DEDICATION REMARKS

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Dedication of University of Illinois Radio Telescope Facility

Danville, Illinois

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Dr. Henry, Lieutenant-Governor Shapiro, Mr. Clement and members of the University Board of Trustees, Mr. Bentley and members of the Danville Chamber of Commerce who provided the excellent lunch we have just enjoyed, and other distinguished officials and guests, I am happy to be here on an occasion which honors not only the University and State of Illinois and the Navy but also the community of Danville.

I regret that a prior commitment prevented Admiral Coates, the Chief of Naval Research, from being here on this memorable day. Today we dedicate an instrument that is unique in the world at the present time. This giant radio telescope facility will permit us to investigate far distant extra-galactic radio sources that may well provide us with startling new data on the origin and basic structure of the universe.

This installation, which we will visit a little later, is the first of its kind to go on the air. Another unusual distinction is that the huge antenna has been constructed largely by ordinary road-building machinery. Rather than the usual parabolic dish we have a parabolic-shaped cylinder or trough, 600 feet long and 400 feet wide, scooped out of a natural creek valley where quiet surroundings can be assured. The valley had to be properly contoured to provide the dimensions for the reflector. Over a covering of heavy asphalt roofing material was placed a wire-mesh screen to serve as the actual reflection surface.

In a major engineering achievement, tolerances were held to two inches, thereby permitting the planned operating frequency of 600 megacycles to be attained. Four wooden framework towers 155 feet high support a long north-south catwalk above the focal axis of the cylinder. Along this axis are placed 275 conical helical dipole antennas which serve as the receiving elements. These can be phased so as to deflect the antenna beam through the range of 10 to 70 degrees in declination. Thus, even though the huge reflector is fixed and non-steerable, some degree of flexibility in aiming it is provided. Basically, however, the rotation of the earth will be the principal guiding mechanism as this instrument probes into areas of the universe more remote than ever before penetrated. This could reveal information that may shed light, for example, on the long-standing controversy between the cosmological theories of the expanding universe and the steady-state universe.

Much credit for this project must go to Professor G. C. McVittie of the Department of Astronomy of the University of Illinois, who conceived this massive effort in radio astronomy several years ago. His dedication and dynamic enthusiasm have sparked this project from the start. His dogged determination in overcoming the number of frustrating obstacles that can be expected in designing and constructing such an unusual installation has been the prime factor in achieving the success we will see today. Working closely with him and making a number of critical decisions was Professor George Swanson of the Electrical Engineering Department, who was responsible for the antenna and system design and will now be in charge of operating the facility. Such a team, which symbolizes the new alliance of the theoretical scientist with the highly skilled, imaginative engineer, could not be denied.

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The Illinois telescope is the fourth Navy-sponsored radio telescope to be placed in operation within the past three years of which this is by far the largest. These instruments form an integrated part of the Office of Naval Research contract radio astronomy program. Each is specifically designed with special capabilities so that there is little, if any, wasteful duplication.

ONR's contract-research program in radio astronomy represents a very important part of the United States effort in this field. The program achieves such stature not only because of its magnitude and because of the fine facilities, such as at Danville, that we apply to it but also due to the careful planning of the type and scope of the investigations underway. Where possible, each study is enhanced by the complementary and supplementary effects of other studies in the program.

The radio astronomy program obtains for the Navy a great deal of valuable knowledge not only in astronomy but in many fields not directly related to it. For example, it has brought about the development of improved electronic instrumentation so important to advanced navigation and time-keeping systems. The requirements of advanced radio telescopes have led to the exploitation of highly sensitive receivers, such as masers and parametric amplifiers, and to the full development of the passive radiometer -- devices which have obvious applications outside radio astronomy.

There has been a definite contribution to the nation's space effort. The new knowledge gained of the dusty lunar surface, the high "greenhouse" temperatures of Venus, and the intense Van Allen-type radiation belt around the planet Jupiter was bought at little expense compared with the awesome sums spent on space probes and other space projects. Some of the knowledge gained through radio astronomy may already be saving the lives of future pioneering astronauts -- by pointing the way to the possible prediction of solar flares, which periodically send deadly radiation far into space.

But the primary purpose of the program is the quest for knowledge about our universe--without particular regard to its applications. We will aim our telescopes at the sun, moon, and the planets of our solar system. We will explore our galaxy with its billions of stars and its spiral arms of hydrogen, studying the history of new star formation and the cataclysms of supernovae or exploding stars, the most gigantic thermonuclear explosion the universe can ever experience. Finally, we will search the extreme depths of space among the most distant galaxies that our instruments can detect, far beyond the limits of terrestrial visual instruments and an area that can never be reached by earth space travelers according to our present knowledge of physical laws.

Out of these basic studies will come important new information of benefit to all mankind. The University of Illinois radio telescope at the Danville site is destined to play a major role in the gathering of this new knowledge for some time to come. In fact, its magnitude and careful design is a guarantee that it will have a long and useful life. Further, we will see the name of Danville become a standard of high scientific achievement throughout the scientific community and the nation.

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