Eddington medallist and Associate of the RAS.

Robert Hanbury Brown is widely known for his invention and astronomical exploitation of the intensity interferometer and his clarification of the quantum nature of light. He also played an important role in the development of radar and in stimulating a wide range of researches in the formative years of Jodrell Bank; he was a respected statesman in the scientific community in Australia and in international astronomy.

Robert Hanbury Brown was born on 31 August 1916 in Nilgiri Hills, India, into an Indian Service family. He was educated at Tonbridge School, took a first-class degree in electrical engineering at Brighton Technical College and then embarked on a research degree at Imperial College (IC). He indulged his interest in flying by making the inaugural flight of the newly formed London University Air Squadron. While still a research student, his talents were spotted by Sir Henry Tizard, the Rector of IC, who encouraged him in 1935 to apply for a post in the Air Ministry which he discovered later was involved with the secret development of radar.

Hanbury Brown's backround and natural abilities were given full rein in the hand-picked team doing pioneering research in radar under the leadership of Robert Watson-Watt. As a 20-year-old he was assigned to the receiver section of the Radio Location and Direction Finding group at Bawdsey Manor and its outstation at Orfordness on the east coast. With a good head for heights, he readily installed equipment on the 240 ft high masts surveying the North Sea. He moved on to Air Interception radar where he vividly recalled the challenges of installing and testing radar systems in aircraft bristling with Yagi aerials. At the onset of war there was an urgent requirement, at Churchill's insistence, to develop and install user-friendly radar equipment in aircraft. Hanbury Brown enjoyed the challenge of applying this new technique to an operational problem. It also resulted in his losing the hearing in one ear when, in 1941, he became disconnected from his oxygen supply in a Beaufighter at 20 000 ft.

He worked for some time on developing beacons for aircraft and ground stations to identify friend from foe. The beacons used in the allied invasion of Europe in 1944 were based on his designs. After a period as head of a scientific liaison team in the USA during the second half of the war and then four years as a research consultant, he was keen to explore new pastures.

Hanbury, as he was known to all, came to Jodrell Bank in 1949 on the invitation of Bernard Lovell, who by then had established a research programme of radio and radar astronomy and had recently constructed a 218 ft fixed-reflector radio telescope with a tilting mast. Hanbury threw himself into the research programme, using the telescope to make the first radio detection of the Andromeda Nebula and to detect radio sources in the galactic plane. His fertile mind spawned relevant research student projects that generally involved building your own receivers and aerial systems. His experience from radar days was a great help to me personally in building our first H-line receiver.

He soon became intrigued by the emerging debate as to whether the radio sources were galactic or extragalactic – stars were small, galaxies were large, or so it was then thought. A radio interferometer of several kilometres baseline should distinguish between them. The idea of an intensity interferometer with a 100 km baseline became a dream; in such an instrument it was not necessary to preserve the radio frequency phase over long baselines and, furthermore, scintillation was not the problem. It was for Michelson interferometry. Hanbury, with two research students Roger Jennison and M K Das Gupta, made this dream a reality and successfully measured the diameters of the two brightest radio sources, Cassiopeia A and Cygnus A, both of which were several arcminutes in diameter. The concept of an intensity interferometer was thereby vindicated experimentally and a rigorous theoretical treatment was developed in a collaboration with Richard Twiss from the Services Electronic Research Laboratory. An application to optical interferometry then became a major ambition. The classical work by Michelson had come to a halt in 1920 when his baseline reached 20 ft. The intensity interferometer should work out to kilometre baselines, Hanbury argued.

Before such a project could be launched, Hanbury Brown and Twiss realized that a laboratory demonstration using these principles would be necessary. However, on publication of the results of this experiment there was widespread disbelief. Ultimately the “Hanbury Brown and Twiss effect” was accepted and enabled the physics community to think more fundamentally about the photon nature of light.

