

AGENDA
NRAO STAFF MEETING

Friday, August 22, 1958
New York Office
Friday, August 29, 1958
Green Bank Office

1. Review of Plans and Specifications for the Laboratory Building and Residence Hall and Cafeteria
2. Status of Supplemental Request
 - 2.1 Review of July 25 letter to NSF
3. Review of Operating Budget for FY 1959, 1960, 1961
4. Review of Capital Budget for FY 1960
5. Review of Communication Problem
6. The 85-foot Radio Telescope Program
 - 6.1 Status of work at Green Bank
 - 6.2 Schedule for completion by Blaw-Knox
 - 6.3 Status of Receivers and Horn Feed
 - 6.4 Status of Precision Indicator System
 - 6.5 Immediate task to be accomplished by NRAO
7. Status of Works Area
8. The 140-foot Radio Telescope Program
 - 8.1 Action initiated by E.W. Bliss and Darin & Armstrong
 - 8.2 Proposals on the drive and control system
 - 8.3 The Franklin Institute and the oil pad bearings
9. Progress on Other Programs
 - 9.1 Little Big Horn
 - 9.2 12-foot paraboloid
 - 9.3 Corner Reflector Interferometer
 - 9.4 Receiver Developments
10. Arrangements for the October Meetings
 - 10.1 The Radio Astronomy Advisory Committee
 - 10.1.1 New members
 - 10.1.2 Agenda

AGENDA - NRAO STAFF MEETING -

10.2 Dedication of 85-foot Telescope

10.2.1 List of invitees

10.3 General arrangements for above and Meeting of Trustees
Friday, October 17, 1958

11. Personnel

11.1 New additions to staff

11.2 Positions soon to be filled

11.3 Plans of visitors

12. Site Problems

12.1 Acquisition of land east of Route 28

12.2 Master Plans for site development

12.3 Financing of Museum and Visitors' Program

13. Publications

13.1 Responsibility for Patent Reviews

13.2 Referee Procedure

13.3 Definitive Article

13.4 Monthly Reports

File

NRAO STAFF MEETING

New York, N. Y., August 22, 1958
Green Bank, W. Va., August 29, 1958

September 23, 1958

Copy of Agenda attached

Record prepared by:
C.F. Dunbar - 8/22 Mtg.
R.M. Emberson - 8/29 Mtg.

Present: August 22, 1958: L.V. Berkner
L.R. Burchill
F.J. Callender
C.F. Dunbar
R.M. Emberson
E.E. Halik

August 29, 1958: L.V. Berkner
F.J. Callender
F.D. Drake
R.M. Emberson
J.W. Findlay
D.S. Heeschen
E.E. Halik

1. Review of Plans and Specifications for the Laboratory Building and Residence Hall and Cafeteria

Callender said estimates from Bowman had come in for the Residence Hall and Cafeteria and the Laboratory Building. The estimates are \$364,000 and \$367,000, respectively. The Residence Hall will include four apartments and sixteen rooms, as well as the Cafeteria. The total area is about 22,000 square feet, which makes the cost \$16.20 per square foot, as against estimates of \$20.00 per square foot for the Navy construction at Sugar Grove. The Bowman plans and estimates include all utility lines to a point five feet from the building. Callender strongly recommended that the stand pipe for the water supply system be installed, although in the July 25, 1958 letter to Luton, this item had been one of the ones omitted to achieve a saving of about \$400,000. The specification of plumbing fittings for the Laboratory and Residence Hall required a decision (i.e. stand-pipe vs low pressure system) and after discussions between Bowman, Callender and Emberson, a decision was made to specify the stand-pipe system. Bowman is going to make a landscaping plan covering all the buildings. Callender is considering having the parking lot installed by the Observatory's own force.

