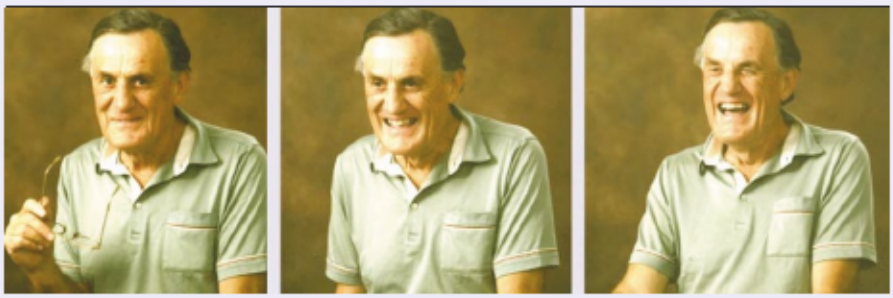
Obituary

Robert Hanbury Brown (1916–2002)



HANBURY BROWN FAMILY

Pioneer in radar and observational astronomy

Robert Hanbury Brown, a giant from a golden period of innovation in astronomy, died on 16 January this year, at the age of 85.

Hanbury, as he was always known, was born in India in 1916, the son of an army officer. Forsaking his schoolboy plans to become a classics scholar, he graduated in engineering from the University of London in 1935. He then worked on the secret development of the coastal radar — Chain Home — which was to prove vital in the 1940 Battle of Britain. By then, Hanbury was working with a group developing a shorter-wavelength radar that could be installed in aircraft. His splendid autobiography, *Boffin* (Adam Hilger, 1991), gives a vivid account of the trials and triumphs of this work, which by 1941 gave night fighters of the Royal Air Force the edge over the German bombers.

Hanbury's contributions also included work on the polarization of radio waves, crucial for the optimal design of aerials on equipment for air-to-surface surveillance and in the detection of ships and submarines. During his secondment (1942–47) to the US Naval Research Laboratory in Washington DC, his work led directly to the NATO 'identification friend or foe' (IFF) system of today, along with the civilian system of ground-based air-traffic control now used throughout the world.

But all this was a prelude. Returning to Britain, Hanbury sought to pursue a higher degree in university research. His work having been secret, however, he had no publications. His enquiries brought him together with one of us (B.L.), who had returned to the University of Manchester with military radar equipment and built a 218-ft radio telescope at Jodrell Bank. Finding ways to minimize the background noise that bedevilled early efforts, Hanbury and his student Cyril Hazard showed that cosmic radio waves were emanating from the Andromeda spiral galaxy, 2 million light years away and far outside our own Galaxy — which, until then, had been thought to be the origin of all such emissions.

This discovery, using a fixed paraboloid dish, was the happy retort to those questioning the feasibility of the huge steerable radio telescope B.L. was then evangelizing for. Following years of struggle, this pioneering 250-ft, steerable dish was completed in 1957. Hanbury was among those to use it. In particular, he and Hazard played a significant part in the discovery of quasars — 'quasi-stellar objects', now taken to be the most distant, and so oldest, observable objects in the Universe.

Early on, Hanbury had also begun to think about a radio interferometer, which could measure the angular size of the sky's two strongest radio sources, Cygnus A and Cassiopeia A. For all anyone knew, this might have required an interferometer baseline of a thousand kilometres or more. The technical difficulty lay in combining the radio signals, received at two widely separated points, with the required phase stability. Hanbury had the idea of measuring the correlation of the fluctuations in intensity, a process that does not require the phase information needed in approaches based on detecting signal amplitudes. This deceptively simple solution raises profound questions, and Hanbury collaborated with the theoretical physicist Richard Twiss to put it all on a sound basis. Surprisingly quickly, by 1952 the intensity interferometer was built, and had shown the radio sources to be so extended that baselines of only a few kilometres were needed (so that earlier methods would have been adequate). In Hanbury's words, he had built a sledgehammer to crack a nut.

What came next ensured that Hanbury's name will always be in astronomy texts. He and Twiss applied the same ideas to optical astronomy, but immediately encountered objections that their proposals violated basic physical laws. The experimental approach depended on correlating light quanta, or photons. In essence, it required photons to arrive in pairs: astronomers thought they might; some physicists said they could not. At the same time as the Hanbury Brown–Twiss equation demonstrated the feasibility of pair-arrival, Hanbury's wife Heather symbolically produced twin sons.

In a major astronomical 'first', Hanbury demonstrated the feasibility of his intensity interferometer by measuring the diameter of the 'dog star', Sirius, under the unusually favourable sky conditions of the harsh British winter of 1955–56. He then sought more interesting stars in the Southern Hemisphere, under less cloudy skies. So he left his personal chair at Manchester, and moved to the University of Sydney in 1962, joining the extraordinary physics department being put together there by Harry Messel. This was the first really multi-professorial department in Australia (one of us — R.M. — being there at this time as a young faculty member).

Hanbury's next interferometer was built in a sheep paddock, outside Narrabri, New South Wales. Each of its two telescopes was 23 ft in diameter and composed of 250 mirrors, and they moved on a track 600 ft in diameter. The local wildlife of the outback provided both diversion and disruption. And drought and flood were a feature of the area. Nonetheless, the interferometer was a winner, with the diameter of tens of stars being measured, and a new scale of stellar temperatures being established.

During these years, Hanbury and his family shuttled between Narrabri and his home at Forty Baskets Beach, with its splendid view of Sydney harbour. Much of the shuttling was done in his beloved Alvis 1952 drophead coupé: given his driving style, the ride down the potentially lethal 1-in-4 drive to this house was unforgettable. Hanbury loved the warmth of Australia, and it reciprocated. He was an early recipient of its highest honour, Companion of the Order of Australia (the order is a cheerfully confused manifestation of Oz republicanism from the 1970s, the Queen being its head).

Five years after his retirement in 1981, he and his wife returned to Britain, and lived quietly in Hampshire. Hanbury was a superb and imaginative engineer, a natural astronomer, and a true visionary. He was also, as we and so many others can attest, a really lovely man. **Bernard Lovell and Robert M. May**

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