

Robert Lamme Brown

Radio astronomer Robert Lamme Brown died suddenly of a heart attack on 20 December 2014 in Florence, South Carolina, while traveling to Disney World to visit his grandchildren, to whom he was devoted.

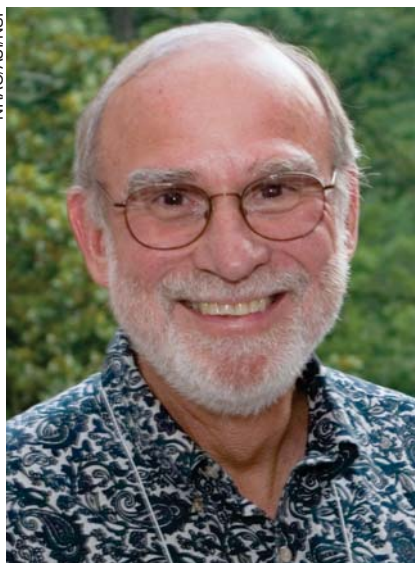
Born on 17 August 1943 in Los Angeles, Brown was raised in Inglewood, California. While attending the University of California, Berkeley, he worked in Kinsey Anderson's cosmic-ray research group. He received his BA in 1965. He then went to the University of California, San Diego, where he worked under Robert Gould and was awarded a PhD in 1969. His thesis, "Interstellar absorption of cosmic x rays," was published in *Physical Review D* in 1970 and was one of the 100 most cited papers in astronomy and physics during the 1970s.

Brown joined the National Radio Astronomy Observatory (NRAO) as a postdoctoral fellow. Although trained as a theorist, he quickly became a skilled observer. A deft manager, he served as the site director of the NRAO's Green Bank and Tucson facilities, head of its Millimeter Array (MMA) project, and NRAO deputy director.

One of Brown's most significant discoveries, made with Bruce Balick, was the compact radio source at the center of the galaxy, which he later named Sagittarius A*. On 13 and 15 February 1974, the NRAO Green Bank interferometer and a 45-foot antenna in Huntersville, West Virginia, combined to provide enough resolution and sensitivity to detect the faint, compact source. It has since been shown to be coincident with the center of the Milky Way and driven by a massive black hole. The discovery was a fundamental advance in our understanding of galactic nuclei. Brown was also an expert on radio recombination lines, and the 1978 review he wrote with Jay Lockman and Gillian Knapp remains the standard.

Brown's interest in extragalactic astronomy centered on spectral lines in high-redshift objects. He and Morton Roberts were the first to detect neutral hydrogen (HI) in absorption against a quasar, 3C286. Observing HI absorption led Brown to search for carbon monoxide emission from the hyperluminous IR galaxy F10214+4724. He and I found the CO(3→2) rotational line, which extended by a factor of more than 10 the redshift of CO emission detections in IR-rich galaxies. The discovery was a major motivation for the de-

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velopment of the MMA, one of three precursors that merged to become the Atacama Large Millimeter/Submillimeter Array (ALMA).

His aptitude for doing several things simultaneously served Brown admirably at the NRAO. He could write effortlessly, and as deputy director he was responsible for drafting the many program plans, long-range plans, and reports required by NSF. A patient person, Brown was well suited to help during negotiations, such as of the agreements with the Soviet Union and Japan for space-based very long baseline interferometry; the merger of the MMA, the Large Millimeter/Submillimeter Array of Japan, and the European Large Southern Array into ALMA; and the frequently contentious process to determine the NRAO's yearly investment in new instrumentation. His perseverance was essential during the years it took to secure funding to keep the MMA project alive and to join forces with Europe and Japan to form ALMA.

A lover of adventure and travel, Brown was the first NRAO member to visit the Atacama Desert of northern Chile as a possible location for the MMA. He immediately recognized its potential and initiated site testing. The location eventually became the site for ALMA, and it has been critical to the array's stunning success. Indeed, ALMA's success owes as much to Brown's efforts as to anyone's.

Brown was enthusiastic about working with young people. He supervised NRAO summer students, mentored postdoctoral fellows, and supervised five graduate students at the University of Virginia.

In 2003 Brown left the NRAO to become the director of the National Astronomy and Ionosphere Center (NAIC) and its principal facility, the Arecibo Observatory. Commuting between Cornell University, which was NSF's contractor for the NAIC, and Arecibo in Puerto Rico, Brown made many improvements to the observatory's operation.

To channel his energy after he retired in 2008, Brown and his wife, Karen, opened an ice cream parlor in Corolla, on the Outer Banks of North Carolina. He defined his shop role as "chief financial officer and head of janitorial services."

Friendly, outgoing, and well liked, Brown had an infectious laugh that resonated in the halls of the NRAO. He is missed by his family, friends, and colleagues.

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John Howard Gibbons

John Howard Gibbons, who had an extraordinary career as a nuclear physicist, educator, and public servant, died on 17 July 2015 in Crozet, Virginia, from complications of a stroke.

Born in Harrisonburg, Virginia, on 15 January 1929, Jack developed a lifelong love of nature and hiking and was an intrepid cave explorer. Scouting was also central to his youth; he ran a Boy Scout camp at age 13 and subsequently became an Eagle Scout and a member of the Order of the Arrow, scouting's national honor society.

