

ASSOCIATED UNIVERSITIES, INC.

UPTON, L. I., N. Y.
TEL. YAPHANK 4-6262

May 29, 1957

Mr. James M. Mitchell
National Science Foundation
1520 H Street, N. W.
Washington 25, D. C.

Dear Jim:

I enclose twelve copies of minutes I have prepared regarding the discussions at the National Science Foundation on May 21, 1957. If you people find any serious discrepancies, we can consider revising them entirely. Otherwise, I suggest you incorporate any changes or additions in a separate memorandum which can be appended to the minutes.

I sincerely hope that the record is reasonably complete. It represents the combined efforts of Emberson, Burchill, and me.

Very truly yours,

Charles F. Dunbar
Secretary

CFD:VN

ENCL.

cc: RMEberson
IRBurchill

THIS COPY FOR

RADIO ASTRONOMY PROJECT

Record of Meetings at National Science Foundation

May 21, 1957

STAFF GROUP CONFERENCE 9:00 A. M.

Present: National Science Foundation:

James M. Mitchell
F. J. Callender
F. K. Edmondson
James Morgan
J. B. Roberts
C. B. Ruttenberg
F. C. Sheppard

Associated Universities, Inc.:

Lewis R. Burchill
Richard M. Emberson
Charles F. Dunbar

1. Federal Communications Commission Hearings: Emberson reported conversation with Porter on coverage of the Federal Communications Commission Hearings, which will open on May 20, 1957. These are concerned with frequency allocations and will lead into hearings on regulations designed to protect the observatory site at Green Bank. Porter considers that the expense of having a representative at every session would be prohibitive and that purchase of a full transcript of hearings would not be warranted because of the high cost. He recommends that he attend only the hearings at which AUI and NSF witnesses testify, and obtain a transcript of these proceedings. He will also try try through unofficial sources of information to find out as much as he can about what goes on at other sessions.

The consensus was that this course should be followed.

2. Appointment of Observatory Director: Mitchell and Edmondson expressed concern at the failure to appoint a Director, and the latter urged that the decision to make United States citizenship a necessary condition of the appointment be reconsidered. Emberson and Dunbar described the discussion at the AUI Trustees' meeting and the reasons for the decision to defer the appointment. Mitchell recognized the validity of these arguments without necessarily agreeing that they were controlling.

It was the consensus that this matter was one to be determined by Messrs. Berkner and Waterman.

3. Master Plan: Emberson said Bowman will have a complete site development plan by the end of the summer. This will be a long-range plan going beyond the funds which have been requested. He did not think that the plan could be completed much before September, but said that perhaps some portions of it or a rough preliminary version would be ready sometime in July.

4. 140-Foot Telescope: Emberson expects to go out for bids on the 140-foot telescope about July 1, but of course this date is subject to the usual slippage. If it holds firm, there should be some indication by early August of what the telescope will cost. In the meantime, Ashton, after completing the design, will prepare a detailed cost estimate. Emberson described the satisfactory experience of the University of Michigan in contracting with Blaw-Knox Company for an 85-foot telescope, and the serious difficulties encountered by California Institute of Technology (John Bolton) in contracting for two 90-foot dishes. It seems reasonably clear now that the final design will call for an aluminum reflector and a steel yoke. An all aluminum design raises serious technical problems, and the necessary large increase in tonnage of materials and erection costs makes an all steel design undesirable. He expressed the opinion that the telescope should be completed within about two years after a contract is let. No performance guarantee will be required of the fabricator.

