

BELL TELEPHONE LABORATORIES  
INCORPORATED

SUBJECT: The Jansky Antenna Replica  
at Green Bank, W. Va.  
Case - 22098

DATE: October 3, 1966  
FROM: A. C. Beck  
MM-66-1261-2

MEMORANDUM FOR FILE

On April 15, 1960, Grote Reber wrote a letter to George C. Southworth saying, "It would be suitable and appropriate to have a replica of Jansky's original antenna to full scale" at the National Radio Astronomy Observatory in Green Bank, West Virginia. A copy of this letter is attached to this memorandum as Fig. 1. Southworth called me the day he received the letter, and later sent it to me. He answered Grote Reber the next day, saying that I had agreed to go through Jansky's records and other sources to find out as much as possible about the original antenna.

Most of the records were readily available to me, for I had looked up much of the background material on which Southworth's paper about Jansky's work entitled "Early History of Radio Astronomy" was based. In addition, I had used Jansky's rotating array structure for a number of antenna measurement projects, and was quite familiar with its construction, as I had made numerous alterations and additions during this work. C. P. Clausen had been responsible for its original erection.

at Holmdel after its move from Cliffwood, and had made alterations on it later for me and for other members of staff. We think its last use was for testing an early warning radar antenna during the war by W. D. Lewis.

Written records proved to be scarce. Jansky's notebooks contained only diary type entries, samples of which are shown on Fig. 2, but these were sometimes helpful. Progress Reports helped with dates, but told little about antenna details. The notebook referred to "drawing up plans for the array". Investigation showed that shop sketches were not returned to staff members at that time, but were bound in covers and retained. The old ones were located in the attic, but there were only four sheets that had any connection with this antenna. Copies of these sheets are attached as Figs. 3, 4, 5 and 6. They had some dimensions, so helped considerably. Array element sizes and lengths could be found from some notebook entries, a knowledge of the design and operating wavelengths, and some information still in existence about other Bruce arrays. A small amount of information was found in Jansky's publications, particularly "Directional Studies of Atmosphericics at High Frequencies". Perhaps the most useful information was available from two photographs. One was used in his original publications, and is attached as Fig. 7. Another was the famous one that has been used and published in many places. It was taken by a

commercial photographer, Jake Eickenbush of Newark, N. J., on June 6, 1933, for publication in an article about the Holmdel Laboratory in the July 1933 issue of "New Jersey Bell" magazine. A copy is attached as Fig. 8.

When it became evident that there was enough information to prepare drawings, the matter was discussed with the publication department. They contacted the National Observatory people, and consideration began to be given to having the Laboratories construct and donate a replica. As a result, on July 19, 1960, A. R. Thompson and I made a visit to the Green Bank Observatory. Grote Reber was there on that day, and we had a very interesting time discussing the possibilities of erecting a replica, what parts were available, how much of the work they could do, and other details. After this, A. R. Thompson wrote a memorandum proposing that the antenna be built by us and presented to the Observatory.

Drawings for the replica project were prepared by S. J. Bennett as information was found or worked out. His thorough study of all the source material, discussions with people who knew about the antenna, and determination of details from the photographs, made a large contribution to this project. The complete set of these drawings is attached to this memorandum, and listed on the summary sheet.

The antenna replica was then constructed at Crawford Hill by our carpenter shop under the personal supervision of

C. P. Clausen, whose background of experience and knowledge of the original antenna contributed greatly to this undertaking. No parts of the original antenna were found, although a diligent search was made, except the main gear reducer on the motor drive. This was used on the replica.

A number of old Ford Model T wheels and axles had been obtained personally by Grote Reber for such an antenna. They were stored in New Jersey, and he donated them for use on this structure. We got them from storage, and installed them on the framework.

Every effort was made in the construction of this replica to ensure the longest possible life. The best available materials were used, such as Wolmanized lumber, extra heavy galvanizing on steel parts, many brass and bronze fittings, teflon as well as glass curtain insulators, and weatherproofing of the drive mechanism. Although some materials are slightly different from the original for this reason, care was taken to make this an accurate and true replica of the original in all other respects.

Since it had to be taken apart and shipped to Green Bank in "kit form", markings on the parts together with detailed assembly drawings and photographs were provided to facilitate reassembly by Observatory personnel. These photographs, as well as the drawings, are also attached to this memorandum as Figs. 9-15, inclusive.

