

L. R. Bearehill

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Record of Meeting at the National Science Foundation
July 7, 1958

Copy of Agenda attached.

Present: National Science Foundation:

Geoffrey Keller
A. J. Leigh
J. E. Luton
C. B. Ruttenberg
F. C. Sheppard

Associated Universities, Inc.:

L. V. Berkner
F. J. Callender
C. F. Dunbar
R. M. Emberson

1. Budget and Financial Matters

1.1 Status of the Supplemental Request: Luton and Berkner agreed that the hearing before the Thomas Committee on July 3 had gone satisfactorily. Berkner thinks the House will approve about \$4,000,000 and urged NSF to make every effort to have any reduction restored by the Senate. He said he had made clear in his testimony that with the supplemental appropriation it would be possible to provide a complete installation, but that further capital funds would be necessary for the healthy development of the Observatory.

1.2 Authorization to Proceed: Luton said that as soon as favorable action is taken by Congress NSF expected to be in a position to authorize AUI to proceed with the Bliss contract and other work, all within the limits of the contract amount. It was agreed that the form of authorization which Luton presented to the meeting would be satisfactory.

In connection with the commencement of the work by Bliss, Emberson said that Wickes, the Iowa contracting firm, had indicated positively that it would not be interested in bidding on the foundation. Darin & Armstrong has advised Bliss that it can start work on 48-hours notice, and Bliss can start fabricating the telescope almost at once. It has about 65 per cent of the steel already available.

Berkner emphasized that AUI would make no commitments in excess of the contract amount and that once the supplemental appropriation had been received, it would reserve the full amount required for the telescope and use only the balance for the buildings, etc. Bowman will be ready to go out for bids on the Laboratory and the Residence Hall and Cafeteria by the end of July. It probably will be desirable to solicit bids for the entire package as well as for the individual items.

1.3 An FY 1959 Supplement to Provide Advance Funding for Operations: Luton said that under Bureau of the Budget regulations he could not get a request for

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advance funding for operations into the FY 1959 supplemental budget. However, NSF will continue to try to get two-year funding on operations as part of the regular appropriation. Luton does not consider the prospects good. Berkner said he would take the matter up with Dr. Killian and explain the desirability from everybody's point of view of having operating funds two years in advance.

Luton said the NSF Appropriation Bill for FY 1959 has gone to a Conference Committee. The Senate restored the cuts made by the House of Representatives. He thinks the NSF will ultimately get an appropriation of about \$125,000,000, and in his judgment there is a good chance of \$400,000 for NRAO FY 1959 operations.

1.4 The May 1 Submittals by AUI on Estimates of FY 1960-61 Operations and FY 1960 Capital Budgets: Callender said he had told Alger, of the Bureau of the Budget, when the latter was at Green Bank, that the ultimate operating level would be about \$800,000 a year. Berkner's testimony was \$750,000.

As to capital funds for FY 1960, Luton said he was not in a position to engage in any discussion. The matter has been discussed internally at NSF, and he has given Dr. Weaver a copy of AUI's budget request.

2. Site Acquisition and Development

2.1 Acquisition v. Easements: Luton understands AUI wishes to use \$40,000 from the \$80,000 allocated to the easement program to acquire title to more land. Ruttenberg asked whether the original easement program covering a much more extensive area would not be more desirable, particularly in view of the possible unconstitutionality of the West Virginia zoning statute. Berkner said AUI's recommendation was based on careful consideration and consultation with the Corps of Engineers. He is satisfied that the easement program will create local ill will. Callender emphasized the great difficulty of setting a price for the easements and expressed the opinion that in most cases the easements could not be obtained without condemnation. He said one of the property owners in the neighborhood, in particular, was determined to resist the easement program and might even challenge the constitutionality of the statute. Berkner laid stress on the great importance of acquiring the land immediately across the road. This would have the effect of greatly reducing the noise quieting problem. In his judgment, it would be entirely practical to acquire the land without the houses (eight in number), which would have the effect of leaving plots too small for commercial exploitation. Furthermore, AUI's original recommendation had been for the acquisition of some 7,000 acres. Berkner also stressed the potentially controversial character of the easement program, and the fact that the easements would not have the effect of providing a quick and automatic remedy in the event of noise interference. The Observatory would still be dependent on the good will of the individual property owner to permit quieting of the noise producing device.

