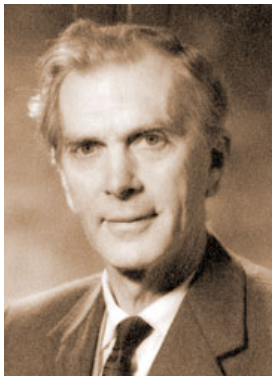
Sir Martin Ryle



Brighton, UK, 27 Sep. 1918 - Cambridge, UK, 14 Oct. 1984

Title Professor of Radioastronomy, University of Cambridge, UK.
Nobel laureate in Physics, 1974

Nomination 2 Dec. 1975

Commemoration – Sir Martin Ryle, who died on 14th October 1984 at the age of 66, was one of the most outstanding figures in British science of the present century. He was born into a distinguished academic family, his father being, first, Regius Professor of Physics in Cambridge and then Professor of Social Medicine in Oxford. Gilbert Ryle, the eminent Professor of Metaphysical Philosophy, was Martin's cousin.

Martin Ryle himself was a student at Christ Church, Oxford, from where he graduated with First Class Honours in Physics in 1939 just before the beginning of the last war. At the outbreak of war Ryle joined a brilliant team of electronic scientists who were concerned with research in the field of radar and in particular with the development of airborne radar systems.

When war was over Ryle joined the Cavendish Laboratory in Cambridge, where he started to investigate the emission of radio waves, which James Hey had discovered during the war as coming from the sun and as affecting radar networks. Not many scientists believed at the time that the sun was really the source of radio emission, but if it was, where exactly did the radio waves come from? In the 1940s radio aerials operating in the metre waveband had beam widths of 10 degrees or more. They could well detect radio emission from the Sun as a whole, which is half a degree wide, but they were quite unable to pinpoint possible sources such as sunspots, which Galileo had easily spotted with his tiny optical telescope more than 300 years earlier.

The problem, then, was to improve as much as possible the small resolving power of radio telescopes. In this Ryle started his work by introducing a radio analogue to the optical interferometer, with which Michelson 30 years earlier had been able to determine the diameters of stars. Instead of using a single antenna Ryle used two which could be moved apart and which at the same time could be connected by cable. With this device he was able to pinpoint radio sources such as sunspots with considerable accuracy.

With ever more refined equipment and using the same principle of radio interferometry, Ryle was soon in a position to pinpoint radio sources with accuracies which made it possible to compare their positions with those of objects visible in optical telescopes. In this way he discovered that the majority of localised radio stars in the sky could be identified with distant galaxies many millions of light years away. In his Nobel Lecture in 1974 Ryle said: "I think that the event which more than anything else led me to the search for ways of making more powerful radio telescopes, was the recognition in 1952 that the distant radio source in the constellation of Cygnus was a distant galaxy – 1000 million light years away".

By 1955 Ryle and his colleagues had discovered nearly 2000 such radio sources, whose numbers increased as their intensities decreased, and this in such a way that there were more galaxies per unit volume the further one looked out into space, or in other words the further one looked back in time. This observation was in obvious disagreement with Fred Hoyle's steady state theory of the Universe which was then much under discussion. Few modern scientific theories have led to such a major controversy and personal bitterness between scientists as the dispute between Hoyle and Ryle. Ryle insisted that his observations of radio sources pointed not to a steady state but to an evolving Universe which had started with a "Big Bang" from a superdense condition some 10,000 million years ago. This picture was very much confirmed when Penzias and Wilson discovered the microwave background radiation in 1965.

For the rest of his life Ryle was concerned with the mapping of radio sources with positional accuracies of seconds or even fractions of a second of arc. He achieved this by his most ingenious method of "aperture synthesis", in which the power of a large telescope, such as Sir Bernard Lovell's 250 foot (76 metre) dish at Jodrell Bank, is achieved and more than achieved by the use of a number of smaller radio telescopes which can be moved successively to different separations and whose output processed by suitable computers can simulate exactly the performance of a huge single radio telescope, too large to be actually constructed.

Ryle's genius showed in everything he did but perhaps nowhere better than in his concept of aperture synthesis. He was a marvellous designer of instruments and he was equally great in the use of his equipment for the solution of theoretical problems like those in astrophysical cosmology.

His exceptional achievements were rewarded in 1966 by a knighthood from the Queen, by his appointment to the first Chair of Radio Astronomy in the University of Cambridge three years later, and in 1974 by the Nobel Prize, which he received jointly with his friend and colleague Antony Hewish, who with the Cambridge equipment had discovered the existence of pulsars. In 1972 Ryle also became the first Astronomer Royal to come from Radio Astronomy.

Other honours followed, coming, however, at a time when poor health did not any longer allow him to leave Cambridge. He was unable even to attend the Nobel ceremony and he never managed to come to any of our meetings in this Academy, to which he was elected in 1975. However, he took a great interest in our proceedings and particularly in the discussions of our Study Week on Energy in 1984. He became increasingly worried about the possible misuse of nuclear energy and the danger of nuclear war. In one of his last publications, "Towards the Nuclear Holocaust", he took a very pessimistic view of the future and in a letter to Professor Chagas, President at our Academy, the year before his death he said: "I am left at the end of my scientific life with the feeling that it would have been better to have become a farmer in 1946". This was indeed a sad sentiment coming from one who was not only one of the most ingenious scientists of our time and a great inspiration to a generation of students but also one of the most charming of people whom to know was a privilege and an unforgettable experience.

Hermann Brück