Obituaries

Prepared by the Historical Astronomy Division

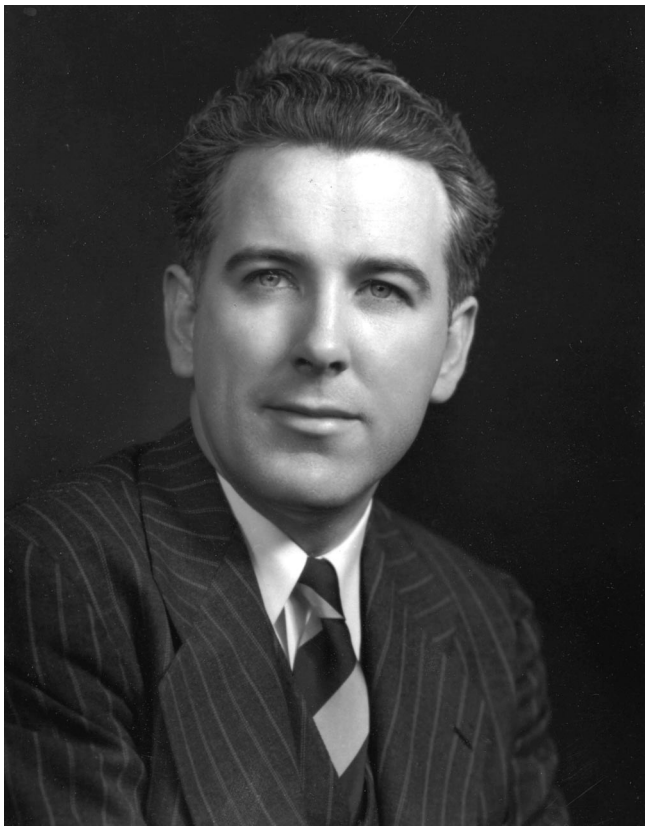
JAMES GILBERT BAKER, 1914–2005

Dr. James Gilbert Baker, renowned astronomer and optical physicist, died 29 June 2005 at his home in Bedford, New Hampshire at the age of 90. Although his scientific interest was astronomy, his extraordinary ability in optical design led to the creation of hundreds of optical systems that supported astronomy, aerial reconnaissance, instant photography (Polaroid SX70 camera), and the US space programs. He was the recipient of numerous awards for his creative work.

He was born in Louisville, Kentucky, on 11 November 1914, the fourth child of Jesse B. Baker and Hattie M. Stallard. After graduating from Louisville DuPont Manual High, he went on to attend the University of Louisville majoring in Mathematics. He became very close to an Astronomy Professor, Dr. Moore, and many times used his telescopes to do nightly observations. While at the university, he built mirrors for his own telescopes and helped form the Louisville Astronomical Society in 1933. At the University of Louisville, he also met his future wife, Elizabeth Katherine Breitenstein of Jefferson County, Kentucky. He received his BA in 1935 at the height of the Depression.

He began his graduate work in astronomy at the Harvard College Observatory. After his MA (1936), he was appointed a Junior Fellow (1937-1943) in the Prestigious Harvard Society of Fellows. He received his PhD in 1942 from Harvard in rather an unusual fashion, which is worth retelling. During an Astronomy Department dinner, Dr. Harlow Shapley (the director) asked him to give a talk. According to the *Courier-Journal Magazine*, ''Dr. Shapley stood up and proclaimed an on-the-spot departmental meeting and asked for a vote on recommending Baker for a Ph.D. on the basis of the 'oral exam' he had just finished. The vote was unanimous.'' It was at Harvard College Observatory during this first stage of his career that he collaborated with Donald H. Menzel, Lawrence H. Aller, and George H. Shortley on a landmark set of papers on the physical processes in gaseous nebulae. In addition to his theoretical work, he also began designing astronomical instruments with ever greater resolving powers and wide-angle acceptance which he described as the ″the royal way to new discoveries.''[a] He is well known for the Baker-Schmidt telescope and the Baker Super Schmidt meteor camera. He was also a co-author with George Z. Dimitroff of a book entitled, *Telescopes and Accessories* (1945). In 1948 he received an Honorary Doctorate from the University of Louisville.

With the start of World War II, the U.S. Army sought to establish an aerial reconnaissance branch and placed the project in charge of Colonel George W. Goddard. After months of searching for an optical designer, he asked for a recommendation from Dr. Mees of Eastman Kodak. Following the recommendations of Dr. Mees,[b] Col. Goddard found this friendly and unassuming twenty-six year old graduate student at Harvard to be the perfect candidate. He was impressed by Dr. Baker's originality in optical design and provided him a small army research contract in early 1941 for a wide-angle camera system. Goddard's ''Victory Lens'' project began on 20 May 1942 when he visited Dr. Baker's office at Harvard College Observatory and described the need for a lens of f/2.5 covering a 5x5 plate to be made in huge quantities. Multiple designs were developed during the war effort. A hands-on man, Dr. Baker risked his life operating the cameras in many of the early test flights that carried the camera systems in unpressurized compartments on aircraft. He was the director of the Observatory Optical Project at Harvard University from 1943 to 1945. He began his long consulting career with the Perkin Elmer Corporation during this period. When the war ended, Harvard University decided to cease war-related projects and subsequently, Dr. Baker's lab was moved to Boston University and was eventually spun off as ITEK Corporation. However, he continued to be an associate professor and research associate at Harvard from 1946 to 1949. In 1948 he received the Presidential Medal for Merit for his work during World War II in the



James Gilbert Backer
Image courtesy of the Optical Society of America, Optics and Photonics News (October 2005), p. 50.

