London Representatives:
Colin Turner (London) Limited.
Office: 122, Shaftesbury Avenue
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THOUGHT OF THE DAY

The greatest of faults, I should say, is to be conscious of none.—Thomas Carlyle.

Our New 'Window' Into Space

By
Maurice Goldsmith

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The largest radio telescope in the world is to be built in Great Britain. Its construction is planned to begin this summer, and to be completed, it is hoped, in 1956. The radio telescope is a new tool designed to help us to "tune-in to the creaks and groans of the universe around us." It differs from the conventional telescope in that the observer is concerned with "sound" and not with "light" patterns.

More than 300 years ago, Galileo exclaimed of the optical [illegible] events we observe took place that long ago—long before human life existed.

In the last 20 years a new "window" has been opened for us. It arises from the fact that our techniques have advanced so greatly that we can now pick up radio waves from outer space. It was K G. Jansky, an engineer in the United States of America, who first discovered that radio waves could be detected from sources outside the earth, although this had been suspected by the British physicist, Sir Oliver Lodge, over half a century ago.

Jansky was studying sources of interference to short-wave radio communication circuits. He noted that a steady hiss seemed to come from the direction of the sun. Later observation showed that the sun was not responsible, but that the radiation come from the Milky Way. Jansky argued that "the source of these radiations is located in the stars themselves, or in the interstellar matter distributed throughout the Milky Way."

Jansky was, in fact, picking up the long wave emissions—about 20 or 30 metres wavelength—being radiated by an incandescent body, such as a star. But [illegible]

Kapitan China Receives Certificate Of Honour

Sibu's Kapitan China, Mr. Teo Chong Loh was the central figure of importance at a ceremony held in the compound of the Court House in Sibu last Friday when he was presented with the Certificate of Honour by His Excellency the Officer Administering the Government during his tour of the Third Division.

The ceremony was witnessed by a large gathering of officials, community leaders and the public. His Excellency the Officer Administering the Government was accompanied by the Resident, Mr. D.C. White and the Private Secretary, Mr. A.M. Phillips. Mr. Teo Chong Loh was supported by Mr. Chew Geok Lin, M.B.E. and Mr. Teo Kui Seng.

delightful sight it is to behold the body of the Moon, which is distant from us nearly sixty semi-diameters of the Earth, as near as if it was at a distance of only two of the same measures." Since then, the telescope has remained basically unchanged, except that it has become enormously more powerful and precise.

With the naked eye we can see only some 5,000 or 6,000 stars; with a small telescope, about 100,000; with a 40-inch telescope, 100 million; and with a 100-inch, 500 million.

About 30 years ago, we discovered that the Milky Way was a system of stars far more extensive than we had imagined; and that it would take nearly 100,000 years travelling at the speed of light to cross it. More recently, with the aid of the powerful 200-inch telescope on Mount Palomar, we have discovered star systems so remote that it would take hundreds of millions of years to reach them even though we travelled as fast as light. We know that our nearest neighbouring universe is the Great Nebula of Andromeda, which in magnitude, in number of stars, and in structure is similar to our own galaxy.

When we look at Andromeda we look out into space and back into time, for "nearby" Andromeda is about 800,000 light years away. In seeing Andromeda, we look out into space as far as a ray of light can travel in 800,000 years, which means that the observations.

In 1940, Grote Reber, an American amateur astronomer, began a deliberate study of cosmic noise with specially built apparatus. (Cosmic noise is distinguished from galactic noise, which are the signals produced by radiations which originate in our own galaxy, and from solar noise, for signals from radiations coming from the sun). Researchers in England and Australia also began special studies using the highly developed radio and radar techniques of the second world war.

They confirmed Jansky's early results, and ensured that the new science of radio astronomy was set up on a firm base. The accuracy of these early radio telescopes was very poor compared with that of optical telescopes. By 1948, however, simultaneous developments in Sydney, Australia, by Bolton and Stanley, and in Cambridge, England, by Ryle and Smith, led to the construction of a new type of radio telescope which, to a certain extent, overcame this difficulty.

Within the year, researchers using these new radio telescopes announced the most startling finds. They discovered intense sources of radiations, known as radio stars. Their source remains a mystery, for no one has yet been able to identify any visible object or objects responsible for them.

As the new tool has become more sensitive, we have discovered many more radio stars. We know now of a hundred or so, but these are probably only the nearest and most intense of a very large number in our galaxy. Astronomers believe there are as many radio stars in the galaxy as there are visible stars (and this latter population is some hundred thousand million).

Only two years ago, using a refined giant radio telescope, Lovett, in Great Britain, succeeded in detecting the radio waves from the Great Nebula in Andromeda. He concludes that there must be radio stars in that nebula as there are in the Milky Way, and that the numbers are about the same. Other recent work indicates that the objects which generate these radio emissions exist in all the external nebulae.

Radio astronomy is also providing much new information about the sun and meteors. The sun's atmosphere emits radio waves, and by studying them we learn about conditions in the solar atmosphere. When the solar surface is disturbed by sun spots, very intense radio emission is received on the earth. The solar flares which occasionally occur in the region of the sun spot groups are accompanied by immense bursts of radio energy. Charged atomic particles are ejected. These take about 24 hours to reach the earth and cause severe disturbances, such as fade-out of long distance radio communication and displays of the aurora borealis.

Radio astronomy also provides a new method of studying the aurora. Pulses of radio energy are transmitted through the radio telescopes and their reflection from the aurorae enable them to be studied under all conditions of daylight and cloud.

The radio echo or radar pulse technique has also been applied to meteors. For the first time in history it has been possible to study the activity of the daytime sky and to reveal the existence of great streams of meteors on the sunlit hemisphere of the earth. These radio techniques have also been able to determine that all meteors come from within the solar system, and none from interstellar space. The radio pulse technique has also been used to obtain echoes from the moon, thus giving a new approach to the study of the ionosphere and of the lunar surface.

The new radio telescope to be built for Manchester University, and to be under the direction of Dr. A.C.B. Lovell, is a large steerable type, which can be directed at will to scan any part of the sky or to follow the course of any particular star.

It is expected that this great instrument will do for radio astronomy what the large optical telescopes have done for classical astronomy. With it we shall learn more about the fundamental physics of the universe, and of our own earth.