WHY WAS FRED HOYLE PASSED OVER IN THIS YEAR'S NOBEL AWARDS?

J. V. Narlikar

ALTHOUGH ASTRONOMY and astrophysics form major parts of physics, these subjects have attracted comparatively few Nobel prizes. 1983 has been one of those exceptional years; two astrophysicists shared the year's physics prize: Subrahmanyan Chandrasekhar and William Fowler.

By nature quiet and unassuming, yet a stickler for thoroughness, Chandrasekhar is internationally respected for his critical comments in astronomy and astrophysics. Most scientists would agree that he should have got the Nobel award long ago. His pioneering work on white dwarf stars was done about five decades back.

The other awardee, William Fowler, a septuagenarian like Chandrasekhar, presents a contrast in personality. Informal and jovial, Willy can be the life and soul of an evening party. Yet, in his approach to work, he is as thorough and painstaking as Chandrasekhar.

Like Chandrasekhar who has been in the University of Chicago since 1936 Fowler has also remained in one academic institution most of his life. He joined the California Institute of Technology in the 1930s and has been there since. He began as an experimental nuclear physicist but an encounter with the Cambridge astrophysicist Fred Hoyle turned his interest to astrophysics.

One of the mysteries of the universe is the origin of the various chemical elements in it. Were they created with the universe or did they get manufactured later, out of simpler building blocks, like protons and neutrons? Physicists like the latter alternative since it requires simpler assumptions.

It was Fred Hoyle's conjecture that all atomic nuclei could be made in stars. In the 1940s it was well established that stars like the Sun act as fusion reactors converting hydrogen to helium, the next stable element in the ladder of complexity. Could the process be carried on further? Somehow a way had to be found for making carboon, the next stable nucleus. Hoyle felt that three helium nuclei could be brought together to make an excited nucleus of carbon which would subsequently decay into the normal stable carbon. There was no other way of ascending the nuclear ladder.

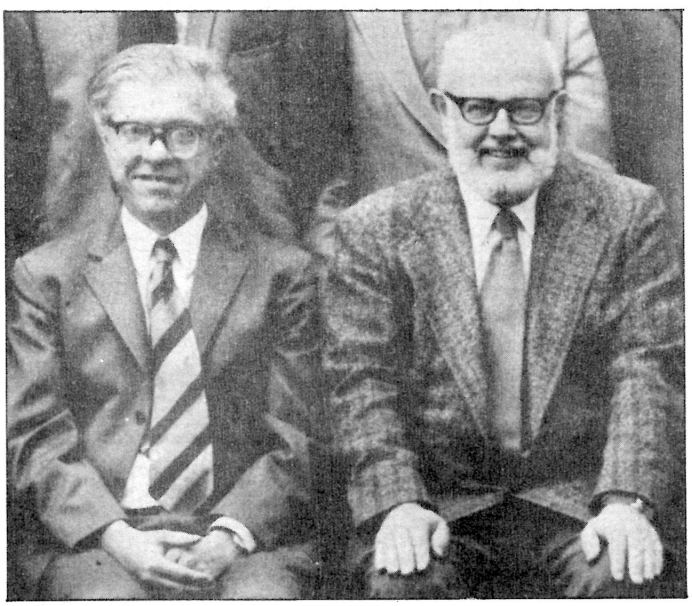
Willy Fowler recalls that his first reaction to this proposal was that it was downright crazy. However, with his experimental colleagues he verified Hoyle's prediction. An excited state of carbon nucleus does exist, exactly as Hoyle had conjectured. That was the turning point for Fowler.

In the subsequent decade and a half the Fowler-Hoyle combination generated many fruitful ideas. Their work on stellar evolution and their detailed investigation in nuclear synthesis in collaboration with the husband-wife team of Geoffrey and Margaret Burbidge have brought maturity to stellar astrophysics. In the early 1960s the Fowler-Hoyle papers on supermassive stars anticipated the discovery of quasars and to some extent the later work on the use of black holes as energy sources in astrophysics. The Fowler-Hoyle combination is so well known in astrophysics that many (including their author) will find the omission of Hoyle's name from the Nobel list inexplicable.

Nevertheless the award to Fowler aptly recognises the excellenece and pioneering aspects of his work in stellar astrophysics, especially the use of nuclear theory to unravel the mysteries of stars.

Why was Fred Hoyle passed over in this year's Nobel awards? We may get the authentic answer to this question in the distant future, when the records of deliberations of the Nobel Committee become available to historians of science. Until then we have to be content with guesses and speculations. These are also of interest because they throw light on the sociology of science. Here are these guesses:

In 1975, Hoyle was openly critical of the Nobel award given to Martin Ryle and Antony Hewish, the latter for the discovery of pulsars because Jocelyn Bell, who first picked the pulsar signals,was not included amongst the awardees. Hoyle's comments generated a great deal of con-



Hoyle and Fowler —"He seemed to know a lot about everything."

Fred Hoyle as Fowler sees him

He claimed that the synthesis of the element carbon from helium in red giant stars could take place only if the nucleus of the carbon atom had a very special property at that time unknown. I was very sceptical, to say the least, but my colleague, Ward Whaling, and his students and postdoctoral associates went into the laboratory and found that Fred Hoyle was right, not only in principle but in precise detail. That made a believer out of me!

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Fred Hoyle is a Yorkshireman — down-to-earth, combative, intolerant of nonsense, generous to a fault with friends, contemptuous of detractors. It was a great day for me when I got to know Fred Hoyle and become his friend and collaborator.

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I learned an enormous amount about physics and astronomy from him. But I learned other things in addition. He introduced me to cricket by taking me to a test match at Lords between Pakistan and England and he taught me the finer points of the game.

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troversy and this may not have endeared him to the Nobel Committee.

Apart from this, Hoyle has generally been very critical of the bandwagon effect in astronomy and cosmology where, instead of objective assessment, fashion dictates the lines of research that are undertaken and supported. His Yorkshire origin prompts him to be forthright rather than diplomatic in his comments. Since Nobel nominations come largely from "the Establishment", Hoyle may have paid the price of antagonizing those that count in the Nobel game.

Finally, as *Nature* said in its editorial comment, Hoyle's recent pronouncements on astrobiology, especially his thesis that life is of cosmic origin are,not approved by the experts in exobiology. This may have been an additional factor in the final decision of the Nobel Committee.

Whatever the reasons, the omission of Hoyle does raise the question whether the highest awards in science always reflect an objective asessment of the "best" quality work. If they do, then why was Hoyle omitted?

Like many scientists I keep two lists. List A contains names of those who deserve a Nobel award and have got it. List B contains the names of those who should have got the award but did not get it. It contains names like Eddington and Hubble. It contained, until recently, Chandrasekhar who now moves to list A. While Hoyle continues to occupy a high position on my list B.

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