[a]Oscar Bryant, ''Astronomical Designs,'' in Accent, the University of Louisville College of Arts and Sciences Alumni Newsletter, Spring 1994.
[b]George W. Goddard, Brigadier General, Overview, 273.

Office of Scientific Research and Development.

In 1948, he moved to Orinda, California from Cambridge, Massachusetts and became a research associate of Lick Observatory for two years. He returned to Harvard in 1950. He had spent thousands of hours doing ray trace calculations on a Marchant calculator to produce his first aerial cameras. To replace the tedious calculations by hand, Dr. Baker introduced the use of numerical computers into the field of optics. His ray-trace program was one of the first applications run on the Harvard Mark II (1947) computer. Later on, he developed his own methodology to optimize the performance of his optical designs. These optical design computer programs were a family affair, developed under his direction by his own children to support his highly sophisticated designs of the 1960s and 1970s.

For most of his career, Dr. Baker was involved with large system concepts covering not only the camera, but the camera delivery systems as well. As the chairman of U.S. Air Force Scientific Advisory Board, he recognized that national security requirements would require optical designs of even greater resolving power using aircraft at extreme altitudes. The need for such a plane resulted in the creation of the U-2 system consisting of a plane and camera functioning as a unit to create panoramic high-resolution aerial photographs. He formed Spica Incorporated in 1955 to perform the necessary optical design work for the US Government. The final design was a 36-inch f/10 system. Dr. Baker also designed the aircraft's periscope to allow the pilot to see his flight path. By 1958, he was almost solely responsible for all the cameras used in photoreconnaissance aircraft. He continued to serve on the President's Foreign Intelligence Advisory Board and on the Land Panel.

Before the launch of Sputnik, he designed the Baker-Nunn satellite-tracking camera to support the Air Force's early satellite tracking and space surveillance networks. Because of his foresight, cameras were in place to track the Sputnik Satellite in October 1957. These cameras allowed the precise orbital determination of all orbiting spacecraft for over three decades until the tracking cameras were retired from service.

He continued to advise top Government officials in the evolution of reconnaissance systems during the 1960s and 1970s. He received a Space Pioneer Award from the US Air Force. He received the Pioneers of National Reconnaissance Medal (2000) with the citation, ''As a young Harvard astronomer, Dr. James G. Baker designed most of the lenses and many of the cameras used in aerial over flights of 'denied territory' enabling the success of the U.S. peacetime strategic reconnaissance policy.''

Around 1968, he undertook a consulting contract with Polaroid Corporation after Dr. Edwin Land persuaded him that only he could design the optical system for his new SX-70 Land Camera^{TM} . He was also responsible for the design of the Quintic^{TM} focusing system for the Polaroid Spectra Camera system that employed a revolutionary combination of non-rotational aspherics to achieve focusing function.

In 1958 he became a Fellow of the Optical Society of America (OSA). In 1960 he was elected President of the Society for one year and helped establish the *Applied Optics Journal*. He was the recipient of numerous OSA awards, spanning the breadth of the field, and has been honored with the Adolf Lomb Award, Ives Medal, Fraunhofer Award, and Richardson Award. He was made an honorary member of OSA in 1993. He also was the recipient of the 1978 Gold Medal, the highest award of the International Society of Optical Engineers (SPIE). Furthermore, he was the Recipient of the Elliott Cresson Medal of the Franklin Institute for his many innovations in astronomical tools.

Dr. Baker was elected a Member of the National Academy of Sciences (1965), the American Philosophical Society (1970), the American Academy of Arts and Sciences (1946), and the National Academy of Engineering (1979). He was a member of the American Astronomical Society, the International Astronomical Union, and the Astronomical Society of the Pacific. He authored numerous professional papers and has over fifty US patents. He maintained his affiliation with the Harvard College Observatory and the Smithsonian Astrophysical Observatory until he retired in 2003. Even after his retirement in 2003, he continued work at his home on a new telescope design that he told his family he should have discovered in 1940.