After its first assembly here, the replica was dismantled, and then shipped to Green Bank on November 12, 1963. It was reassembled on a new circular track near the main entrance by the Observatory staff, where it is capable of rotation at the same rate Jansky used. I stopped at Green Bank later on a vacation trip, and discussed details with them. The installation there is very well done, and is flood lighted at night, as is Reber's original antenna, making it quite spectacular. A bronze plaque on a monument near the structure gives pertinent data and the fact that it is a gift from Bell Telephone Laboratories, Inc. A photograph of the final installation at Green Bank is attached as Fig. 16.

Formal presentation to Associated Universities was made with fitting ceremonies by W. O. Baker during a visit to Green Bank by the National Science Board on March 17, 1966.



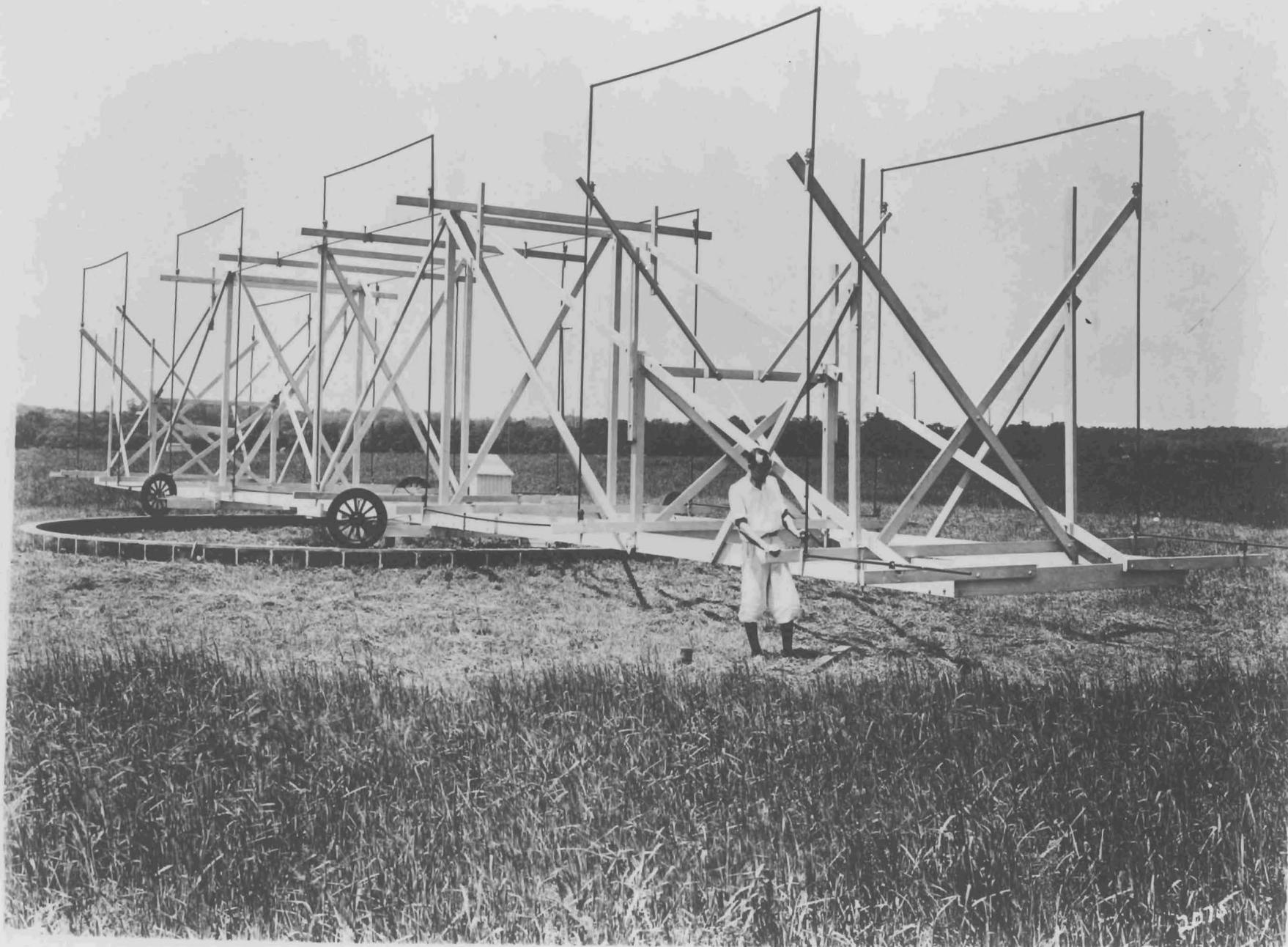
A. C. BECK

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Att.

Figure Captions w/Photo Numbers  
Figures 1 - 16 inc.  
Drawing List  
Drawings 23

*Only figure 8*



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FIG. 8