Keller urged that the course of action be followed which will hold down the number of houses, and thus the number of people, in the immediate vicinity of the Observatory.

Ruttenberg said he would discuss the entire matter with the Corps of Engineers.

2.2 General Policy on Future Acquisition and Other Protective Measures: Ruttenberg asked about the item of \$250,000 for site protection in the budget for

FY 1960. Berkner explained that this was for noise detection equipment, clean-up of noises detected, and the purchase of land. Emberson said that Wolaver, who owns ten acres of land immediately across the road from the entrance, has offered to sell his land at the price he paid for it.

Berkner emphasized AUI's wish to keep some sort of reserve for future contingencies in the matter of acquisition for site protection.

2.3 General Plans for Site Management and Development Outside the Main Road Area: Callender said AUI was developing a long-range program for management of the Green Bank site. He has been in consultation with the Forest and Soil Conservation Services. For the time being he is allowing available land to be used for haying and grazing at rates consistent with local practice. In addition, former owners are being allowed to remain on their property during the growing season. All these arrangements, which cover all but about 200 acres, are for the current year only, and the future program will be conducted in such a way as not to diminish the utility of the site for arrays. Callender presented a memorandum describing the current situation, and a copy of this is attached to this record.

3. Status Reports on Work in Progress

3.1 House Renovation: Callender said renovation of the last house suitable for use has begun and some decorating is still being done in another. When this work is completed, nine houses will be available.

3.2 85' Telescope - including control building and precision indicators: Emberson described a recent visit to Blaw-Knox and the discussions with Messrs. Jackson and Needham. He was accompanied by Heeschen and Small. At their meeting with the Blaw-Knox representatives Emberson and Small emphasized the serious embarrassment to which AUI was being subjected by Blaw-Knox's continued delay in completing and erecting the instrument. The original completion date of July 15, 1958 which was selected by Blaw-Knox, cannot possibly be met, and it is obvious that there will not be a working telescope at Green Bank this summer. This will result in curtailment of visits to the site by prominent scientists and will delay the putting to use of the receivers which are almost completed. The rapid obsolescence of equipment of this kind may mean actual financial loss to AUI. Emberson and Small pointed out the need for a specific proposal for contract modification and said they would expect some provision for liquidated damages in the event of delay in completion beyond October 1, 1958. Blaw-Knox produced a new schedule at the meeting under which shipment of material will begin on July 15 and work by July 21. Emberson expressed the hope that the instrument would be movable, if not operable, by October 15.

Emberson described the discussion with Blaw-Knox over wiring the telescope. There is a potential jurisdictional problem which Blaw-Knox must consider.

3.3 140' Telescope: Emberson stated that Ashton was well satisfied with the drawings prepared by Bliss for the aluminum structure. Invitations for proposals on the drive and control system have gone out, and the last date for receiving proposals is July 31.

3.4 Electrical Power Distribution System: Callender reported that the on-site power distribution system has been completed.

3.5 Works Area: Bids on the Works Area are due on July 14, and will be privately opened at Bowman's office. The complicated alternatives offered to bidders make a public opening undesirable.

3.6 Receiver Procurement: The Airborne Instruments Laboratory's receiver is completed and is undergoing final test. The traveling wave tube receiver is three weeks ahead of schedule and is nearly completed. Findlay is making a simple high frequency receiver for use on the Little Big Horn and to serve as a kind of backstop for the two more complicated instruments.

4. Scientific and Technical Activities

4.1 Attendance at Paris and Moscow Meetings: Drake and Heeschen are going to both the Paris and Moscow meetings. The United States will not have any exhibit at the Moscow meeting, but both Drake and Heeschen will have some photographs available. The model of the 85' Telescope has not been delivered and so cannot be taken to Moscow.

4.2 Electronic Developments: These are described under 3.6.

4.3 Programs Related to Calibration and Standardization: Findlay is setting up instrumentation to carry out a standardization program. The principal piece of equipment will be a horn 120 feet long, with an aperture roughly 15 by 20 feet. It has been necessary to buy 1/8 inch aluminum plate because the necessary plate proved to be unavailable as a surplus item. The estimated cost of the horn is \$6,000; other related costs will bring the total to \$10,000.