5. 85-Foot Telescope: Emberson said he had prepared specifications for the purpose of obtaining lump-sum proposals for an 85-foot telescope expected to cost about \$300,000 erected, and which could be delivered within about a year. NSF representatives expressed grave doubt of the desirability of contracting for an 85-foot dish until more is known about the cost of the 140-foot telescope and about the FY 1958 appropriation. Emberson emphasized the importance of having a working piece of equipment as soon as possible, so as to get the observatory started and attract a high calibre staff. Admittedly, there would be some daytime noise interference during the construction phase, but this would not be really serious except for a relatively short period of time during the erection of the 140-foot dish. In any event, it would be possible to use the observing equipment at night. Callender pointed out that if the cost of the 140-foot telescope is going to be known by about the first of August, the time gained by adopting Emberson's view would only be about a month. He urged the desirability of preserving maximum flexibility. Mitchell and other NSF representatives emphasized the complete uncertainty about the capital funds which will be available in FY 1958 and FY 1959, and laid stress on the need for a completed facility, including the 150-foot telescope, for the sum of \$4,000,000. In this connection, Burchill pointed out that, of the \$4,000,000 presently allocated to the contract, \$100,000 is for operations, leaving only \$3,900,000 for capital. Emberson said that \$3,000,000 was the maximum amount which could be spent for the 140-foot dish within existing budgetary plans, and that this figure would mean cutting back on site and covenant acquisition, building plans, and other desirable parts of the program. Emberson pointed out that in all probability the cost of obtaining electric power for the site will be less than \$100,000 instead of the \$400,000 which has been budgeted. Mitchell asked what buildings were planned for the observatory and what the absolute minimum was. Emberson said there would have to be some sort of building in addition to the research facilities. It might be necessary to resort to a wooden structure, of an avowedly temporary character, like the so-called test shack at Brookhaven. The ideal minimum would be the central part of the projected laboratory building and some sort of a maintenance building.

It was agreed that additional capital funds in FY 1958 would solve a lot of problems, but just how much is absolutely necessary cannot be accurately stated at this time.

Present: National Science Foundation:

F. J. Callender
James Morgan
Charles B. Ruttenberg

Associated Universities, Inc.:

Richard M. Emberson
Charles F. Dunbar

6. Site Management: The question what to do with portions of the site not actually used was discussed. There appear to be two possibilities. The first is to allow the present owners to remain in possession of the land (but not the buildings) and use it for grazing or haying. Some kind of lease or license would have to be worked out with each one. Although the amount of income to be derived would be small, Ruttenberg considered that it would have to be returned to the Treasury as a miscellaneous receipt. If this is not the case, income of this character could be used as a revolving fund for maintenance of the site. The applicable contract provision is Article V, paragraph 3, which provides that all revenue received by AUI is to be applied either in reduction of payments to be made by the Foundation to AUI under the contract, or as NSF requests. The other, and more desirable appearing possibility is to persuade the United States Forest Service to manage and maintain the unused land.

It was agreed that Callender and Dunbar would explore this possibility with the Forest Service.

7. Consolidation of Site Description: The property being acquired by the Corps of Engineers will be described in a series of deeds covering different parcels. There are obvious advantages in getting a consolidated description, and Callender and Dunbar will explore methods of doing this with the Corps of Engineers. It will also be desirable to discuss with the Forest Service the feasibility of straightening out the observatory boundaries by transfers to and from the Forest Service. No substantial amount of property will be involved in these transactions.

8. Maintenance of Buildings: Callender expressed the opinion that the Corps of Engineers should be advised what buildings on the property to be acquired will be needed. It is his understanding that unneeded buildings will be disposed of by the Corps of Engineers as part of the process of acquisition, either by sale or demolition.

9. County Road: The feasibility of closing the county road which crosses the site and leads to a small amount of privately owned land on the east bank of the river was discussed. It was the consensus that the best solution was to purchase the privately owned property, which then could either be kept or turned over to the Forest Service, and then make arrangements to close the road. However, it is agreed that an immediate decision on this point is unnecessary.

10. Restrictive Covenants: The question whether the program of acquiring restrictive covenants from peripheral property owners was discussed. Emberson pointed out that this part of the acquisition program is estimated to cost about \$100,000 (200 transactions at \$500 apiece). The issue is whether the covenants have sufficient substantive value to warrant this expenditure. It was agreed that

ordinarily the elimination of electrical interference of some kind could be handled on a simple public relations basis. However, cases might arise where a property owner would be completely uncooperative, and there the covenant would give AUI and/or NSF a right of entry. The Zoning Act gives no right of entry, and situations might arise where the interference is of a character not falling within the terms of the statute. Callender emphasized the desirability of obtaining covenants covering the town property.