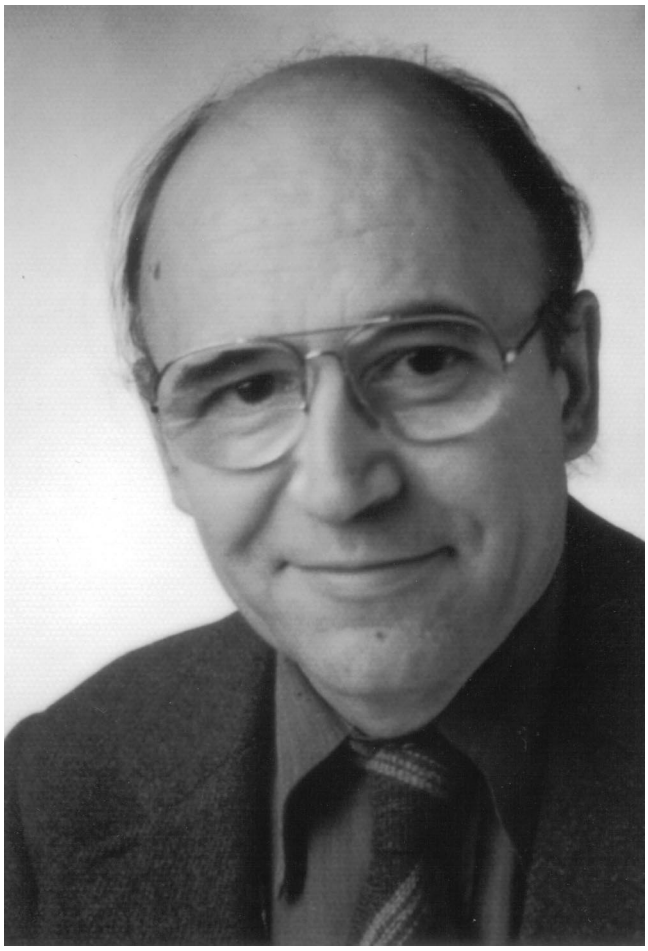
Light was always his tool to the understanding of the Universe. An entry from his personal observation log, 7 January 1933, made after an evening of star gazing reveals the pure inspiration of his efforts: ″After all, it is the satisfaction obtained which benefits humanity, more than any other thing. It is in the satisfaction of greater human knowledge about the cosmos that the scientist is spurred on to greater efforts.″ James Baker fulfilled the destiny he had foreseen in 1933, living to see professional and amateur astronomers use his instruments and designs to further the understanding of the cosmos. Whereas, he had not predicted that his cameras would protect this nation for over many years.

He is survived by his wife, his four children and five grandchildren.

Neal K. Baker
National Oceanic and Atmospheric Administration

NORMAN HODGSON BAKER, JR., 1931-2005

Norman H. Baker, a key contributor to the foundation of modern stellar pulsation theory and former editor of the *Astronomical Journal*, died on 11 October 2005 in Watertown, New York near his beloved summer home in Natural Bridge. He succumbed to complications of Waldenstrom's macroglobulinemia, a bone marrow lymphoma that he had successfully surmounted for twenty-two years. Norm, as he was known to all, was born 23 October 1931 in Fergus Falls, Minnesota to Norman Hodgson and Jeannette (née Lieber) Baker. He attended the University of Minnesota where he met the first of many lifelong astronomical friends, Bill Erickson. He received his BA in 1952. He went on to do his PhD, ''Radiation from Particle Interactions which Create Current,″ at Cornell University under Phil Morrison. He then moved to a postdoctoral position at the Max Planck Institut für Physik und Astrophysik in München with the intent of pursuing his work in plasma physics with Ludwig Biermann



Norman Hodgson Baker, Jr.

and Arnulf Schlüter. However, Rudolf (Rudi) Kippenhan snatched him away to pursue what became his lifelong interest, stellar physics. This was the dawn of the era in which electronic computers were becoming practical for scientific calculations, and Norm immediately adopted this new tool. Indeed, he remained at the forefront of computing technology throughout his life: He was certainly the first member of the Astronomy Department at Columbia to buy a Mac, and was undoubtedly one of the few emeritus professors in the world known by all the administrative staff as the first person to turn to when stumped by a computer problem.

Following his first paper with Kippenhan on stellar rotation, Norm turned his attention to stellar pulsations, a topic he would pursue throughout his career. His 1962 paper in *Zeitschrift f*ür Astrophysik on pulsational models of Cepheids (Baker and Kippenhan 1962, **54**, 155) is a classic in thefield. The first figure displays the three dimensional model of the atmospheric absorption coefficient as a function of log *P* and log *T*. Sophisticated three-dimensional computer images being many years in the future, it was contructed from a folded and bent sheet of grid paper which was subsequently photographed. Using extensive numerical analysis, the paper showed that stars in the δ Cephei region of the H-R diagram were ''pulsationally unstable due to the destabilizing effect of the He^+ region.'' This paper, along with those of Zhevakin, Cox, and Christy, established our modern understanding of pulsational instability in horizontal branch stars. His second paper with Kippenhan the following year brought convection into the problem; this topic became another lifelong theme of Norm's research that he subsequently pursued with Douglas Gough. His most cited work, carried out a decade later with van Albada, was an attempt to understand the properties of horizontal branch stars. It synthesized for the first time stellar evolution theory and the insights gained from studies of stellar pulsations. Between 1961 and 1965, Norm held no fewer than five positions. After a year on the west coast at the Convair Science Research Lab in San Diego, he landed in the New York area to pursue pulsations, oscillating among the Goddard Institute for Space Studies, the Institute for Advanced Study in Princeton, Yale, and New York University. In 1965, he was hired as an Assistant Professor in the Department of Astronomy at Columbia University by Lo Woltjer, and remained at Columbia until he retired in 2003. As a teacher, he was deeply appreciated by undergraduate and graduate students alike for lectures that were models of clarity, for his out-of-class assistance which was generous and unstinting, and for incorporating into his courses modern numerical techniques which served the students well throughout their careers. In 1975 when Woltjer returned to Europe, Norm took over the editorship of the *Astronomical Journal*, a position he held (shared in the last few years with Leon Lucy) for a decade. His scrupulous integrity and forthright honesty served him, and the Society, well. Despite his scathing intolerance for administrative stupidity, he also managed to complete successfully a term as Chair of the Department of Astronomy. (This author, who currently holds the Chair and shares the intolerance, has yet to fathom the gracious equanimity Norm displayed.) His early interest in brewing beer during graduate school at Cornell (where he co-founded the Old Undershirt Brewing Company) was transformed in later life into an expertise in German wines. The precision that marked his research extended to every aspect of his private life. I had the distinct pleasure of subletting his apartment during my first year on the faculty at Columbia while he was on leave in Europe. We spent most of the year trying to imagine how we could ever restore it to the state of perfect organization in which we found it. Norm is survived by his wife and constant companion of thirty years, psychiatrist Doris Blum Nagel, by his sister Dr. Jean Trousdale, and brother Dr. Richard C. Baker, two nieces, three nephews, and by several generations of undergraduates, graduate students, postdocs, and colleagues who hold fond memories of his patience, kindness, humor, and quiet *joie de vivre*.