4.4 Scientific Visitors: Emberson described the arrangement with Bartlett, who has just graduated from Yale and is being employed at the Observatory during the summer. He will start graduate work in radio astronomy at Yale in the fall. Grote Reber is coming to the Observatory in the latter part of July. Fifty per cent of his salary and all his expenses, including materials, will be borne by Research Corporation. Dr. Hvatum has been offered an appointment for one year. He is a specialist in electronics and will work closely with Findlay and would probably come to Great Britain early in October. The delay in completing the 85' Telescope has necessitated postponement of several visits which had been planned.

4.5 Question of Report on Dr. Heeschen's Visit to Jodrell Bank: Emberson said Berkner did not favor any written report by Heeschen on his visit to Jodrell Bank. Keller argued that a report would be useful in meeting criticism of the cost of the 140' Telescope. The difficulties encountered by the British with the 250' instrument should serve to demonstrate that the 140' Telescope is not over-designed, but merely contains reasonable safety factors. Berkner explained that the principal difficulty with the 250' telescope is the general distortion of the surface. No defects have developed which cannot be corrected, although unquestionably correction would be expensive. However, even in its present condition, the instrument is very useful, particularly at frequencies below 1300 megacycles. Considerably greater gain will be achieved by the 140' Telescope at frequencies over 1300 and up to 10,000 megacycles. Keller suggested that a statement be prepared to the effect that in designing the 140' Telescope careful consideration has been given to the various problems encountered in the erection

and operation of the 250' telescope, and the design is intended to avoid the difficulties which the British have encountered. He proposed that any such statement be marked "Administrative and Confidential."

Berkner described the work done by Dr. Feld in checking anticipated deflections in Ashton's design, and said that Feld's computations were highly satisfactory to AUI and Bliss.

4.6 Jasik Contract: Emberson explained that the horn feed which Dr. Jasik is designing and building for NRAO will be operable at 3 to 4 and at 21 centimeters simultaneously. The feed can be employed effectively with any paraboloid having approximately the same F/D ratio (0.43) as the 85 and 140 foot telescopes.

Luton then brought up the matter of the proposed study by Jasik of an improved type of feed to reduce back lobes. He said the National Science Board had questioned whether financing Jasik's work (either by grant or contract) would not amount to supplementing indirectly the funds provided to AUI under its contract and also whether any commitment to make Jasik's prototype available to AUI had been made. Dr. Eckhart, who was at the Board meeting, erroneously told the Board that there was no commitment to AUI. After the meeting, Luton explained to Dr. Weaver that AUI had called attention to Jasik's work in the first place and that NSF had then asked for a specific proposal, which was forthcoming. The proposal was that Jasik should be financed directly by NSF but that his work should be under the technical supervision of AUI. Dr. Weaver expressed himself as completely satisfied with the situation and said he would have voted for approval even if this information has been given to the Board. Under these circumstances, Luton considers there is no objection to going ahead with the contract with Jasik, and will urge Dr. Waterman to act accordingly.

Berkner made the following points:

- (1) AUI first raised the question of supporting Jasik's work because it wished to encourage development of this sort for the benefit of radio astronomy in general. AUI offered to contract direct with Jasik or to provide consulting services in connection with a contract between NSF and Jasik.
- (2) Development of feeds is highly desirable. Dr. Menzel, in particular, has urged the start of work to increase the capacity of receivers.
- (3) Berkner himself talked with Jasik, and the latter agreed to make a specific proposal for work designed to help all existing instruments, and which if successful will be highly important to radar reception as well as to radio astronomy.
- (4) The purpose of the arrangement with Jasik was not to supplement the AUI contract by indirect means. AUI offered to handle the matter in whatever way NSF wished.
- (5) If necessary, AUI will buy the first model of Jasik's feed when it is completed.

5. Schedule of Future Activities

5.1 Next AUI-NSF Staff Meeting: No date was set for the next AUI-NSF meeting.

5.2 NRAC Advisory Committee - October 15: Berkner described the plans for meetings at Green Bank in mid-October. The Radio Astronomy Advisory Committee will meet on October 15. The next day the Committee and the AUI Trustees will inspect the site, and hold an informal dedication of the 85' Telescope. NSF will be invited to send representatives. On October 17, the Board of Trustees will hold the annual meeting of the corporation.

Accepted on behalf of
National Science Foundation

Prepared and submitted on behalf of
Associated Universities, Inc.