It was agreed that Callender should discuss the whole problem with the Corps of Engineers and request the Corps not to push this part of the program until a firm decision can be reached.

11. Bidding Procedures and Contractual Arrangements: Emberson described the methods he proposes to use in soliciting bids for the 140-foot telescope. He proposes to advertise through recognized commercial channels and to supply specifications and drawings to anyone requesting them, at a charge approximately equivalent to the cost of preparation - probably \$25.00. In addition, before a bid or proposal will be entertained, the bidder must give evidence of qualification. Procedures used at Brookhaven in procuring the components of the big accelerator will be closely followed. Callender agreed to find out whether there was some United States government journal in which an advertisement could be inserted.

What may be called conventional contracting will be handled by Bowman. However, Bowman will be instructed to advertise in all cases. Bowman will not sign construction contracts, but will arrange the solicitation and opening of bids, and, hopefully, prepare contract documents for signature by AUI.

Routine procurement will be by purchase order, and care will be taken to obtain adequate competition.

In response to questions by Mitchell, Emberson emphasized that every effort will be made to let fixed-price contracts for the two telescopes. He is confident that there will be no difficulty on obtaining lump-sum bids for the 85-foot telescope, and he hopes that the same will hold true for the 140-foot dish. However, it is possible that in the case of the latter instrument more than one contract will have to be let, because it may not be possible to find a single contractor willing to undertake fabrication of the reflector, the mount and the drive and control system, construction of the foundation, and erection of the telescope on the foundation. As a last resort, AUI will enter into a cost-plus-fixed-fee contract for the 140-foot telescope, but this will only be after careful consideration and detailed consultation with the Foundation. Cost-plus-fixed-fee and time-and-materials contracts will be freely used on relatively small undertakings involving research and development; e.g., the contract now being negotiated with The Franklin Institute for development of an oil pad bearing system for the telescope.

SUB-GROUP CONFERENCE 10:45 A. M.

Present: National Science Foundation:

J. B. Roberts
F. C. Sheppard
Hudson
Kling

Associated Universities, Inc.:

L. R. Burchill

12. Time Schedule for Budget Actions: The time schedule attached to this record was discussed and agreed to be satisfactory. The question of individual responsibility in each organization for particular actions and notifications was recognized as one for internal arrangement in both AUI and NSF.

13. Transfer of Cash: It was agreed that AUI will request cash quarterly, or more often if absolutely necessary. NSF has prepared a form to be used, copy of which is attached, and which was agreed to be satisfactory. The matter of cash balances was discussed, and it was agreed that the size of balances was a matter for AUI decision.

14. Budget Request Forms: NSF presented forms to be used in making budget requests, copies of which are attached. AUI will review these forms, and final agreement will be reached as soon as feasible.

15. Reporting: The need for more detailed reporting, especially on construction in progress and by object classifications in operations was discussed.

16. Financial Plans - FY 1957 and FY 1958: The need for revision of financial plans submitted for FY 1957 and FY 1958 were recognized. Burchill outlined what would be needed if AUI embarked at once on procurement of an 85-foot telescope.

17. Accounting: Accounting treatment of government furnished costs was discussed. It was agreed that a separate transfer account would be maintained by AUI to reflect government furnished costs in order to permit the proper adjustment of funding from time to time.

FULL GROUP CONFERENCE 2:00 P. M.

Present: National Science Foundation:

Alan T. Waterman
F. J. Callender
F. K. Edmondson
J. M. Mitchell
James Morgan
J. B. Roberts
C. B. Ruttenberg
Raymond J. Seeger
F. C. Sheppard

Associated Universities, Inc.:

Lloyd V. Berkner
Lewis R. Burchill
Richard M. Emberson
Charles F. Dunbar

18. Procedures and Budgets: Berkner and Emberson pointed out that apparently AUI and NSF had not succeeded in working out a proper time schedule for the submission by AUI of financial information. As a result, AUI is always a little late in its presentations, and decisions are made without proper consultation. Berkner expressed the view that part of the trouble was a departure by NSF from the contracting officer concept, on which he laid stress in his letter to Waterman dated October 8, 1956. At that time, both parties agreed on the need for a focal point on each side of the contract. Waterman said that until further notice

Mitchell should be regarded as the contracting officer for NSF. Burchill said that in conference with Shoppard and Roberts in the morning, a time schedule had been worked out, copy of which is attached.

