obituaries

To notify the community about a colleague's death, subscribers can visit http://www.physicstoday.org/obits, where they can submit obituaries (up to 750 words), comments, and reminiscences. Each month recently posted material will be summarized here, in print. Select online obituaries will later appear in print.

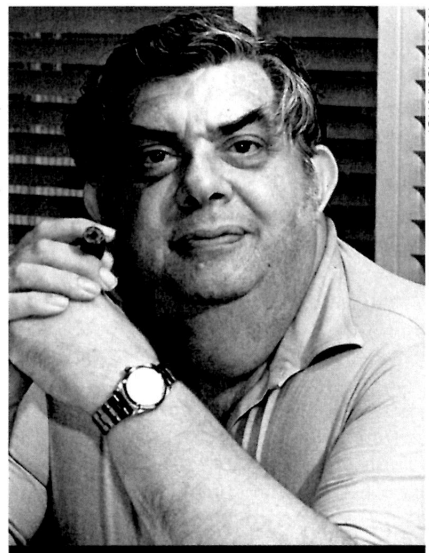
Geoffrey Ronald Burbidge

Geoffrey Ronald Burbidge died in La Jolla, California, on 26 January 2010 after a prolonged illness. Although physically debilitated for many months, Geoff retained the mental and intellectual sharpness that had been so effective in the critical appraisal of his field: astrophysics and cosmology.

Geoff was born in the small English market town of Chipping Norton on 24 September 1925. At Chipping Norton Grammar School, he excelled in history and mathematics, was a voracious reader of English novels and plays, and counted cycling and tennis among his recreations. He later got a scholarship to study at Bristol University. Among his family of well-to-do partners in a building firm, he was the first member to attend a university.

In the mid 1940s Bristol was well known for its physics department, with stalwarts such as Arthur Tyndall, Nevill Mott, Cecil Powell, and Giuseppe Occhialini for inspiration. Geoff ended up with an honors degree in physics in 1946, and after World War II he took a position in a ballistics laboratory. His work on explosives and guns taught him to appreciate physics as a fascinating field, and he decided to enroll as a graduate student in physics. Because of his excellent performance as an undergraduate, he had no trouble getting a scholarship to University College London. He decided to work with Harry Massey in the mathematics department on problems in quantum electrodynamics, a hot subject at the time. To interact with a more dynamic group in the field, Massey recommended that Geoff visit the University of Cambridge regularly. He did so, but he found that the Cambridge colloquia were much more mathematically than physically oriented. He got his PhD in theoretical physics in 1950.

It was while at University College London that Geoff met and married Margaret Peachey, an astronomer and assistant director of the University of London Observatory. Perhaps that event and the ongoing developments in astronomy gradually oriented Geoff away from particle physics and toward astrophysics. In 1951 he and Margaret sailed for the US for their respective assignments; Geoff had been awarded an Agassiz Fellowship to work at the Harvard College Observatory in Massachusetts. In a 2007 article in the *Annual Review of Astronomy and Astrophysics*, Geoff recounted how his US visa was delayed because the words "hydrogen" and "helium" appeared in his 1950 paper entitled "Hydrogen and Helium Line Intensities in Some Be Stars," which apparently aroused some suspicion during the McCarthy era.



NOAO/AURA/NSF

Geoffrey Ronald Burbidge

Upon his return to the UK in 1953, Geoff had a rather uncomfortable period as a postdoc in Martin Ryle's radio astronomy laboratory at Cambridge. Ryle demanded from his colleagues complete loyalty to his views, which Geoff, with his characteristically independent mind, did not offer. So he was treated as an outsider. He explained in the 2007 *Annual Review* article how the radio group was secretive about its findings and future steps. Once Geoff was asked to accompany the loyalists to Oxford University for the Halley Lecture, where Ryle was to announce his new findings on radio source counts, without Geoff's being told what the contents were. He was so angry at that mistrust that he refused to go.

It was in the mid 1950s that Geoff and Margaret began to collaborate with William Fowler and Fred Hoyle on the problem of how chemical elements are formed. The quartet, known collectively as B^{2}FH, in due course delivered its magnum opus in an extensive paper in *Reviews of Modern Physics* in 1957. It describes how stars at different stages of their evolution, including the death of more massive ones in supernovae, produce practically all observed chemical elements. The work has been hailed as a triumph of applications of nuclear physics, statistical mechanics, and stellar structure to solve a deep problem in astrophysics.

After spending some years at Caltech and the Yerkes Observatory, both the Burbidges were offered senior appointments at the University of California, San Diego in 1962. Except for a few years at Tucson, Arizona, where he was the director of the Kitt Peak National Observatory, Geoff remained at UCSD. With his independent mindset, he brought many changes to the observatory, some of which were liked and some not. Perhaps because of the latter, he lost his job as director in a major reorganization of the observatories of which Kitt Peak was a part.

For much of his career, Geoff worked in high-energy astrophysics, pointing out the energy problem inherent in conventional theories of radio sources, quasars, and active galactic nuclei. Working with Hoyle he steadily moved

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David H. Blackwell
24 April 1919 – 8 July 2010
William Callahan
5 September 1931 – 5 July 2010
Dorothee E. Krahn
5 June 1922 – 26 June 2010
Brian Flowers
13 September 1924 – 25 June 2010
Arnold Kramish
6 June 1923 – 15 June 2010
Vladimir Arnold
12 June 1937 – 3 June 2010
Harry Edward Peters
1922 – 19 May 2010
Robert Damburg
4 April 1930 – 7 May 2010
Michael Stephen Feld
11 November 1940 – 10 April 2010
David Halliday
3 March 1916 – 2 April 2010
George Curriden Baldwin
5 May 1917 – 23 January 2010
Stavros Fallieros
6 July 1927 – 21 December 2009

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toward the radical view that not all redshifts, especially of quasars, arise from expansion of the universe. Over the years he came to appreciate the controversial work of Halton Arp, who indicated the possible existence of anomalous redshifts. Although that point of view gradually isolated Geoff from the overall astronomical community, he kept an open mind. For more than 30 years he successfully edited the *Annual Review of Astronomy and Astrophysics*. Not even his strongest critic in the redshift controversy could have accused him of lacking the fairness required of the editor.

Geoff was a much-traveled person. At international conferences he could be found in a front seat apparently dozing but remarkably alert when it came to asking questions of the speaker. India was a favorite haunt of his, and he was in contact with many Indian astronomers. He was fond of traveling in chauffeur-driven cars and even made the trip from Mumbai to Bangalore. Those who have seen the driving on Indian highways would appreciate the risk he was taking. But then he was an old radical who cherished risky paths.

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