 2. 140' Studies

**2.1 Models and Model Testing:** Findlay explained the need for running tests at three centimeter wave lengths with a model of the 140' telescope. He has approached five different firms and has found a paraboloid in England which would serve as a model. The dimensions are 144" and 62-1/2", as against 140' and 60' for the actual telescope. The model is priced \$1,000 plus transportation. Findlay estimates that \$300 will suffice for crating and shipping. Dunbar will look into the matter of duty.

**2.2 Drive and Control:** Emberson emphasized the importance of getting definite ideas on what will be needed for the drive and control mechanism of the 140' Radio Telescope. General Electric is going to make a specific proposal for a system quite different from that proposed by Electric Boat Company. In his judgment, AUI should prepare its own design and performance specifications and should settle all unsolved questions, such as whether an electric or hydraulic system should be employed. The existing performance specifications are not such as to produce true competition among bidders.

Findlay expressed the fear that if AUI defined the system it wanted at this stage, it might tie the hands of prospective bidders who might well be able to produce a better system. Neither he nor Heeschen consider that AUI can necessarily design a system cheaper and better than what can be devised by a company wishing to use a system of its own to meet the performance specifications.

Berkner proposed that a consultant, T. W. Brown, of Lombard Governor Corporation, be brought in to help evaluate proposals and make a selection. The advice of the prime contractor should also be solicited. He does not consider that a full time engineer is needed on the drive and control system, but some additional help is needed. Heeschen agreed that the specifications should be clarified and that other sources besides Electric Boat and General Electric should be solicited. It was concluded that negotiations for Brown's services should be commenced as soon as possible.

2.3 Contract -- Provisions for Checks and Tests: Emberson said that the Navy has issued very detailed test procedures to be used on its telescope. Berkner said these should be reviewed and incorporated in the contract for the 140' instrument, so far as necessary.

### 3. Antenna Studies:

3.1 Feeds and Supports for 85', 140', and Other Paraboloids: Emberson said Dr. Menzel had proposed a study project covering preliminary design of large antennas at an estimated cost of about \$40,000. Berkner said any proposal of this sort should be referred to the NSF.

Findlay suggested that a large joint program such as Menzel proposed was unnecessary at this time. Gradual progress, such as the work Silver is doing at Berkeley, should be continued, but there is no need for AUI's supporting a big study project.

3.2 Large Apertures: Berkner said he had considered the proposal made by Heeschen in letter dated November 20, 1957 for doing preliminary studies for a 1,000' antenna. Heeschen thought a total expenditure of not more than \$10,000 would suffice for this phase and proposed the formation of a group consisting of Lilley (Yale), Carroll, Findlay, and himself. Berkner proposed a two stage program. He suggested that various designs for a very large telescope be studied and that by April 1 the most promising design be selected. Schematic drawings and rough cost estimates should then be made, and the whole matter discussed with NSF. The second stage would be the preparation of a more complete engineering design and a more accurate cost estimate, which should be completed in time for funds to be requested for FY 1960.

Berkner suggested that some idea be obtained, perhaps from Dr. Feld, on what a rough design and cost estimate would cost, and that funds be requested from NSF or else squeezed out of funds now available. He also agreed with Heeschen that the best way to get price estimates on a fixed or limited movement paraboloid should be considered as soon as possible.

### 4. Public Relations

4.1 Program Summary: Emberson asked how the program summary developed at the October 16, 1957 meeting of the Radio Astronomy Advisory Committee should be distributed. Berkner decided that the program summary should be mailed out by Heeschen in draft form and then finalized after comments had been received. Before finalizing, it should be reviewed again by the Radio Astronomy Advisory Committee.

4.2 Distribution of Booklet: Berkner decided that the booklet prepared for the October ceremony should be sent out with a suitably inscribed card. The Foundation should be asked whether its name should be used also.

4.3 Request for Speeches: Berkner said that in dealing with requests for speeches, priority should be given to university groups and to local organizations. Every member of the staff should expect to participate in work of this kind. He sees no objection to individuals keeping honoraria offered. The speakers should not request the sponsoring organization to pay travel expenses.

## 5. Organization of NRAO

5.1 Site Management: Berkner pointed out that there were a number of unsolved problems in connection with management of the Green Bank site. He would like to develop plans by which the land not actually required for the Observatory could be used for recreation and perhaps for the production of revenue. Also, he considers that our bookkeeping should be such as to make clear that NSF funds are being used for research to the maximum extent and not for recreation. He proposed that a plan be prepared by Callender, Westman, and Burchill. A progress report should be made at the January staff meeting.

Callender said the first step in developing such a plan is to find out what land will be available and what it can be used for. He proposes to explore the subject with the Forest Service and other agencies. Burchill emphasized the undesirability of over-complicating the accounting and the fact that site maintenance should be the responsibility of the Observatory business office.

Westman said that construction and grounds maintenance are serious problems and a wide variety of possible solutions will have to be considered.

5.2 Staff; Weekly Employees, Permanent Appointments: It was decided that there should be a semi-annual personnel review covering all weekly employees. Callender will discuss this with Burchill.

Berkner requested that Callender work up an appointment policy for the staff covering the making of limited appointments at the outset which can become indefinite or tenure at a future date. He recommended that Callender examine the Brookhaven policy.

## 6. Budgets and Financing

6.1 Cash Requirements for Third Quarter: It was decided that Callender should work out with Burchill what the cash requirements will be for the third quarter of 1958.

6.2 Interim Approval by Frank Callender; Check Signing: It was decided that the Executive Committee should be requested at the December meeting to authorize Callender to act as one of the signatories on Observatory checks.

## 7. Miscellaneous

7.1 Paris and Moscow Meetings: The matter of attendance at the Radio Astronomy Symposium to be held in Paris about August 1, 1958 and the meeting of the International Astronomical Union to be held in Moscow after the Paris meeting, was considered. Findlay and Heeschen have been invited to both meetings. Heeschen thinks that if Drake accepts the AUI offer of an appointment, he should attend the Paris meeting. Emberson considers it undesirable for both Findlay and Heeschen to be away for a month at the time the 85' Telescope is expected to be in final adjustment and acceptance tests. Heeschen would like to attend the Paris meeting, but does not want to be away for more than a week, in view of the schedule for the 85' Telescope.

Berkner tentatively decided that Findlay should attend the meetings in Paris and Moscow and should also inspect the various radio telescopes in Europe. No decision was reached in regard to Heeschen and Drake.

7.2 Observatory Staff Meetings and Meetings with NSF: It was tentatively decided that there should be a meeting of the Observatory staff at Green Bank on January 30, 1958 and a meeting with the NSF on January 31, 1958. In addition, a meeting with NSF probably should be arranged for early in January, possibly January 10.

7.3 Occupancy of Buildings: Berkner proposed that the laboratory be moved from the Kessler house, where it now is, to the Moro Beard house, near the 85' Telescope, and that the whole of the Kessler property be used for business offices. This decision met with general approval. Heeschen emphasized the desirability of acquiring moveable laboratory furniture.

Berkner suggested that the 85' Telescope be named for the late Dr. Teitel and said he would take this matter up with the Board of Trustees. He also suggested the desirability of retaining on the various houses the names of the previous owners, naming the central laboratory after Karl M. Jansky, and giving appropriate names to on-site roads.