In the meantime Hanbury was laying the foundations of long baseline Michelson interferometry of radio sources using radio links to transfer the phase. With Henry Palmer and research students, he identified a family of extremely small-diameter sources which ultimately were identified as quasars. Also, in one of the first observing programmes on the new 250 ft steerable telescope, he and Cyril Hazard mapped the radio emission from 32 normal galaxies. At about this time Hanbury made a sortie into optical astronomy to Pic-du-Midi Observatory, where he and I used a fish-eye camera with an H-alpha filter to photograph the giant radio loop, now known as the North Polar spur. I came to appreciate Hanbury as a most innovative and entertaining colleague.

The intensity interferometer came to absorb most of Hanbury's time. Following the successful laboratory experiment, he and Twiss built an optical intensity interferometer based on two war-time search-light mirrors each 5 ft in diameter. They resolved Sirius on a 30 ft baseline, giving a diameter of 7.1 millarc-seconds. The technique was thus a proven success; with a flux collector of such a size it was possible to measure clear correlation even from a twinkling main-sequence star at low elevation at Jodrell Bank. Hanbury's ambition was then to measure the diameters of a large number of main-sequence stars on baselines of 100s of metres on a good site. Using his considerable skills of persuasion and his many contacts from his radar days and later, he eventually realized his dream in the rolling farmland of Narrabri, Australia, in a collaboration between the Universities of Manchester and Sydney. With his team of ex-Jodrell Bank scientists Cyril Hazard, John Davis and Roy Allen and the support of Richard Twiss, he built two 22 ft diameter segmented mirrors on a circular track of 618 ft diameter. The story of the heroic effort by this small team to build a world-leading instrument in an Australian outback location are told in his books Boffin and...
The Intensity Interferometer. In all, the diameters of 32 stars were measured to provide the first temperature scale for hot stars. In his last years in Sydney, Hanbury worked with John Davis in designing a Michelson interferometer which could work with a factor of 10–100 times higher sensitivity.

Hanbury's contributions to astronomy and physics were recognized by many awards and honours. He was an Eddington medallist and an Associate of the Royal Astronomical Society; a Fellow and Hughes medallist of the Royal Society. The award which particularly pleased him was the Albert Michelson medal of the Franklin Institute which recognized the measurement of the angular diameter of stars. He was awarded the Fellowship of the Australian Academy of Science and he was appointed Companion of the Order of Australia for leadership in Australian science. On the international level, he was president of the International Astronomical Union (1982–85), appropriately when its General Assembly was held in India, his birthplace; it was a pleasure to welcome him to the Manchester 2000 GA and to see the wide regard in which he was held.

Wynn-Williams made significant contributions to the debate on how to search for life in these extreme extraterrestrial environments and advocated strongly the search for signatures of photosynthetic life on Mars. It would be easy to focus on astrobiology – it is a noisy science of enormous interest to the public – but Wynn-Williams had achieved international recognition long before his more recent work in this field. In 1980 he was awarded the Polar Medal for his contributions to Antarctic science. By the time he had reached a total of 10 visits to the Antarctic, he had visited the Ross Island and Dry Valleys regions as a guest scientist with the University of Canterbury in New Zealand and with the American polar programme. Further fieldwork took him to Terra Nova Bay and Northern Victoria Land with the Italians. As Secretary of the BAS Club he expressed his love of Antarctic camaraderie and the traditions of that region of the world, traditions that are heavily embedded in an extraordinary history that he relished.

The breadth of his research interests is represented by his involvement on the editorial boards of Polar Biology, Extremophiles and the International Journal of Astrobiology. He published over 80 research papers. He enjoyed imparting this knowledge to young people and he ran a lunchtime science club at Chesterton Community College in Cambridge that drew in eminent people from across the country. He also chaired the parent–teacher association of the college. This love of teaching followed him throughout his career, beginning in the 1970s when he spent a period teaching biological science in schools in London and Tonbridge, Kent.

David always found time for singing. Making full use of his Welsh ancestry, he could be heard with many groups, among others the Cambridge Philharmonic Choir.

David Wynn-Williams is survived by his wife Elizabeth and his two daughters, Cherry and Rosanna.

Charles S Cockell.