The estimate for the Laboratory Building is about \$17.00 per square foot. The partitioning included is minimal so that the interior of the building can be arranged to suit the needs of the research program. The roof is not designed for heavy use, but if properly protected by wood walkways and platforms it will be suitable for installations of

small equipment. Dr. Berkner suggested that when the second wing of the Laboratory is built, one section of the roof be of heavy construction capable of supporting a modest telescope, as was provided in the original study plan. Mr. Callender expects to get alternate bids on various types of interior finish, and also stone or brick facing.

Dr. Berkner emphasized the importance of getting the Residence Hall completed as quickly as possible. He instructed Dr. Emberson to communicate with Mr. Luton and explain that AUI is going out for bids in the near future and hopes to be in a position to award a contract prior to October 1, 1958. Therefore, it is important that the National Science Board approve an amendment to the prime contract at its September meeting, so that the contract amount can be increased as soon as the Bureau of the Budget releases the funds. Dr. Emberson will also tell Mr. Luton that AUI will discuss the entire situation with him before making any award and ask what further approvals, if any, NSF wishes to give. It was pointed out that there has never been any formal approval of a financial plan submitted by AUI in the manner contemplated in the prime contract, although implicit approval of the building program is certainly to be found in the request for supplemental funds made by NSF to the Bureau of the Budget. It was agreed that the exterior color finish of the Works Area would be deferred until a decision could be made compatible with the finishes of the Laboratory and Residence Hall.

2. Status of Supplemental Request

2.1 Review of July 25 letter to NSF: Detailed consideration was given to the schedule attached to the July 25 letter to the NSF giving an itemized analysis of a reduction in supplemental funds to the \$4,000,000 level which has now been voted by Congress. The conclusions reached with respect to the various items were as follows, with the proposed reduction shown for each:

- a-1 Site-Acquisition - \$50,000: Mr. Callender will discuss with NSF the proposal to buy land on the east side of Route 28. Deletion of \$50,000 will drastically reduce any immediate land acquisition program and eliminate the emergency reserve recommended by the AUI Trustees.
- a-2 On-Site Secondary Road System - \$40,000: Mr. Callender will obtain estimates or proposals on the connecting entrance roads and parking lots for the new buildings and perhaps by a change order will add these to the building contracts. It was the consensus that the exterior of the buildings must be finished and that such finishing includes the entrance roads, parking lots, and

landscaping. Therefore, if inclusion of the roads, etc., increases the bids above the IBA estimates, it will be necessary to restore the proposed reduction of \$40,000 and somehow compensate for this elsewhere. Dr. Berkner proposed that \$50,000 be reserved for "finishing" costs.

a-3 Water Supply and Sewer System - \$40,000: It was the consensus that the central water supply and sewer systems should be built as soon as possible and that the water stand pipe be constructed at the time the Laboratory and Residence are built. The stand pipe will cost \$35 - 45,000, and the possible deferments of expenditures on the water supply and sewer systems must be deduced by this amount, i.e. reduced 50% to about \$40,000.

a-4 Electric Power System - \$142,000: This reduction, which includes the deferments effected in bringing power on to the site, will have the effect of stopping the program for putting power lines underground, and also of preventing the installation of any kind of on-site communication system. The communication problem was discussed in detail. Dr. Berkner proposed that an automatic switchboard be set up on site. A complete installation of this kind will not be absolutely essential until after July 1, 1959. Therefore, expenditures in the meantime should be limited to about \$20,000 for equipment and parkway cable to use in laying cables underground. Parkway cable to outlying stations can be used instead of conduits at a considerable saving.

Dr. Emberson reported that Bliss has ordered the installation of a tie-line from Canton to Green Bank. He also said he had discussed the whole problem of telephone communications with the New York Telephone Company and has asked for the installation of seven trunk lines for use by the Observatory. Mr. Callender has discussed the unsatisfactory telephone service with the local telephone company and is keeping a record of calls, so that he will have evidence to lay before the Public Service Commission, if this becomes necessary. Dr. Berkner said a telephone should be provided in each room of the Residence Hall and adequate provision should be made for the ultimate growth of the Laboratory.

c-1 Stand-by Generator - \$50,000: The early proposal to provide a standby generator for the 140-foot telescope was subsequently amended to provide a larger unit as a standby for the entire Observatory. It is now proposed to defer this purchase until the capital budget for FY 1960.