1/s/ J. C. Lorton

Date: Sept. 15, 1958

1/s/ Charles F. Dunbar
Charles F. Dunbar, Secretary

Date: July 29, 1958

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NATIONAL RADIO ASTRONOMY OBSERVATORY
Post Office Box 2
Green Bank, West Virginia

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June 13, 1958

MEMORANDUM TO: LLOYD V. BERKNER

SUBJECT: FARM MANAGEMENT PROGRAM FOR 1958

As you know, I am currently conducting a study, with the assistance and advice of the County Agricultural Agent, the County Conservation Agent and the Forest Service, which will lead to recommendations for a long range program of site development and management. This report with its recommendations should be completed sometime late this summer or early fall. In the meantime I have proceeded to make interim arrangements for a temporary program of farm management during the current year.

The Observatory site includes approximately 2,650 acres of meadow, pasture and timber land. Of this total it is estimated that approximately 1,000 acres is in timber with the balance in meadow and pasture land. The quality of the meadow and pasture ranges all the way from very good to mediocre or poor. There is probably about 400 acres of good meadow land, 800 acres of good to mediocre pasture, and about 400 acres of poor pasture and scrub land.

Of the 2,650 acres involved approximately 500 acres is being farmed by former land holders who are still in residence. These land holders are, by name, the Lamberts, the Lowes, the Arbogasts and the Browns. In the case of the Lamberts and the Lowes their land is in condemnation and they have not as yet received any funds toward the purchase price of the properties. The condemnation hearings will open in Green Bank on June 23, 1958 and it is assumed that sometime during the summer the final judgments will be handed down and the monies involved paid to the owners. As soon as this occurs I will see that notice is served on the Lamberts and Lowes that they must vacate at the end of the present growing season. I will not ask them to vacate sooner since they make their livelihood from the land and, even though they will have been paid, it is fundamental that the money will do them no good in the middle of the season. In the case of the Arbogasts, which is also going to condemnation, you will remember we have always agreed to grant Mrs. Rachel Arbogast a life estate. Usually reliable sources report that she has never looked healthier. The Browns, of course, have always been one of our major problems. I usually chat with them about once a month, and it is my understanding that they plan to move into a home in Green Bank proper in the late summer or early fall. We will, of course, if they so desire, honor our previous commitment to them permitting them to stay in their home for a maximum of two years, dating from 1 July, 1957.

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Most of the 500 acres described above is in pasture and meadow land. This subtracted from the total leaves a balance of approximately 2,200 acres in total comprising about 1,000 acres of timber and 1,200 acres of meadow and pasture. It is this latter acreage which I have been immediately concerned with during the current growing season. Conceptually, I have approached our interim program with the following objectives in mind (1) to maintain the property in approximately its present state without allowing it to grow back to brush and without spending any of our appropriated funds in the process (2) to achieve a modest but reasonable income from such arrangements as I may be able to negotiate in accordance with local agricultural practices (3) to better our relations with the local community and the former land holders. To achieve these objectives I have tried to establish arrangements and rates which are acceptable and reasonable and have in each case first offered the use of the land to the former property owners. It should be noted that these arrangements will start on July 1, 1958 and continue for the remainder of the 1958 growing season with no commitment expressed or implied to renew the arrangement in 1959. All of the people involved know that we are in the process of developing a long range program and are willing to accept the present arrangement as a one-time deal only.

As a result of our efforts the situation to date is as follows:

Incumbents	500 acres
Firm agreements to lease or rent	1,500 acres
Probable agreements to lease or rent	400 acres
Balance	<u>250</u> acres
Total	2,650 acres

The agreements to lease or rent will involve grazing or haying only. I would estimate that the probable income from these arrangements during the 4-1/2 months remaining in the growing season will be not less than \$1,000.00 and not more than \$2,000.00. The rental rates and the manner in which they were established is described in the following paragraphs:

GRAZING

The grazing rates I have established are as follows:

Cow and Calf	\$2.00 a month
Cow	\$1.50 a month
Yearling	\$1.00 a month
Sheep (lambs are counted as sheep)	\$.25 a month

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The above rates were established on the basis of information provided by the supervisor of the Monongahela National Forest. Fortunately, in April of this year the Forest undertook a study of their own grazing rates and experience, and the grazing arrangements by private persons in the area. The results of this study were made available to me by the Supervisor in a letter of May 7, 1958. In order that you may make your own comparisons of the above rates with the Forest Service and local practice the following information is provided:

