# RADIO TELESCOPE AT JODRELL BANK EXPERIMENTAL STATION, UNIVERSITY OF MANCHESTER

ON June 10, representatives of the Press and others assembled at the Jodrell Bank Experimental Station of the University of Manchester to inspect the progress on the erection of the radio telescope. The reasons for building the telescope, which is sponsored jointly by the Department of Scientific and Industrial Research and the Nuffield Foundation, were explained by Prof. A. C. B. Lovell, and the engineering consultant, Mr. H. C. Husband of Sheffield, described some of the engineering problems. The essential feature of the telescope is a 250-ft. diameter steel bowl, paraboloidal in shape, 62·5 ft. deep at the focus. This is to be covered with a reflecting screen of 1 inch square mesh. This main bowl, weighing 600 tons, will be carried on two towers so as to pivot on a horizontal axis 180 ft. above ground. The drive for the elevation movement will be by 100-h.p. metadyne motors through 27-ft. tracks which were originally in the battleship *Royal Sovereign*. The two towers are each mounted on six bogies which move on a circular railway track. The bases of the towers are connected by a cross girder to the central pivot. The azimuth motion is obtained by an electrical drive from four of the bogies.

The foundations were completed by the end of 1953. They consist of a concrete ring supported on reinforced piles sunk to the keuper marl (in places up to 90 ft. below ground-level), which carries the 17-ft. gauge double railway track of diameter 350 ft. This railway track, which has to carry a superstructure weighing 1,500 tons, is level to $\frac{1}{8}$ inch, and in order to provide the necessary stability nearly 5,000 tons of steel and concrete have been used in the foundations. The central pivot, which is already in position, is carried on similar deep foundations. A sample of the twelve bogies on which the main steel framework is to be carried was also available for inspection. At the time of the visit, a 120-ft. crane mounted on 60-ft. gabbards was erecting the first of the main 15-ton 120-ft. jib cranes on 120-ft. gabbards, two of which are required to erect the telescope itself. The erection of the steelwork is expected to begin this month and to be largely complete by the end of the year. It is anticipated that the radio telescope will be finished in 1955.

The radio telescope was also discussed by Prof. Lovell in a Friday evening discourse at the Royal Institution on May 21. The need for such a large instrument arose from the desire to obtain high power gain and directivity in the investigation of the radio waves from space. In this the requirements are analogous to those of conventional telescopes. The significant advances in the study of the universe have been made through the medium of large telescopes. Successive increases in aperture, culminating in the great 200-in. on Mt. Palomar, have given more resolving power and more light-gathering power, thereby enabling more distant regions of the universe to be explored. The analogy in radio astronomy is very close; but since the wave-lengths are a million times longer than light, the radio telescopes have to be of far greater size than their optical counterparts. Prof. Lovell described how the new radio telescope would be used for investigating the extra-terrestrial sources of radio noise, or radio stars, so few of which have so far been identified with visible objects. Demonstrations were also given of the use of the radio telescope in the study of meteors, the moon, and of the complex relationships between events on the sun and the disturbances in the earth's ionosphere.

# METHODS OF LAND-CLEARANCE FOR AGRICULTURE

ON April 20 a meeting arranged by the Agriculture Group of the Society of Chemical Industry was held at the Royal College of Science, London, to discuss the large-scale clearing of forests. Unfortunately, three out of the five speakers named on the programme were unavoidably absent; the subject-matter of two papers, however (those of R. H. Gunn and A. McBride), was incorporated by Dr. A. H. Bunting, of Tozi Research Farm, Singa, Sudan, into a joint paper entitled "A Review of Methods of Land Clearing".

Dr. Bunting began by pointing out that in many regions of the world land-clearing has always been a fundamental component of agricultural systems and is an integral part of the system of shifting cultivation still widely employed by primitive communities who grow their crops on patches where the bush or forest has first been cut down or burnt. In many tropical areas the nutrient status of the soil is so low that, under the existing conditions of management, only one or two crops can be taken from the cleared area, which is then abandoned and soon becomes covered by vegetation consisting in the main of regrowth from the roots and stumps of the cut woody plants. It is accepted that burning of the cut vegetation before cultivation gives rise to increased yields. The nutrient value of the ash is probably only one of several factors involved. Dr. Bunting stressed the need for further analysis of the function of bush fallow in restoring productivity. Recent work in the Sudan suggests that a type of erosion described as 'surface wash' of the exposed soil may be one reason for the rapid decline in productivity of tropical soils after the bush canopy has been removed. Under these conditions, the top few inches of the soil which may contain the bulk of the accumulated fertility can be washed away.

Modern methods of farming often demand a different type of clearing, involving the complete and large-scale removal of stumps and roots of the existing trees and bushes. Such large-scale clearance schemes are likely to include the following phases: survey of the area by aerial photography and ground observations, followed by the preparation of detailed soil and vegetation maps; production of a land utilization and conservation policy and construction of access roads and labour camps; cutting of the vegetation; disposal of debris; removal and disposal of stumps; and installation of soil conservation works.