- c-3 Observing Equipment - \$50,000: It was the consensus that there would have to be a further deferment in this item to compensate for retention of some of the other reductions proposed in the July 25 letter to Mr. Luton. It was also the consensus that future requests for funds for electronic equipment were more likely to be favorably considered by NSF and the Bureau of the Budget than requests for funds for buildings, roads, etc. Therefore, it is desirable to use available funds to complete the buildings, even though this may involve deferring acquisition of some electronic equipment for another year.
- d-2 Maintenance Shop and Repair Equipment - \$35,000: If forced to do so, purchases of shop and repair equipment will be deferred to provide the indicated reduction in the immediate budget plans; presumably the deferred amount will be added to the FY 1960 budget.
- d-3 Office Furniture and Equipment - \$10,000: Same as d-2 above.
- d-4 Living Quarters Furniture and Equipment - \$25,000: Mr. Callender agreed that postponement of purchases of this kind would not be damaging. It probably will not be necessary to completely furnish the Residence Hall and Cafeteria before FY 1960.

Dr. Berkner endorsed the view that immediately available funds should be used to "finish" the site, even though this meant reductions in the program for purchasing electronic equipment. He proposed that a special request be made to NSF for \$350,000 to be used to acquire the first maser receiver. He pointed out that a receiver of this type takes about a year to build, and therefore, if it is to be ready by early in the calendar year 1961, the order will have to be placed in the Fall of 1958. It appeared that approximately \$165,000 would have to be taken from the electronic budget to permit essential work at the site to proceed during the year.

3. Review of Operating Budgets for FY 1959, 1960, 1961

Dr. Berkner said discussion of these budgets should be postponed until final Congressional action on the Independent Offices Appropriation Bill for FY 1959.

4. Review of Capital Budget for FY 1960

Dr. Berkner emphasized that all deferred items of capital expenditure must be included in the budget request for FY 1960 and pointed out that in preparing this request, allowance must be made for

possible, more or less arbitrary cuts by the Bureau of the Budget and the Appropriations Committee.

5. Review of Communication Problem

This item was discussed above in 2.1.

6. The 85-foot Radio Telescope Program

6.1 Status of Work at Green Bank: Dr. Emberson said that Blaw-Knox was having difficulty in aligning the polar shaft, but that in general the work is going well. The polar wheel is now in place.

6.2 Schedule for Completion by Blaw-Knox: Blaw-Knox hopes to have completed its work by October 1, 1958, but will give no firm commitment. Mr. Jackson, the Vice President, however, has guaranteed that the telescope will be movable at the time of the meetings in the middle of October. The final cost estimate, including \$10,000 for lead and \$10,000 for wiring, comes to \$297,000.

Dr. Emberson described the misunderstanding which has developed with Blaw-Knox over the wiring and said it had been decided to accept Blaw-Knox's position and pay \$7,800 to have the wiring done by Blaw-Knox instead of by the Observatory staff. Blaw-Knox has never wired equipment it furnishes and apparently never believed that its contract included wiring. Blaw-Knox will also provide the wiring equipment house for \$2,000. Mr. Callender has been instructed to issue the necessary change order recognizing the Blaw-Knox position.

6.3 Status of Receivers and Horn Feed: The Traveling Wave Tube Receiver built by Ewen-Knight has been delivered. Jasik has delivered the horn feed. Airborne Instruments Laboratory is still adjusting the receiver it has built; delivery will be made early in September.

6.4 Status of Precision Indicator System: Mr. Callender said he was holding up the second progress payment on the precision indicators until the vendor's costs warrant making further payment. The indicator system will be installed by AUI.