Berkner emphasized the need for a formal presentation by AUI of its proposed budgets. After this presentation, it is also essential that AUI be promptly advised, if and whenever NSF finds it necessary to revise, for purposes of its overall budget, figures submitted by AUI. This would follow internal review of the budgets by AUI's officers and Trustees and the Advisory Committee for Radio Astronomy. He suggested a schedule approximately as follows, to be adhered to in future years:

(a) January: AUI will prepare the final budget for the fiscal year commencing the following July 1, and a preliminary budget for the next fiscal year;

(b) March 1: AUI will submit these budgets to NSF;

(c) May or June: NSF will hold formal hearing on the budgets, at which AUI will present all necessary supporting material. In this connection, AUI will bring up to date all reports, present proposed research programs, and submit figures and justification therefor;

(d) August: Following Congressional action, NSF and AUI should confer in order to work out final plans for the then current fiscal year, and settle the submission to be made by NSF to the Bureau of the Budget for the next fiscal year. Ordinarily, this submission is made in September. AUI should be ready to give all necessary assistance;

(e) January: A mid-year review will be held, resulting in whatever revisions in the financial plans for the current fiscal year may be necessary.

It was agreed that AUI should be kept informed of decisions by NSF as events develop, and that, in turn, AUI should be ready to provide all necessary information and assistance to NSF. Waterman made the point that it is always impossible to make final decisions with respect to the budget to be requested for any fiscal year until the precise amount of the appropriation for the previous fiscal year is known. For example, a budget prepared in the spring of 1957 for FY 1959 may well require revision when the appropriation for FY 1958 is settled.

With respect to FY 1959, it was agreed that a hearing should be held in the near future, if possible before June 30, 1957. (This date was later set for June 28.) The decisions reached at that time should then be reviewed when final Congressional action on FY 1958 is known. With respect to FY 1958, Waterman said the House of Representatives had indicated that NSF would receive \$40,000,000, but that what action will be taken by the Senate is highly uncertain. Burchill pointed out that AUI requested \$1,680,000 for FY 1958, but that the budget submitted to Congress by the Bureau of the Budget contained the figure of \$1,130,000. This change took place without any formal notice to AUI. Berkner emphasized the importance of funding operating budgets a year in advance. Waterman said it might be possible to obligate an additional amount to the contract from FY 1957 funds in order to bring the total capital amount up to \$4,000,000.

19. Financial Plan -- 85-Foot Telescope: The arguments in favor of proceeding immediately with the purchase of an 85-foot telescope were reviewed. Emphasis

was laid on the desirability of starting actual research as soon as possible. Berkner and Emberson pointed out that the 85-foot dish would be needed, whatever developments took place with respect to the 140-foot dish, in order to permit research to begin and to attract a staff. Berkner also pointed out the desirability of starting as soon as possible a study to determine the best type of receiver for the big telescope. This receiver could be used on the 85-foot telescope pending completion of the larger instrument. In discussing the price of an 85-foot telescope, Emberson pointed out that Blaw-Knox was providing such an instrument at the University of Michigan for an erected cost of \$296,000. Savings have developed in the financial plan submitted by AUI for FY 1957 amounting to about \$350,000 -- \$300,000 in installation of electric power, and the balance in operations.

At the conclusion of the discussion, the consensus was that procurement of an 85-foot telescope was desirable, but that no immediate commitment should be made. AUI will proceed with preparations for purchasing this instrument, and the matter will be reviewed by NSF and AUI early in July. NSF will inform AUI of the results of hearings in the Senate which will take place before the middle of June, and it is hoped that the situation will be sufficiently clarified by July 1 to permit final decision.

20. Selection of a Director: In the course of discussion in regard to the 85-foot telescope, the question was raised whether decisions of this sort should be postponed until a director has been selected. AUI's Advisory Committee considers this unnecessary. The consensus of the Committee was that the two large telescopes (85-foot and 140-foot) would be necessary, whatever research programs were undertaken and whoever was chosen director. The Committee also considered that research programs should be selected with a view to augmenting most effectively current programs in the United States or starting new ones. Emberson described the position taken by Dr. Struve to the effect that the observatory should devote itself to basic research in areas not hitherto explored.