David J. Helfand
Columbia University

ALASTAIR GRAHAM WALKER CAMERON, 1925-2005

Alastair Graham Walker Cameron, one of the most creative and influential astrophysicists of his generation, passed away on 3 October 2005, at the age of 80, at his home in Tucson. Subsequent to his retirement from Harvard University, where he had been a member of the faculty from 1973 through 1999, Cameron remained active as a Senior Re-

search Scientist at the Lunar and Planetary Laboratory of the University of Arizona.

Cameron had a distinguished career during which he made outstanding contributions both in scientific research and in public service to science. Notable among the latter are the years he spent as Chairman of the Space Science Board of the National Academy of Sciences from 1976 to 1982. He was a member of the National Academy of Sciences and the recipient of a number of awards for his diverse contributions to the sciences, including the J. Lawrence Smith Medal of the National Academy of Sciences in 1988, the Leonard Medal of the American Meteoritical Society in 1994, the Henry Norris Russell Lectureship of the American Astronomical Society in 1997, and the Hans A. Bethe prize of the Division of Nuclear Physics of the American Physical Society for 2006, for outstanding work in nuclear physics and astrophysics. He was enormously active in the organization of conferences and workshops and in an editorial capacity, for a number of journals in astronomy, astrophysics, and space physics. Over the course of his career, he made seminal contributions to such diverse areas of astronomical and astrophysical research as nuclear reactions in stars, nucleosynthesis, the abundances of the elements in the Solar System, meteoritics, stellar evolution, neutron stars, the origin of the Solar System, the physics of planets and planetary atmospheres, and the origin of the Moon.

Born on 21 June 1925 in Winnipeg, Manitoba, Cameron received his undergraduate degree from the University of Manitoba and his doctorate in nuclear physics from the University of Saskatchewan in 1952. He taught for two years at Iowa State and then spent seven years as a Senior Research Officer at Chalk River. It was from this period that his important early contributions to nuclear astrophysics emerged. His research addressed a broad range of problems concerning the origin of the elements, culminating in the publication in 1957 of a discussion of stellar evolution and nucleosynthesis which, together with the paper by E.M. Burbidge, G.F. Burbidge, W.A. Fowler, and F. Hoyle, substantially defined the field of nucleosynthesis as we understand it today.

Cameron joined the staff of the NASA Institute for Space Studies in New York and served as a Senior Scientist from 1961 to 1966, then continued on to the Belfer Graduate School of Science of Yeshiva University in New York, prior to moving to Harvard. Working with an increasing number of graduate students and postdocs, Cameron continued his studies in nuclear physics, concentrating on building systematics of nuclear mass formulae, nuclear level densities, thermonuclear reaction rates, and weak interaction rates. These nuclear systematics, coupled to early calculations of supernova explosions, enabled the first detailed numerical investigations of explosive nucleosynthesis from which the identification of ^{56} Ni as the dominant product emerged.

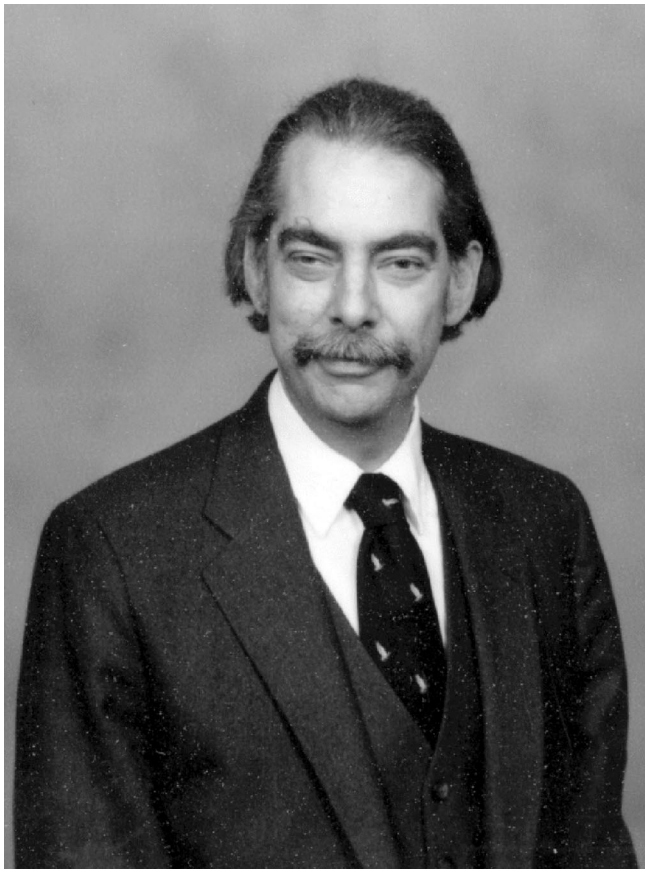
During these years, Cameron's research activities and interests expanded considerably to encompass broad areas of space physics, including specifically the origin of the Solar System. Notable here is the significant role he played in the early formulation and development of the impact theory for the origin of the Moon. This theory posits – and early numerical simulations by Cameron and his collaborators confirmed - that the collision of a large, Mars sized object with the Earth early in its history yields debris from which the Moon can coalesce, and can account for both an iron-depleted Moon and the masses and angular momentum of the Earth- Moon system.

