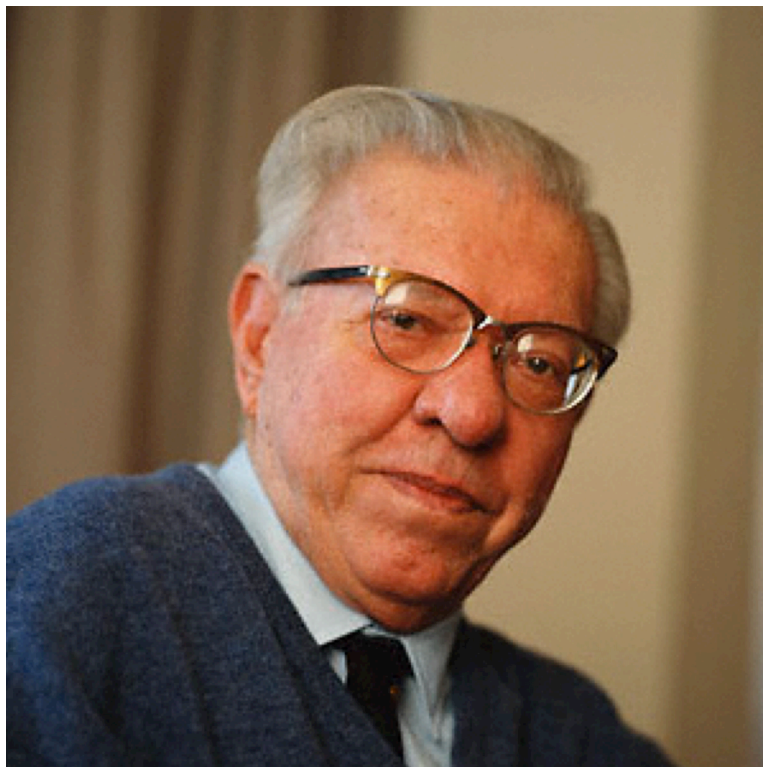


Hoyle, Sir Fred

(1915–2001)

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Sir Fred Hoyle (1915–2001)

by David Levenson, 1994

Hoyle, Sir Fred (1915–2001), astronomer, was born on 24 June 1915 at 4 Milnerfield Villas, Gilstead, a village on the edge of the moors above the town of Bingley in the West Riding of Yorkshire, the only child of Benjamin (Ben) Hoyle and his wife, Mabel, *née* Pickard (who were cousins, their mothers being sisters). He was baptized Fred, not Frederick or Alfred. His father was a woollen rag merchant; his mother was a teacher—and, incidentally, an accomplished pianist who often played professionally in local cinemas. It was from her that Hoyle inherited his love of music, particularly Beethoven.

Education and war service

As a small boy Hoyle went to school in Eldwick, some distance from his home. The Hoyles had little money, and Hoyle walked to and from school, covering 6 miles every day; he had insufficient warm clothing, and this led to an infection that left him slightly deaf in one ear. He easily passed his eleven-plus examination, and this took him to Bingley grammar school. His parents gave him every encouragement, and his scientific ability soon became evident. Originally he aspired to be a chemist, but he soon turned to astronomy; at thirteen he was already studying books such as Arthur Eddington's *Stars and Atoms* (1927). After leaving school in 1933 he went to Emmanuel College, Cambridge, where he read mathematics; he graduated BA in 1936 and MA in physics three years later. He won the tripos part two Mayhew prize (1936) and the Smith's prize (1938), while a research student under Paul Dirac (a satisfactory arrangement because Dirac never liked supervising students and Hoyle did not need supervision). In 1939 he won a research fellowship at St John's College, and on 28 December in the same year he married Barbara Clark (*b.* 1920/21), daughter of Rowland Hill Clark, ironworker, of Scunthorpe. Their union was exceptionally happy; they had two children, a son (Geoffrey) and a daughter (Elizabeth).

Wartime duties took Hoyle away from Cambridge to work on radar at the Admiralty. It was during this period that he met some of his most important future collaborators, [Hermann Bondi](#), [Thomas Gold](#), and Raymond Lyttleton. At the end of the war he returned to Cambridge, and became a university lecturer in mathematics, though most of his time was spent on research.

Astronomical research

Hoyle was particularly interested in the structure and evolution of the stars, and his first really important papers (written with Lyttleton) date from 1946. In the late 1930s Hans Bethe and Carl von Weizsäcker in Germany had found that the principal energy source of main sequence stars (such as the sun) was the fusion of hydrogen into helium, but many problems remained. Hoyle was largely responsible for extending and developing these early ideas, and during the early 1950s he was the world's leading astrophysicist. In 1958 he collaborated with the American physicist William Fowler in explaining how all the materials found on earth and elsewhere have been formed inside stars. When giant stars come to the end of their active careers and explode as supernovae, the heavy elements are scattered in space; new stars are formed from the debris. In fact, 'we are all made of stardust'. The other main contributors were Geoffrey and Margaret Burbidge. Fowler was awarded the Nobel prize; Hoyle was not, and made no secret of his annoyance. Much later (in 1997) the Swedish Academy of Sciences did award him the prestigious Crafoord prize, but it was often said that the failure to award him a Nobel prize was a flagrant injustice.