	<u>FOREST SERVICE</u>	<u>AVERAGE LOCAL RATE</u>
	<u>Rate</u>	<u>Rate</u>
Cow & Calf	\$1.05	\$2.38
Cow	\$1.05	\$2.05
Yearling	\$1.05	\$1.69
Sheep	\$.13	\$.40

As you will see the rates established for the Observatory for this year fall more or less half-way between the Forest Service rates and the average local rates. In way of explanation you should be aware of the fact that the Forest Service rates quoted above are for their best pasture and meadow. The rates are much lower in the poorer pasture and forest land. I, of course, have no intention of renting our good pasture and meadow for sheep grazing. Also it may be of interest to note that in the Forest Service Report there was recommended to the Regional Forester a new set of rates which would be higher than their present ones but still slightly lower than the ones I have established for the Observatory. Incidentally, the Service recommends that it takes 3 acres of the best grass to support a cow, 5 acres of good grass and 7 acres of poor grass. On this schedule it would mean that if we grazed the entire site we could support at any given time about 350 head. This at an average of \$1.50 a head would bring an income of \$525.00 a month or approximately \$3,000 a season. As one final item people to whom we are renting land for grazing purposes must salt and care for their stock, maintain fences, keep the pastures cut where necessary, etc.

HAYING

The local practice for making hay is a 50-50 proposition; the property owner gets one bale and the person making the hay gets one bale. Where a baler is not used it is more or less on a stack basis. In many instances hay is stored on the land and disposed or sold at a later date. For this season I am making arrangements on the haying to have the crop shared on a two to one basis; one bale being the Observatory's and two going to the person making the hay provided

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however that the person making the hay must dispose of the entire crop and pay to the Observatory an amount determined by the local market rate. In other words he can sell it for the Observatory or buy it himself from the Observatory. Since some of the former land owners who have bought new farms are very much in need of a hay crop this year most of them are interested in this arrangement. However many of them do not themselves have the equipment to make the hay. They must therefore in turn make arrangements with someone else to make their hay for them. Under the above described arrangement therefore in these instances one bale goes to the person making the hay, one bale goes to the former property owner, and one bale goes to the Observatory. Speaking honestly I must admit that this arrangement is probably a generous one. However, I do not have the time to haggle, I think it would be a mistake to do so at this time, and I want to get the hay off the place.

As one final bit of information there were last year probably 100 acres of corn planted and harvested on the Observatory site by the various owners. In accordance with sound land management and the advice of the County Conservation Agent this land should be sowed back in grass and grain this year. I have therefore agreed that if the former land holder and/or renter will sow such acreage in accordance with a satisfactory seed mixture recommended by the Conservation Agent he may have the first crop.

/s/ F. J. Callender
Business Manager
National Radio Astronomy
Observatory

FJC:mi

cc: Dr. Emberson
Mr. Burchill
Mr. Dunbar

AGENDA

AUI-NSF Staff Meeting
Washington, D. C.

July 7, 1958

1. Budget and Financial Matters
 - 1.1 Status of the supplemental request - hearings, ARPA support, estimated date of action
 - 1.2 Authorization to proceed - BOB and NSF position; AUI ready on \$2.6 Million
 - 1.3 An FY 1959 Supplement to provide advance funding for operations
 - 1.4 The May 1 submittals by AUI on estimates of FY 1960-61 operations and FY 1960 capital budgets

 2. Site Acquisition and Development
 - 2.1 Acquisition vs easements
 - 2.2 General policy on future acquisition and other protective measures
 - 2.3 General plans for site management and development outside the main road areas

 3. Status Reports on Work in Progress
 - 3.1 House renovation
 - 3.2 85-foot Telescope - including control building and precision indicators
 - 3.3 140-foot Telescope
 - 3.4 Electrical power distribution system
 - 3.5 Works Area
 - 3.6 Receiver procurement

 4. Scientific and Technical Activities
 - 4.1 Attendance at Paris and Moscow meetings
 - 4.2 Electronic developments
 - 4.3 Programs related to calibration and standardization
 - 4.4 Scientific visitors
 - 4.5 Question of report on Dr. Heeschen's visit to Jodrell Bank
 - 4.6 Jasik Contract

 5. Schedule of Future Activities
 - 5.1 Next AUI-NSF staff meeting
 - 5.2 NRAO Advisory Committee - October 15
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