6.5 Immediate Tasks to be Accomplished by NRAO: The Observatory is under an obligation to install the foundation for the equipment house to be supplied by Blaw-Knox under the change order referred to in 6.2 above.

7. Status of Works Area

Mr. Callender said the schedule provided by the contractor is satisfactory. It calls for the building being under roof by October 15.

8. The 140-foot Radio Telescope Program

8.1 Action Initiated by E. W. Bliss and Darin & Armstrong:

Dr. Emberson reported that with NSF approval he had given Bliss a go-ahead letter on August 14. The following day Bliss started work in their weld shop. Darin & Armstrong proposed to mobilize their forces to start work at Green Bank on September 2.

8.2 Proposals on the Drive and Control System: Four proposals for the drive and control system have been received and a fifth one (Bendix) should be in hand in the near future. The proposals are now being evaluated by Messrs. Brown, Findlay, Halik, Karelitz, and others.

The lowest price was proposed by J. W. Fecker. Mr. Karelitz believes this company has the mechanical capability, but no one is sure about the electronics; the Fecker proposal will have to be revised to include the inductosyn indicator system, rather than a geared synchro, and to provide 50% more power. These changes will result in a substantial increase in price.

Airborne Instruments Laboratory and Cutler-Hammer (recently merged) submitted a cost-plus-fixed-fee proposal, but after a conference on August 18, indicated that it would make a lump-sum proposal after obtaining further information.

American Machine & Foundry also submitted a cost-plus-fixed-fee proposal, but is ready to discuss the possibility of quoting a fixed price. Dr. Emberson has arranged for a meeting on August 25, 1958.

Electric Boat Company quoted two prices, one of about \$400,000 and the other over \$500,000. This higher proposal (by the Stromberg-Carlson Division) was for a digital system. Mr. Halik is doubtful about some of the hydraulic equipment proposed.

8.3 The Franklin Institute and the Oil Pad Bearings: Dr. Emberson described the misunderstandings which have developed with The Franklin Institute. He is unwilling to accept the Institute's latest proposal for an extension of its contract and for an increase in the cost ceiling, including an additional fee. He is considering the possibility of negotiating with Franklin for a task order arrangement for consulting services.

9. Progress on Other Programs

9.1 Little Big Horn: The aluminum plate is expected in Green Bank in the near future. A large wooden shed has been built to

provide temporary housing for the fabrication of the horn.

- 9.2 12-foot Paraboloid: The instrument house and mount are ready for installation of the reflector. Dr. Findlay said he would survey the paraboloid surface before mounting the reflector.
- 9.3 Reflector Interferometer: The reflectors have been completed. There is still some cable to be installed.
- 9.4 Receiver Developments: Dr. Findlay has completed the receiver he designed, and it is undergoing tests. This will be used on the Little Big Horn and the telescopes, as needed.

10. Arrangements for the October Meetings

10.1 The Radio Astronomy Advisory Committee

- 10.1.1 New Members: Dr. Emberson says he proposes to invite the three newly elected members and their three predecessors.
- 10.1.2 Agenda: Dr. Berkner considers that the research program for the Observatory should be the principal item on the agenda. He suggested that the first day (October 15, 1958) be devoted first to a tour of the site and then to general discussions of the Observatory and its programs. On the second day (October 16, 1958), the Committee will be invited to attend the dedication of the 85-foot Telescope, preceded by an opportunity for an executive session, if it wishes to hold one. Dr. Emberson should be available for the executive session, if the committee wishes him to attend. Dr. Menzel will be asked to deliver an oral report at the meeting of the AUI Executive Committee on the afternoon of October 16, or to prepare a written report for consideration by the Board of Trustees on October 17.

10.2 Dedication of 85-foot Telescope

- 10.2.1 List of Invitees: Dr. Berkner proposed that invitations be extended to Senator Revercomb, Congressman Staggers, Dr. Waterman and members of the NSF staff, and all members of the National Science Board and the Astronomy Advisory Panel.