Cameron was an extremely imaginative and productive scientist whose contributions profoundly influenced many areas of research in what he liked to refer to as cosmogony. The proceedings of the symposium which celebrated his sixtieth birthday were indeed published, at his request, under the title ''Cosmogonical Processes.'' He was also a strong early advocate of distributed computing, as anyone who visited his research office at Harvard will well remember. To those who worked closely with him, as students, postdocs, or colleagues, he will be remembered for his encouragement of young scientists, his enthusiastic acceptance of new ideas, and his pure enjoyment of his science.

J.W. Truran
University of Chicago
F.-K. Thielemann
University of Basel
J.J. Cowan
University of Oklahoma

GEOFFREY GARDNER DOUGLASS, 1942-2005

Geoffrey Gardner Douglass passed away on 15 February 2005, following a long illness. Geoff was born 11 June 1942 in Rocky River, Ohio, and grew up there with a passion for science, theatre, and pets. He attended the nearby Case Insti-



Geoffrey Gardner Douglass

tute of Technology (Cleveland, Ohio) before coming to the U.S. Naval Observatory on 28 April 1967. He worked at the USNO for over 30 years, until his retirement in January 1999. He was involved in the observing and measurement of parallax and double star plates on the SAMM and MANN measuring engines, and was stationed at Blenheim, New Zealand from 1985-1988 working at the Black Birch site on the Twin Astrograph Telescope. While there he and his wife Doris travelled extensively throughout New Zealand and Australia, He later worked with an early iteration of the USNO StarScan measuring machine. However, most of his work involved observations of visual double stars with the USNO 26-inch Clark Refractor, collaborating with F.J. (''Jerry'') Josties on the photographic program in the late 1960s to the development of the USNO's speckle interferometry program throughout the 1990s.

Geoff collaborated closely with Charles Worley from 1968 until Charles's death in December 1997, writing much of the double star software and assisting in the production of the USNO's double star catalogs. This was a period of transition, when some 200,000 punch cards of the Lick IDS (Index Catalog of Double Stars) were transferred from Lick Observatory to the USNO, then converted to magnetic tape. This ultimately resulted in the 1984 WDS catalog (currently maintained online). It was often joked that the ''W'' and ''D'' in the WDS (officially the ''Washington Double Star'' catalog) really stood for ''Worley'' and ''Douglass.'' The ''Curmudgeon'' and the ''Dour Scot'' were a team for nearly thirty years.

Geoff's first observation, of BU 442, was made 2 June 1967 with the USNO double star (photographic) camera, and his last, STF 342, was made on 28 November 1998 with the USNO speckle camera on the 26-inch refractor. In between he was an active collaborator and observer on these two different programs which, during his tenure at USNO, contributed over 18,000 measured positions to the WDS. While he discovered no new pairs, this was never his interest. He was much more interested in following up known systems and characterizing their motions to improve the catalog. During his long illness, even while at Cameron Glen Nursing Home, he continued to have an interest in the activities at the USNO and continued to be sought out for his knowledge on the instrumentation of the speckle camera. Late in 2004, when he was consulted on the location of a set of visual measures made in the early 1990s, his comment was that ''every measure counted.''

During his last year at the observatory he oversaw the publication of over 10,000 speckle observations, and guided the recently hired Brian Mason (Charles's replacement) in the management of the double star program.

Geoff battled illness for many years. He was a symbol of the worthiness of organ donation, living for some two decades following a kidney transplant, before succumbing to complications following the failure of the transplanted kidney.

Geoff is survived by his wife, Doris, with whom he shared a love of cats and classical music. They touched many lives both at the Observatory and at their church, Graham Road United Methodist, where both he and Doris were active leaders in many ministries. Geoff was very passionate about his religious views, going so far as to name his old computer ''crux.''

Geoff will be sorely missed by his many friends and colleagues.

Brian Mason and William Hartkopf
U.S. Naval Observatory
Thomas Corbin
U.S. Naval Observatory (retired)

DAVID STANLEY EVANS, 1916-2004

David Stanley Evans died on 14 November 2004 in Austin, Texas. He was a noted observational astronomer whose career was divided between South Africa and Texas. He also used the extensive historical collections at the University of Texas to write several books on the history of astronomy.

He was born in Cardiff, Wales on 28 January 1916. David received his BA degree in mathematics in 1937 from Kings College, Cambridge. He became a PhD student at Cambridge Observatory in 1937, and was one of Sir Arthur Eddington's last surviving students. He received his PhD degree in 1941 with a dissertation entitled, ''The Formation of the Balmer Series of Hydrogen in Stellar Atmospheres.'' He was a conscientious objector to war and, thus, spent the war years at Oxford working with physicist Kurt Mendelssohn on medi-

David Stanley Evans

cal problems, involving cadavers, relating to the war. During these years, David was scientific editor of *Discovery*, and he was editor of *The Observatory*.