Jack received his bachelor's degree in mathematics and chemistry from Randolph-Macon College in 1949 and his PhD in physics from Duke University in 1954 under the direction of Henry Newson.

Jack began his research career in 1954 at Oak Ridge National Laboratory. In a pursuit he called "solar-system pediatrics," he carried out experiments on nuclear structure with emphasis on neutron-capture reactions that are key to understanding nucleosynthesis of heavy elements in stars. He was the physics division group leader in nuclear geophysics and astrophysics. Jack also worked on energy efficiency technologies, ballistic missile defense, and environmental issues, and from 1969 to 1973 he directed the lab's environmental program.

In 1973 President Richard Nixon appointed Jack as the first director of the Office of Energy Conservation, where he directed federal programs on energy efficiency, the Federal Energy Management Program, and other initiatives.

At the University of Tennessee from 1975 to 1979, Jack was a professor of physics and served as director of the Energy, Environment and Resources Center. In 1976–79 he chaired the Panel on Demand for the National Academies' study on the future of US energy. The report argued, through engineering and economic analysis, that the US could double the energy efficiency of its economy over the next 25 years. That twofold improvement materialized.

Jack directed the Office of Technology Assessment (OTA) from 1979 to 1993 and oversaw the completion of more than 600 reports containing analysis of complex scientific and technical issues to aid in policymaking. Jack's goal was to elevate the level of scientific discourse so that both sides of a political issue would argue with the same body of science. He felt the analysis stage was only half the job of a science adviser; translating the data into "usable information" often took just as much effort. Jack required reports to be "policy relevant, but never policy pres-



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scriptive" and aimed to shape bipartisan legislation. Two years after he left OTA, it was dissolved in a contentious budget-cutting move.

When he was named President Bill Clinton's director of the White House Office of Science and Technology Policy (OSTP) in 1992, Jack created the first OSTP division on the environment to tackle the emerging and interlinked issues of climate change, habitat degradation, energy demand, biodiversity loss, and pollution. He was instrumental in establishing numerous administration priorities, including increasing agencies' research budgets, creating the National Bioethics Advisory Panel and the Partnership for a New Generation of Vehicles, and signing the Comprehensive Nuclear-Test-Ban Treaty. He also oversaw the first National Climate Assessment, something he had worked to get into congressional legislation in 1990.

One of Jack's proudest White House successes was the creation of the cabinet-level National Science and Technology Council to provide integrated science and technology research budgets across all agencies and set criteria for filling gaps and augmenting priority areas within and across disciplines. As Clinton signed the 1993 executive order, Jack was at his side; indeed, he had coffee mugs made with that photo for his senior staff.

Jack was a consummate communicator and a true civic scientist. He was greatly respected by both sides of the aisle. Soon after his appointment as Clinton's science adviser, *Scientific American* ran a profile of Jack entitled "The nicest guy in Washington."

A generous, caring, and good-hearted human being, Jack treated everyone equally. He would explain to his grandchildren how to estimate the number of grains of sand on the beach with as much care as he explained to cabinet members how nuclear weapons worked. He loved music of all kinds, played the bass washtub, and had a rich bass singing voice. Jack's dedication to singing was such that he interviewed for the science adviser position with Clinton and Al Gore in Arkansas on Christmas Eve of 1992 but made it back to Virginia in time to perform in his church's evening service with Mary Ann, his wife and singing partner since the day they met.

Jack had an amazing recall of about a thousand quotes, and he drew on them to spice up his invariably trenchant remarks on any topic. In speaking of OTA's demise at a 2003 symposium at Rice University's Baker Institute, Jack observed that OTA and Socrates had similar fates: "He gave advice to other people. He was poisoned." Jack would also lament the attacks on mainstream climate science, claiming we had entered "the Disney era of science, where just wishing makes it so," and he would remind all of Daniel Patrick Moynihan's quote that "everyone is entitled to his own opinions, but not to his own facts."

One of Jack's favorite quotes is from Edna St. Vincent Millay and was used in the title of his 1997 book:

Upon this gifted age, in its dark hour,
Rains from the sky a meteoric shower
Of facts . . . they lie unquestioned,
uncombined
Wisdom enough to leech us of our ill
Is daily spun, but there exists no loom
To weave it into fabric.

"Gentleman Jack" sought to weave the facts together to provide a path toward a sustainable future for all. As Gore remarked, "He was utterly unique and irreplaceable."

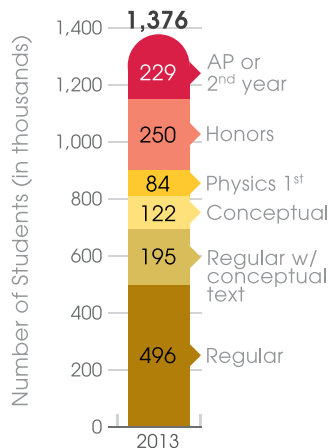
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FACTOID

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About 39% of 2013 US high school graduates took a physics course in high school.

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