- 10.3 General Arrangements for Above and Meeting of Trustees, Friday, October 17, 1958: Mr. Callender will explore the possibility of using the Allegheny Lodge to house the visitors and also for the Trustees meeting. If satisfactory arrangements can not be made there, arrangements will be made for the Three

Hills Hotel in Warm Springs. There will be a dinner for the Advisory Committee on the night of October 15, and dinner for the Trustees and guests for the dedication on the night of October 16. This dinner will have to be early, so that the members of the Advisory Committee and guests can be taken to the train.

11. Personnel

11.1 New Additions to Staff: Mr. Callender and Dr. Emberson reported on new additions to the staff. Mr. Halik's appointment was approved informally by a majority of the Executive Committee, and a formal vote will be requested at the meeting on September 19. Sidney Smith, a young civil engineer, has joined the staff and is at work mapping the site. A tentative offer of an appointment has been made to James Martin, who will serve as Assistant to Mr. Callender. Mr. Burchill pointed out that it is still necessary to find someone with fiscal training. Spencer Greenwood, a master mechanic, will report for work immediately after Labor Day.

Dr. Emberson's original plan was that Messrs. Smith, Martin, and Greenwood should report to Mr. Callender. After discussion, it was decided that they should report formally to Dr. Emberson, when he is at Green Bank, and when he is not, to Mr. Callender, as Dr. Emberson's deputy.

11.2 Positions soon to be Filled: Dr. Emberson said Dr. Findlay was going to get a definite answer from Mr. Campbell. A promising candidate for a position as machinist has been suggested by a tool company which has supplied the Observatory with some equipment.

11.3 Plans of Visitors: Mr. Reber's plans are still uncertain. Dr. Hvatum will require an Exchange Visitor's visa, and this, in turn, requires application by AUI for participation in the Exchange Visitor's Program as a sponsor. Mr. Dunbar is obtaining the necessary forms through Dr. Anderson at Brookhaven. The State Department has promised full cooperation in expediting the paper work.

12. Site Problems

12.1 Acquisition of Land East of Route 28: Mr. Callender will obtain a report from NSF as soon as possible.

12.2 Master Plans for Site Development: Mr. Smith is preparing a map of the site which can be used in planning the needs of the research programs. Once these are determined, it will be possible to define the nature of the property management

problem and to get expert advice from appropriate State and Federal agencies.

- 12.3 Financing of Museum and Visitors' Program: Mr. Callender will discuss the plans for the technical aspects of the museum with Drs. Findlay and Heeschen.

Dr. Berkner proposed that as soon as the land to the east of Route 28 is acquired, one of the houses on it be converted into a reception center. Some doubts were expressed as to the desirability of having the reception center across a main road from the Observatory. This matter will be given further consideration.

13. Publications

- 13.1 Responsibility for Patent Reviews: Dr. Emberson said Mr. Dunbar had pointed out the need for reporting inventions and discoveries to NSF. Appropriate language has been included in subcontracts and in agreements with consultants.
- 13.2 Referee Procedure: Dr. Heeschen will propose a procedure.
- 13.3 Definitive Article: Nothing has been done on a "definitive article" describing the Observatory.
- 13.4 Monthly Reports: Dr. Berkner said the first monthly report should cover both July and August, 1958. Thereafter, he proposed that the reporting period end the 25th day of each month. The members of the staff will be given a deadline for submission of material to be included in the report.