David left England in 1946 in order to take up the position of Second Assistant at the Radcliffe Observatory, Pretoria, South Africa. He and H. Knox Shaw were the entire staff after R. O. Redman left, and they aluminized and installed the mirrors in the 74-inch telescope. His notable scientific contribution was to use lunar occultations to measure stellar angular diameters during the 1950s. He succeeded in determining the angular diameter of Antares and determined that Arcturus was not circular but had an elliptical shape. The elliptical shape was later shown to be an instrumental artifact, but the utility of using lunar occultations to measure stellar diameters and stellar multiplicity was conclusively demonstrated. T. Gold presented David's paper on lunar occultation angular diameters at the January 1953 meeting of the Royal Astronomical Society. For the rest of his life, David resented Gold's remarks, because he felt that he had been ridiculed.

By 1953, David Evans was Chief Assistant at the Royal Observatory headquartered in Cape Town, South Africa. David had designed and built a Newtonian spectrograph for the 74-inch Radcliffe Telescope with which he measured the first southern galaxy redshifts.

David and his family spent 1965-66 in Austin, Texas, where he was a National Science Foundation Senior Visiting Scientist at the University of Texas and McDonald Observatory. They moved permanently to Austin in 1968 and David became a Professor of Astronomy and Associate Director of McDonald Observatory at the University of Texas at Austin.

At McDonald Observatory, R. E. Nather had devised a high-speed photometer capable of measuring millisecond time-scale changes in brightness and with Brian Warner, he invented ''high-speed astronomy.'' This instrument caused Evans to revive his occultation program and, over the next twenty years, he produced the major part of the angular diameters of late-type stars with his students and collaborators. In addition, David and collaborators used the extensive collections of the University of Texas to write *Herschel at the Cape*. David was also involved in observing the occultation of β Sco by Jupiter in 1972 and in observing, during a solar eclipse in 1973, the gravitational deflections in the positions of stars whose light passes near to the Sun. The eclipse was observed from Mauritania, and the observations confirmed Einstein's prediction again.

David Evans and his students studied late-type stars that have large star-spots and others that flare. In addition, they studied stars whose lunar occultation observations had revealed them to be double or even more than two stars.

David Evans's major scientific contribution was an application of his stellar angular diameters to deduce the surface brightness of stars with the result that with suitable color indices one could use photometry to deduce the angular diameter of stars. This is applicable to stars which can never be occulted by the Moon, and its application to Cepheid variable stars has yielded their distances. This relation between angular diameters and a V-R color index is called the Barnes-Evans Relation. Tom Barnes gives most of the credit to Evans, but said that David insisted that the authors be listed in alphabetical order. This work was greeted with initial skepticism but it stimulated an enormous amount of interest and has been used to measure distances to 100 Cepheid variable stars in our galaxy. The method gives a distance to one of them, Delta Cephei, that agrees closely with recently measured parallaxes using HST. The Barnes-Evans method yields distances which are accurate to a few percent and is applicable to Cepheids in nearby galaxies.

Before coming to Texas, David Evans had never given a large lecture course at a university, and his efforts met with mixed success especially in introductory classes for freshmen facing a ''science requirement.'' David had considerably more success supervising PhD dissertations. He was supervisor for four. He was promoted to the position of Jack S. Josey Centennial Professor of Astronomy in 1984, which is the position he held until his retirement in 1986. He was awarded the Gill Medal of the Astronomical Society of South Africa in 1988.

David Evans had a remarkable facility for language, especially English. He was an author of eight books including a 1966 edition of *Teach Yourself Astronomy*, which was an introduction to astronomy and an inspiration to a number of currently active astronomers. He also loved history, especially of Southern Hemisphere astronomy but also of the McDonald Observatory. In fact, David continued to be very active after retirement and when he died he had completed a book (with Karen Winget) on the eclipse expedition to Mauritania, which is not yet printed.

Frank N. Bash
The University of Texas at Austin

WALTER ALEXANDER FEIBELMAN, 1930-2004

Walter Alexander Feibelman, 79, an astronomer who discovered the E-ring of Saturn, died of a heart attack 19 November 2004 at his home at Riderwood Village in Silver Spring, Maryland.

Walter was born 30 October 1925 in Berlin, Germany to Bernard and Dora Feibelman. He came to the United States with his parents in 1941. They were some of the last German Jews to flee Nazi Germany. Years later, he reported his experiences in an account contributed to the U.S. Holocaust Memorial Museum.

As a youth, he worked at a cleaning shop and as a soda jerk before taking a course in tool and die making. He worked at the Abbey Photo Corp. in New York and in a model-making firm, where he constructed models of aircraft for use in identification courses by the Army Air Forces.

After high school, he attended the Carnegie Institute of Technology and received his BS degree in 1956. Until 1969, he was a research scientist at the University of Pittsburgh. While working as an assistant research professor in physics and astronomy at the University of Pittsburgh in 1967, he examined a photo of Saturn taken a year earlier at the university's Allegheny Observatory. The E-ring -- unlike the bright main rings, A, B, C, D and F -- is faint and not easily spotted. He paired his observation with calculations and announced his discovery, which remained unconfirmed until the Pioneer 11 flyby in 1979.