21. Site: Plans for the meeting on October 17 were discussed. Emberson said the Advisory Committee had proposed a meeting on October 16 for part of the day and extending invitations to a selected list of astronomers. This meeting will be devoted to discussing the research programs. October 17 will be devoted to a tour of the site and a description of AUI's plans. Emberson hopes to have a master site development plan from Bowman in time for the meeting on the 17th.

The morning discussion on maintenance was reviewed. Ruttenberg is going to explore the possibility of rentals being retained in a revolving fund to provide for maintenance. It may be necessary to turn receipts of this kind over to the Treasury.

There was agreement on AUI's exclusive right to the site, and an exchange of letters on this point may be desirable.

22. FCC Hearings: Emberson reviewed the morning discussion on the FCC hearings, and it was the consensus that these should not be followed in detail. NSF has asked FCC for the right to be heard on frequency allocations in the 1400-1430 band. NSF will also ask FCC for information about any precautions on such allocations.

23. Name: Waterman said the question of a name for the observatory was being considered by a special committee of the National Science Board. Berkner said he favored the name "Carl G. Jansky National Radio Astronomy Observatory" and emphasized the word "National" does not mean "exclusive".

23. Approval of Construction: Emberson pointed out the need for working out some procedure for approval of the construction program. Mitchell said NSF was working on this matter. There is no disagreement between NSF and AUI on the high desirability of fixed-price contracts wherever possible. Mitchell said that NSF had no objection to the work now going forward at Green Bank.

Following the full group meeting, the staff group re-convened briefly. The need for continuing relationships was discussed, and it was agreed that there should be a meeting on the last Friday in each month. The parties will work out an agenda about a week in advance, and minutes will be settled after each meeting. The first meeting will be held on June 28, 1957, and the principal item on the agenda will be the budget for FY 1959.

- Agenda Item 1.1
Including 1.1.1
1.1.2
1.1.3

N.S.F. - A.U.I.
Budget Procedure Calendar

1. January - President's F.Y. 1958 Budget submitted to Congress.
2. February - Congressional hearings on F.Y. 1958 Budget - Based on data furnished Foundation. N.S.F. would probably not require any action by A.U.I. except in special instances to provide committee with specific data or answers.
3. March - (a) Foundation would advise A.U.I. of any congressional action which would directly affect the Radio Astronomy Observatory.
(b) Foundation would request tentative estimates from A.U.I. for F.Y. 1959 Budget. (About March 1st)
(c) On March 31st data requested in (b) above due in Foundation from A.U.I. - this will not be very detailed since data is for inclusion in MP&E budget submission to NSF Board.
4. April & May - (a) 3(a) would continue if necessary.
(b) Discussions of data submitted per 3(b) above between NSF and AUI.
(c) Present tentative budget to NSF Board (May).
5. June 30 - (a) NSF advise AUI of NSF Board action on FY 1959 data also of action of Bureau of Budget (ceiling, etc.) Including estimate of expenditures for the year. A form will be provided for this purpose by the Foundation.
(b) Keep AUI apprised of congressional action on FY 1958 Budget or on appropriation act.
6. July 30 - (a) By July 30 or 30 days from our notice of 5(a) above AUI to submit detailed budget estimates on formal forms provided by NSF with accompanying justification of such items.
(b) Such data and justification will be integrated into MP&E and NSF budget.
7. August & September - (a) Foundation will present to N.B.B. detailed NSF budget. If approved no further action required by AUI. There may be in some instances minor adjustments. NSF will keep AUI advised of developments.