14. On August 29, L. V. Berkner, F. J. Callender, F. D. Drake, R. M. Emberson, J. W. Findlay, D. S. Heeschen and E. E. Halik met at Green Bank to continue the staff meeting. The site was toured first: The Works Area, 85-foot Telescope, 12-foot Reflector, Little Big Horn, interferometer (H. G. Well's receiver), Hill house, etc..
 15. Building Construction and Plans. Dr. Berkner said he had obtained experienced advice regarding the deceptive savings from crawl spaces under buildings and he therefore asked that the crawl space under the Laboratory be changed to a 7-foot height. He also asked that the necessary fill be made now to permit a 12-foot extension to the central section of the Works Area to accommodate the emergency diesel generator.
 16. FY 1959 Operating Budget. The Independent Offices appropriation as finally passed by the Congress, provided \$350,000 for the FY 1959 operations. Inasmuch as tentative revisions had been made toward a reduction from \$400,000 to \$375,000, Mr. Callender suggested only two additional changes to meet the final budget:
 - 16.1 Charge Messrs. Greenwood and Halik against the 140-foot telescope construction, rather than against operations;
 - 16.2 Do not make a replacement in the New York office when Mrs. Coulton leaves.
 - 16.3 Also, it was becoming apparent that two observing assistants would be desirable at the 85-foot telescope, and these could be provided by a transfer of one position from the Electronics Department, plus the amounts picked up in salaries and insurance from the time lag in filling the positions.
- There was some discussion of the necessary qualifications of the observing assistants. Dr. Berkner was of the opinion they should report to the head of the Astronomy Department and that they should have specific responsibilities concerning the operation and maintenance of the telescope and electronic equipment that no permanent or visiting astronomer could relieve. He felt that they should understand the meteorological problems and thought arrangements could be made for the Senior Observing Assistant to attend the Navy Meteorological School.
17. Dr. Heeschen commented briefly on plans to invite perhaps two or three foreign radio astronomers to NRAO for periods of a few months. Dr. Berkner suggested that the NSF might make individual grants to support some of the visitors.
 18. Dr. Findlay said he would press Mr. Campbell for a decision on joining the NRAO staff. Should the decision be negative, Dr. Berkner suggested that graduates of the special electronics

schools at Cornell, Minnesota and California (Berkeley) be investigated as possibilities.

19. Local School There was a brief discussion of local school problems. Dr. Berkner suggested that an arrangement be made, similar to the one in effect at Brookhaven, whereby families living on the site pay the school, \$10 per month for each child in the school.
20. Capital Budgets After a review of the August 22 discussions, Dr. Berkner stated:
 - 20.1 That we should plan to have the first maser receiver ready by the Fall of 1959 and proposed a specific NSF grant now to permit placing an order;
 - 20.2 That the capital budget for FY 1960 submitted to the NSF on May 1 should be resubmitted to include the \$420,000 struck from the special appropriation, provision for taxes on the telescopes, and such other adjustments as seemed necessary.
[FJC did this on September 2 - copy attached for record]
21. October Meetings The plans for the staff meetings on October 14, Advisory Committee meeting on October 15, 85-foot telescope dedication on October 16, and the Trustees' meeting on October 17 were reviewed. Separate memo on this, dated September 3, 1958, has been distributed.
22. Museum Dr. Berkner suggested that a working model of the Jansky "discovery" telescope, the Reber telescope, the Ewen-Purcell horn, and models of the site, the radio telescopes, etc., be a part of the museum. Dr. Heeschen is to investigate the various types of planetarium equipments available. Generally, the museum exhibits should cover the site and the observing environment, the equipment, and the research programs and results as a part of modern astronomy.
23. Patents Dr. Berkner outlined the arrangements made with Research Corp. for the exploitation of any patentable ideas of people working at NRAO.
24. Paper Referees Dr. Berkner said a referee system should be set up to include papers by visitors as well as by the permanent staff. Meanwhile, he will look to Dr. Heeschen for advise on papers and outside referees. All papers must have a credit line to the NRAO and NSF.
25. Definitive Article Drs. Emberson and Heeschen are to recommend on that at the October staff meeting.
26. Monthly Reports Dr. Berkner said he wanted the reported out promptly, the first of each month. July and August should be covered in the initial report.