

ASSOCIATED UNIVERSITIES, INC.

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NEW YORK 1, NEW YORK

LONGACRE 5-0460

January 16, 1956

MEMO FOR RADIO ASTRONOMY FILE - Site Survey

FROM: R. M. Euberson *RME*

SUBJECT: Inspection of Green Bank, West Virginia Site on January 11-12, 1956

1. Those participating were:

- B. J. Bok (and Mrs. Bok) - Harvard College Observatory
- A. Doalittle - Eggers & Higgins
- R. M. Euberson - Associated Universities, Inc.
- D. S. Neesehan - Harvard College Observatory

2. By prior arrangement, Doalittle, Euberson and Neesehan met in Washington on the evening of Tuesday, January 10, and the next morning proceeded westward (in a rented car). The Boks were to have met them at Hinton, West Virginia, but a telegram advised of delays because of ice and fog and proposed meeting at Hinton the evening of January 11. Accordingly, the route from Washington was via Rte. #211 to New Market, #11 to Harrisonburg, #42 to Churchville, and #220 and #429 (shown as #272 on Geological Survey map) to Deerfield, Virginia (Site #28). The distance from Washington was 160 miles.

3. The inspection at #28 was a short trip down the road toward Marble Valley. Measurements were made of the elevation of the horizon at two points: (1) at the 90° bend in the Marble Valley Road, about one mile southeast of Deerfield; and (2) on Route 429 at 2.7 miles northeast of Deerfield.

Horizon Elevation (in degrees)

	Position (1)	Position (2)
S	1 1/2	1 1/2 (highest point)
SW	4 (close by)	-- (less than 1/2 on either side)
W	3	-- (very close by)
NW	2	-- (very close by)
N	1 1/2	
NE	3 (close by)	
E	3	
SE	2	

MEMO FOR RADIO ASTRONOMY FILE - Site Survey

Page 2

January 16, 1956

The small, close-by rises indicated above would not introduce problems for positions off the paved road. The general conclusion was that the area was quite usable. No count was made of houses and other buildings, but a wood and concrete-block school building was noticed.

4. From Deerfield we proceeded to Green Bank, West Virginia on Routes #250 and #28 (note: Deerfield is 9 miles southwest of Route #250 on #629). The distance from Washington to the Green Bank area is 211 miles via the above routes, but excluding the side trip to Deerfield.
5. We made a count of all houses, stores, churches, or other buildings (not barns, garages, sheds) symbolic of human activities lying in the triangular valley at Green Bank. A rough plot on an enlargement of the area (prepared by Eggers and Higgins) showed 107 such buildings. A count that extended a little further down the road toward Cass, southeastward from Green Bank, and north along Route #28 came to 125 buildings. After touring the many side roads, we concluded that the existing Geological Survey map indicated only the general features and could not be relied on for detailed contours. We then proceeded on to Elkins, via Routes #250 and #219, the distance from Green Bank being 53 miles.
6. The Beks joined the group at Elkins. On Thursday morning, Jan. 12, we returned to Green Bank and retraced most of the side road explorations of the previous day. (Dr. Bek documented his visit with some map shots.) Careful consideration was given to the placement of large radio telescopes, flat arrays, laboratory and service buildings, having in mind a need for a "working control" over the entire valley, but a minimum disruption of existing private activities. These matters were discussed on the return trip to Elkins, where the following conclusions were made (coordinates are the grid prepared by E & H):

140-foot radio telescopes at N-J/6-7, on flat land at least 50 feet above Bear Creek.

50-foot radio telescopes at N-J/8-9, on flat land about 50 feet above the 140-ft. placement. This would mean that the two telescopes could be lined-up east and west about 2000 feet apart, with the centers of the two reflectors on a horizontal line.

January 16, 1956

Central Building and 25-foot radio telescope at G/9-10. This position is at the same elevation as the 60-foot placement. It is about 1000 feet from Route 28.

Riceal Power and Maintenance at G-11/10-11. This part of the development would be close to Route 28 for ease of access with a minimum of disturbance to the remainder of the site.

Housing and Cafeteria at F/10, essentially on Route #28, just northwest of the existing church building. This is at the same elevation as the central building and about 1000 feet south. As the activities here would be under our control, no serious difficulties with the 25-foot telescope would be anticipated.

Right-of-Way Parking at E/8. This placement would require a minimum of work. It is at the same level as the 140-foot telescope and about 2000 feet south of the 60-foot placement (to obtain more shielding, the provisions for casual visitors could be located in the lower area parallel to Route #28 and extending from D/8 to E-F/10. This development would require a short road from Green Bank, parallel to #28, re-entering at about the housing and cafeteria building. The North Fork valley is 25-30 feet below the level of Route #28).

Areas in the area from D to H/3 to 8. The available map shows a variation of about 50 feet over this area.

600-foot radio telescope at G/4, on flat land about 50 feet above Deer Creek, 50 feet below the 140-foot placement and 100 feet below the Central Building placement. Note that the 600-foot and 25-foot telescopes would be on an east-west line with almost 5000-ft. separation. In this position, the 600-ft. telescope would rise 12° above the southwest horizon of the 140-ft. telescope.

200-300-foot radio telescope at L-4/9, or as an alternative at G/11-10. The second placement would have this telescope and the 600-ft. telescope on an east-west line with about 7,000-ft. separation; there would be the disadvantage that the 2-300 ft. telescope would be on the east side of Route #28 with all the other site development on the west side.

7. It will be noted that the above site development does not require a bridge across Deer Creek. Full advantage is taken of a 100-ft. rising at D/6-7 to shield Green Bank from the site; Arbervale lies to the east, northeast of all observing stations except the 2-300 ft. telescope. A general rule is applied that the larger the instrument the further it is placed from the road and other activities.

MEMO FOR RADIO ASTRONOMY FILE - Site Survey
Page 4
January 14, 1956

8. The following distances, provided by the Forest Service at
Elihu, are of interest concerning equal access to Green
Bank from existing and possible future institutions interested
in radio astronomy:

New York	414	miles
Philadelphia	335	
Baltimore	236	
Washington	207	
Richmond	211	
Louisville	444	
Cincinnati	346	
Columbus	304	
Chicago	391	
Detroit	442	
Cleveland	266	
Pittsburgh	148	

cc: B. J. Bok
A. Dealittle
C. F. Danbar
D. S. Hoegshan