

Grote Reber: Yesterday and Today

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THE LIVING LEGEND of Grote Reber is summed up by John Kraus of Ohio State University: "He was the right person doing the right thing in the right place at the right time." For nearly a decade Reber was the world's only radio astronomer.

HISTORICAL VIGNETTES

As Reber tells it, before deciding to build his 31-foot telescope (see preceding article) he wrote to all the "top astronomers in America." He suggested that they do the job and said he would deal with the necessary instrumentation. But nobody was interested. "They all turned me down," says Reber, "so I did it myself."

Why did Reber alone follow up Karl Jansky's seminal work — and why didn't professional astronomers take up the challenge? As Reber puts it, radio astronomy was so unfashionable in the 1930's and 1940's that the field was left to people like himself with little or no astronomical training, and later to scientific iconoclasts outside the mainstream. Reber had taken only a couple of courses in astronomy but, as he jokes, "I knew *immensely* more about astronomy than the astronomers knew about electrical engineering."

Why hadn't Jansky followed up his own work, especially after he learned of Reber's success? Reber recalls a dinner in Washington, D. C., just after World War II. Jansky told him of a proposal for a 100-foot dish for work at a wavelength of 5 meters. He sent the proposal "up the line" at Bell Laboratories, but it got "lost." In Reber's opinion there was no good reason why that profit-oriented company should have wanted to construct such an instrument; Jansky seems to have agreed.

And why didn't Reber detect the Sun before 1943, since his equipment was capable of doing so as early as 1940? One answer is that he worked at the Stewart-Warner radio factory during the day — when the Sun is up! Another is that the Sun was widely believed to have a brightness temperature of only 6,000° Kelvin and thus to be a weak radio source. That caused Reber to think that interference from automobile ignitions would prevent him from making good observations. (Because of his unfamiliarity with the astronomical literature, Reber was unaware of



Grote Reber was honored at a symposium held on his 76th birthday, December 22, 1987. This photograph © 1988 Paul A. Feldman.

a 1939 paper by Walter Grotrian that made a strong case for a much hotter solar atmosphere.)

Reber believes that one reason why radio astronomy lagged in the United States after World War II is that money, prestige, and glamour attended other fields such as nuclear physics. Radio astronomy flourished in countries like Great Britain and Australia because they were not rich enough to compete in nuclear physics and thus opted to pursue cheaper alternatives.

CONTEMPORARY REBER


Since 1954 Reber has worked mainly in Tasmania, which is close to the south magnetic pole. There he has made observations of cosmic radio emission at an extraordinarily long wavelength through occasional "holes" that develop in the Earth's ionosphere. The "antenna farm" he designed for these observations at 144 meters consists of 192 dipoles mounted 70 feet above the ground. The array is 3,520 feet in diameter and covers 223 acres; thus it is one of the world's largest radio telescopes.

Using this antenna during minimum

solar activity in the mid-1960's, Reber mapped the southern radio sky and found that its appearance is the inverse of that at shorter wavelengths. The galactic poles are "brighter" than the Milky Way, due to the latter's high electron content.

On August 4, 1985, the Space Shuttle *Challenger* provided an opportunity for Reber to test his ideas about observing cosmic radio waves at still longer wavelengths. When the shuttle flew over his array near Hobart more than 200 kilograms of fuel were intentionally fired through the maneuvering engines. For a few hours the exhaust gases reduced the ionosphere's charged-particle density, and through this hole Reber detected cosmic radiation at a wavelength of 176 meters. This was the first time such emission had been recorded from the ground.

During the 1986-87 solar minimum Reber planned to extend his 144-meter survey to the northern sky. For this he needed an antenna near the north magnetic pole. He learned of a several-acre square array at Ashton, Canada, that had been lying abandoned. For two winters, as a visiting scientist at the National Research Council of Canada, Reber tried to get usable results. But it was not to be: the wires had been badly corroded and many were destroyed by storms. Reber is now considering building an expanded version of his Tasmanian array in Canada, to be ready for the solar minimum that will occur about 1996. (He will then be 84!)

This year Reber gave a series of lectures, including one at the Joint Institute for Laboratory Astrophysics entitled "The Big Bang is Bunk." He remarked in a letter: "It seems the Big-Bang Creationists have far overplayed their hand and made themselves look like fools, which they are. A lot of people are looking for something else and were right behind me. A few young punks from the University of Colorado tried to make interjections. They were booed down by the audience. I poured on the ridicule and sarcasm. Everyone had a wonderful time." Reber is indeed 76 years young! 

Paul A. Feldman earned his Ph.D. at Stanford University and works as a radio astronomer. In 1981 he co-discovered $HC_{11}N$, which is still the heaviest molecule known in space.