Hoyle was involved in another controversy associated with a Nobel prize. In 1967 Jocelyn Bell (later Bell Burnell), a graduate student at Cambridge working with the radio astronomer Antony Hewish, discovered strange radio sources which pulsed so quickly and so regularly that they were clearly unlike anything else previously known. They proved to be rapidly rotating neutron stars, now known as pulsars. For this discovery a Nobel prize was indeed awarded—not to Jocelyn Bell, but to Hewish as leader of the team. The lack of recognition of the actual discoverer was strongly criticized, and Hoyle (always outspoken) was one of the critics. Many people agreed with him.

The steady state theory

It had long been known that the universe is expanding, and that the groups of galaxies are receding from each other. It was assumed that the universe had been created at one moment, several thousands of millions of years ago, and had been evolving ever since. In 1948 Bondi and Gold, at Cambridge, proposed an entirely different scenario—a universe that had always existed, and will exist for ever; as old galaxies die they are replaced by new ones, created spontaneously in space. This means that the universe is in a 'steady state', and has always looked the same as it does now. Hoyle was an early and enthusiastic supporter of this theory, and refused to believe that the universe had been created in what he contemptuously referred to as a 'big bang'. For a while the steady state theory was popular, and the arguments between the two rival schools of thought even became acrimonious. However, observational results obtained by Martin Ryle and others showed that the distribution of galaxies many millions of light years away is not the same as it is in less remote regions, so that the universe cannot be in a steady state, and the theory, at least in its original form, was wrong. Hoyle was reluctant to abandon it, and produced several variations of it, none of which gained much support. He was not alone in his views—they were shared by the Burbidges and by his colleague and frequent co-author Chandra Wickramasinghe—but by his death the steady state cosmology was to all intents and purposes also dead.

From 1958 to 1972 Hoyle was Plumian professor of astronomy at Cambridge. He founded the Institute of Theoretical Astronomy at Cambridge, and was its director from 1967 to 1972. Problems with funding as well as personal disputes led to his resignation; he left Cambridge, and went to live in the Lake District. From 1975 he was honorary research professor at University College, Cardiff. He became a fellow of the Royal Society in 1957, and was president of the Royal Astronomical Society (RAS) from 1971 to 1973. He was knighted in 1972. Among his many other honours were the gold medal of the RAS (1968), the Bruce medal (1970), and the royal medal of the Royal Society (1974).

Writer, broadcaster, and controversialist

Hoyle's work on stellar structure and evolution was by far his most important contribution to astronomy, and its significance can hardly be overestimated, but his activities extended into many other fields. He wrote several popular books, of which the first, *The Nature of the Universe*, was published in 1951; it was based on a hugely popular series of BBC radio talks in the previous year, and was itself immensely successful. Hoyle was in fact the first true 'BBC

astronomer'. He also wrote science fiction; his first novel, *The Black Cloud* (1957), was still in print at his death. It was a remarkable book, combining fantasy with sober science. Others followed, some written with his son, Geoffrey, though none matched the standard of the first. His last novel, *Comet Halley*, was published in 1985. There were also a few plays, including the successful West End children's play, *Rockets in Ursa Major* (1962), and a BBC television series, *A for Andromeda* (1962).

Hoyle was no stranger to controversy. For example, he believed that life on earth did not originate here, but was brought by a comet. This was not a new idea—the 'panspermia theory' had been described long before by the Swedish scientist Svante Arrhenius—but Hoyle also believed that comets are even now depositing bacteria in our atmosphere, and that they are responsible for epidemics. Together with Chandra Wickramasinghe he wrote books such as *Diseases from Space* (1979), which left medical experts singularly unimpressed. He rejected Darwin's theory of evolution, and believed that evolution occurred because of mutating life-forms continually arriving from space; all this was arranged by a super-intelligent civilization wishing to 'seed' our planet. He also discussed the case of the archaeopteryx, a creature half-reptile, half-bird, which lived around 150 million years ago; the most famous fossil is in the British Museum. In a book published in 1986, Hoyle and Wickramasinghe claimed that the fossil was a fake, and that the 'feathers' were made of concrete, glued onto the main frame. Beverly Halstead, an eminent zoologist reviewing the book for the *New Scientist*, described it as 'libellous nonsense ... one of the most despicable pieces of writing it has been my misfortune ever to read'. Certainly that particular book is best forgotten.

To the surprise of his many friends, Hoyle and his wife left the Lake District in 1990, moving to Bournemouth. He was never idle, but his main research days were over; he died peacefully of a lower respiratory tract infection at Christchurch Hospital, Christchurch, Dorset, on 20 August 2001. He was survived by his wife and their two children. Tributes to him poured in from all over the world; even those who disagreed so strongly with some of his unconventional views could not question his honesty or his integrity. Despite his occasional eccentricities he was one of the most brilliant, colourful, and influential astronomers of the twentieth century.

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Wealth at Death

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