- (b) Budget approved by Board presented to Bureau of the Budget for approval.
8. October & November- (a) NSF will request any additional data from AUI as a result of Bureau of the Budget review. However, if basic detailed data and justification are good will probably not need anything further from AUI.
- (b) If information per 8(a) above is necessary such data will have to be submitted by AUI by November 15th.
9. December - NSF Budget returned to Bureau of the Budget for final approval and inclusion in President's Budget.
10. January - (a) President's FY 1959 Budget submitted to Congress.
- (b) In some few instances it may be necessary for NSF to request from AUI back-up material as the result of Bureau of the Budget's final review (9) above. This information would be used for Congressional hearings also. This action is not likely if we get adequate justification with basic data.
11. February - Begin cycle for F.Y. 1960 budget and hearings on FY 1959 budget.

----- Facility

Budget Authorizations, Expenditures and Balances

	<u>Actual 1957</u>	:	<u>Estimate 1958</u>	:	<u>Estimate 1959</u>
<u>Budget Authorizations Available</u>	:	:	:	:	:
Authorizations	\$ - -	:	\$ - -	:	\$ - -
Balance brought forward:	:	:	:	:	:
Obligated	- -	:	- -	:	- -
Unobligated	- -	:	- -	:	- -
Total authorizations available	- -	:	- -	:	- -
<u>Expenditures and Balances</u>	:	:	:	:	:
Total expenditures	- -	:	- -	:	- -
Balances carried forward:	:	:	:	:	:
Obligated	- -	:	- -	:	- -
Unobligated	- -	:	- -	:	- -
Total expenditures and balances	- -	:	- -	:	- -

OBLIGATIONS BY OBJECT CLASS

Object Class	: FY 1957 Actual :		: FY 1958 Estimate :		: FY 1959 Estimate :		: Increase (+) or	
	: Man		: Man		: Man		: Decrease (-) 59 over 58 :	
	Years	Amount	Years	Amount	Years	Amount	Years	Amount
<u>Operations</u>								
01 Personal Services	--	\$---	--	\$---	--	\$---	--	\$---
02 Travel		---		---		---		---
03 Transportation of things		---		---		---		---
04 Communication services		---		---		---		---
05 Rents and utility services		---		---		---		---
06 Printing and reproduction		---		---		---		---
07 Other contractual services		---		---		---		---
08 Supplies and materials		---		---		---		---
09 Equipment		---		---		---		---
11 Grants, subsidies and contributions		---		---		---		---
15 Taxes and assessments		---		---		---		---
Total obligations for Operations	--	---	--	---	--	---	--	---
<u>Construction</u>								
07 Other contractual services		---		---		---		---
Total Obligations	--	---	--	---	--	---	--	---

SUMMARY OF OBLIGATIONS BY PROGRAM AND PROJECT

	Actual F.Y. 1957	Estimate F.Y. 1958	Estimate F.Y.-1959	Increase (✓) or Decrease (-) 1959 over 1958
<u>Construction</u>				
(Program)				
(Project) _____	\$ _____	\$ _____	\$ _____	\$ _____
(Project) _____	_____	_____	_____	_____
(Project) _____	_____	_____	_____	_____
<u>Total (Program)</u>	_____	_____	_____	_____
(Program)				
(Project) _____	_____	_____	_____	_____
(Project) _____	_____	_____	_____	_____
(Project) _____	_____	_____	_____	_____
<u>Total (Program)</u>	_____	_____	_____	_____
<u>Total Construction</u>	_____	_____	_____	_____
<u>Operations</u>	_____	_____	_____	_____
<u>Operating Expenses</u>	_____	_____	_____	_____
<u>Total Obligations</u>	_____	_____	_____	_____

Comptroller
National Science Foundation
Washington 25, D. C.

Dear Sir:

In accordance with the provisions of Article 8, Contract No. C-50, it is requested that an advance of funds in the amount of \$_____ be forwarded as soon as possible to _____ in order to provide for the continuous operations of the National Radio Astronomy Facility at Green Bank, West Virginia.

This request is based on the following summary statement as of _____:
(Date)

Accrued expenditures to date	\$ - - - - -
Accounts payable	- - - - -
Anticipated expenditures (_____) (current period)	<u>- - - - -</u>
Total requirements	- - - - -
Less total advances to date	<u>- - - - -</u>
Additional advance requested	<u>- - - - -</u>

I certify that the expenditures stated above are as reflected in the accounts and records maintained in accordance with the applicable provisions of the contract.

Controller