

## RADIO ASTRONOMY

The vastness and majesty of the heavens have intrigued and inspired man since the fall of Adam. This is as true today as it has been for thousands of years. Science, particularly in the past decade or so, has ripped away the mask of mystery from many of nature's secrets and the romance that went with them.

Astronomy, as the oldest of the sciences, has probed the heavens the longest and dispelled the most myths. Yet in spite of its age and its progress, astronomy has barely scratched the edges of the heavens.

This came to light in a striking manner relatively recently with the birth of "new science" called radio astronomy. It was conceived accidentally about 1932 by a radio engineer at the Bell Telephone Laboratories, one Karl G. Jansky, while he was working with a rotating antenna to determine the direction of arrival of static on the short waves.

In the absence of accountable static, Jansky found a small amount coming from a fixed direction in space which coincided with the center of our galaxy. Another radio engineer, Grote Reber, picked up the work by building the first radio telescope in the backyard of his home at Wheaton, Ill., and making the first systematic survey of radio waves from the heavens.

After World War II, this unique field became quite populated, especially in England and Australia. Now, at Ohio State University, this science is being given a high priority, thanks to the initiative and skill of one of the leading men in the field, John D. Kraus.

Kraus, who has designed short-wave and television antennas in use all over the world, developed a keen interest in radio astronomy. In 1951, he began construction of an antenna which today consists of 96 helices (spiral

in form) mounted on a steel framework 160 by 22 feet and pivots on an east-west axis.

With this giant radio telescope, Kraus and his crew have received signals from Cygnus A, which is two entire galaxies in collision at a distance of 200 million light years. A light year, you know, is the distance which light can travel in a year's time.

The speed of light is about 186,000 miles per second. A bit of simple multiplication informs us that light, then, covers six-trillion miles--give or take a few billions--in one year.

The stars picked up by the giant radio telescope were a mere 200 million light years away. Some more simple (?) multiplication gives us this figure--200 plus six sets of triple zeros!

Kraus is now building what he calls a super telescope measuring 2,000 feet across and 200 feet high. He's doing this on the theory that the much needed improvements in this new science can be made only the larger antennas. This one will have a range greater than any instrument yet devised.

The giant radio telescope (the one with only 96 helices) made possible a map of the sky which is the most detailed radio "photograph" of the sky of any yet made. It is classed as one of the 10 top astronomical highlights of 1954.

Now, what does all this mean. At present, the answer can only be inferred from what we already know.

To astronomy man owes his calendar and his method of keeping time. The fundamental laws of mechanics are founded on Newton's studies of the motions of the planets. The earth itself has been explored and mapped with the aid of celestial navigation. Even the principles of relativity and nuclear physics were conceived in astronomical considerations.

The answer, on the other hand, may just be additions to man's storehouse of information. Astronomy has proved to us that the earth, as one time believed, is not the center of the solar system. The sun is not the center of our galaxy but instead is near its periphery. The earth, we've learned, is just a grain of sand on a beach with no apparent end.

Yet, thanks to men like Galileo with his optical telescope, to countless succeeding "Galileos" and their observatories throughout the world, and to the modern "radio astronomers" you and we are learning, with deadly definiteness, that behind the vastness and complexity of the heavens there is an order, a unity that confirms a Master Plan.

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