Walter joined the Optical Astronomy Division of Goddard Space Flight Center in Greenbelt in 1969, and worked there until 2002, when he became an emeritus astronomer at NASA.

He became associated with the International Ultraviolet Explorer project, and worked on developing detectors for the orbiting observatory's spectrograph. The project turned out to be one of NASA's most successful observatories, operating from 1978 to 1996. In his scientific career, he published more than 200 refereed articles, mainly on hot stars and planetary nebulae. He also wrote papers in the fields of photography, spectroscopy, physics, telescopes, and railroading.

His awards included a special achievement award from NASA in 1986, a Presidential Certificate of Recognition on National Immigrants Day in 1987, and a NASA Certificate of Outstanding Performance in 1990.

Walter was fascinated with steam locomotives. He documented in photographs the end of the steam era in western Pennsylvania, and published an illustrated study of those giant locomotives in a book, *Rails to Pittsburgh*, in 1979. From the New York Central Railroad, he purchased the shop blueprints of its famous ''Niagara'' locomotive. He scaled those plans and machined more than 1,100 individual parts from brass, which he assembled over several years into a 31-inch model of a Niagara that sat on O-gauge track.

He loved classical music, and made an extensive collection of videos of famous performances, which he showed in well-attended weekly gatherings at Riderwood. He presented his 200th program to listeners the night before he died. He was preceded in death by his wife, Lola King Feibelman. Survivors include a sister, Miriam Feibelman of Jerusalem.

William Oergerle
Goddard Space Flight Center

JOHN DANIEL KRAUS, 1910 – 2004

John Daniel Kraus, 94, of Delaware, Ohio, director of the Ohio State University ''Big Ear'' Radio Observatory, physicist, inventor, and environmentalist died 18 July 2004 at his home in Delaware, Ohio. He was born on 28 June 1910 in Ann Arbor, Michigan. He received a Bachelor of Science in 1930, a Master of Science in 1931, and a PhD in physics in 1933 (at 23 years of age), all from the University of Michigan, Ann Arbor. During the 1930s at Michigan, he was involved in physics projects, antenna consulting, and in atomic- particle-accelerator research using the University of Michigan's premier cyclotron.

Throughout the late 1920s and the 1930s, John was an avid radio amateur with call sign W8JK. He was back on the air in the 1970s. In 2001 the amateur radio magazine CQ named him to the inaugural class of its Amateur Radio Hall of Fame. He developed many widely used innovative antennas. The ''8JK closely spaced array'' and the ''corner reflector'' were among his early designs. Edwin H. Armstrong wrote John in July 1941 indicating in part, ''I have read with interest your article in the Proceedings of the Institute on the corner reflector....Please let me congratulate you on a very fine piece of work.'' Perhaps John's most famous invention, and a product of his intuitive reasoning process, is the helical antenna, widely used in space communications, on global positioning satellites, and for other applications.

John Daniel Kraus

During World War II, John was in Washington, DC as a civilian scientist with the U.S. Navy responsible for ''degaussing'' the electromagnetic fields of steel ships to make them safe from magnetic mines. He also worked on radar countermeasures at Harvard University's Radio Research Laboratory. He received the U.S. Navy Meritorious Civilian Service Award for his war work. In 1946 he took a faculty position at Ohio State University, becoming professor in 1949, and retiring in 1980 as McDougal Professor Emeritus of Electrical Engineering and Astronomy. Even so, he never retired. He was always working, researching, writing, and seeking new knowledge. He was active and vital to the end.

Early on, John became fascinated by Karl Jansky's discoveries of radio noise from space and the potential to use radio waves rather than visible light to ''see'' the universe. He maintained contact with radio astronomy pioneer, Grote Reber. John pursued radio-astronomy research in parallel with textbook writing and his OSU teaching responsibilities. By 1953 he was observing with a 96 helix antenna and had produced one of the first maps of the radio sky. This was followed by his design and construction of the innovative, 110-meter, ''Big Ear'' Radio Telescope—a tiltable, flat reflector joined to a fixed, standing, paraboloidal reflector. Observations began in the mid-1960s. Interspersed with this work were radio observations of Jupiter, Mars, and Venus as well as of the ionized trails of the Sputniks and U.S. satellites.

John and his radio astronomy team discovered some of the most distant known objects at the edge of the universe

and produced one of the most complete surveys of the radio sky. As he stated, ''The radio sky is no carbon copy of the visible; it is a new and different firmament.'' He was closely identified with efforts and activities related to the Search for Extraterrestrial Intelligence or SETI. He edited and published the first magazine on the subject called *Cosmic Search*. The now famous ''WOW!'' signal, of possible extraterrestrial origin, was detected by ''Big Ear'' in 1977.

He was the author of hundreds of technical articles and the holder of many patents. John was a dedicated educator and inspiring teacher, renown for providing plain English solutions to complicated problems. He was thesis advisor to 58 PhD and Master's candidates. His textbooks made complex subjects accessible to many readers. They have been widely used throughout the world and include *Antennas* (McGraw- Hill: 1950, 1988, 2002) and *Electromagnetics* (McGraw-Hill: 1953, 1973, 1984, 1992, 1999) and *Radio Astronomy* (McGraw-Hill: 1966; Cygnus-Quasar: 1986). They have appeared in Chinese, Japanese, Korean, Spanish, Russian, and Portuguese. He also wrote popular books, including the autobiographical *Big Ear* and *Big Ear Two* (Cygnus-Quasar: 1976, 1995), and the instructional *Our Cosmic Universe* (Cygnus-Quasar: 1980).

His professional memberships included the American Astronomical Society, election to the National Academy of Engineering (1972), and Fellow of the Institute of Electrical and Electronic Engineers. He received the Centennial Medal (1984), the Edison Medal (1985), and the Heinrich Hertz Medal (1990) from the IEEE. The Antenna and Propagation Society of IEEE twice awarded him its Distinguished Achievement Award, the last in 2003. He was awarded the Sullivant Medal (1970) from the Ohio State University and the Outstanding Achievement Award (1981) from the University of Michigan.

John and his wife, Alice Nelson Kraus, whom he married in 1941, were committed environmentalists. Alice and he donated the 80-acre Kraus Wilderness Preserve to the Ohio Wesleyan University in 1976. They also endowed scholarships to enhance environmental learning for students at Ohio Wesleyan and OSU. In addition, John was a passionate advocate of metrification in the USA. Predeceased in 2002 by his beloved wife, he is survived by two sons, John D. Kraus, Jr., and Nelson H. Kraus, and five grandchildren. His professional and personal papers are housed at the National Radio Astronomy Observatory archives in Charlottesville, Virginia.

John was viewed by many as a last living link to many of the astonishing scientific discoveries of the 20th century. He valued an open mind and direct physical insights and was of a by-gone era of hands- on invention, empirical testing, and observational research. Yet, he commanded an insightful grasp of the theory, which he could translate into thought provoking learning experiences for students and working engineers alike.

In his epilogue to *Big Ear*, John said, ''I haven't discovered the ultimate truths of the universe but I have experienced the thrill and excitement of playing a small part in the adventure of exploring the astounding, baffling, stranger-than-fiction cosmos in which we dwell.''

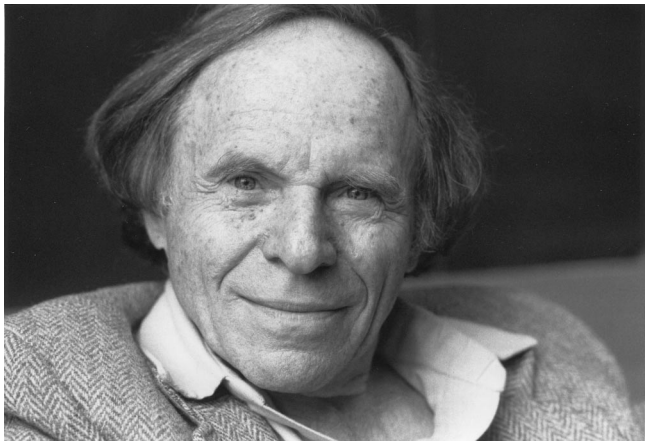
John D. Kraus, Jr.
University of New Hampshire
Ronald J. Marhefka
Ohio State University

PHILIP MORRISON, 1915-2005

Philip Morrison, who died 22 April 2005 in Cambridge, Massachusetts, was born in Somerville, New Jersey on 7 November 1915 to Moses and Tilly (née Rosenbloom) Morrison. Early childhood polio confined him for extended periods, during which he apparently developed his remarkable skill at speed reading. Speed writing (leading to a bibliography of more than 600 items) came later, and his memory must always have been exceedingly retentive.

Morrison went on from the public and private schools of Pittsburgh, Pennsylvania to receive a BS in physics from Carnegie Institute of Technology (now Carnegie Mellon) in 1936. At the University of California, Berkeley, he joined the Young Communist League and later the Communist Party, letting his membership lapse in the early 1940s when work and war came to seem more important. He was officially the student of J. Robert Oppenheimer and worked also with postdocs Robert Serber and Leonard Schiff and with a number of his fellow Oppenheimer students (a spectacular crew, which included Robert Christy, Sidney Dancoff, Bernard Peters [born Pietrkowski], Hartland Snyder, Joseph Weinberg, Dale Corson, Giovanni Rossi Lomanitz, David Bohm, and Eugene Cooper).

Following his 1940 PhD, Phil (his preferred signature) taught for a year at San Francisco State and then at University of Illinois (where he replaced Dancoff, who had gone on to a year at Institute for Advanced Study, Princeton). From Illinois, Morrison was recruited to the Metallurgy Lab (uranium project) at the University of Chicago by Christy in 1942. There he worked on the design for the Hanford Reactor, the main source of plutonium for the Trinity and Nagasaki bombs. He seems to have been sensitive to human relationships even in that context and was the author of a



Philip Morrison
Photo credit: Donna Coverney/MIT

''Dear Opje'' letter to Oppenheimer pointing out that the lack of cooperation between management and the scientists was getting in the way of the project.

Morrison's early research was largely in theoretical nuclear physics—e.g., an abstract-paper pair with Dancoff on internal conversion coefficients, and another pair with Cooper on internal scattering of gamma rays. An isolated 1939 abstract dealt with the zero-point fluctuations of the electromagnetic field and reads as if he might have been sneaking up on the Casimir effect. His first astrophysics paper, on electron capture in the interior of white dwarfs, came in 1941.

At Los Alamos, Morrison and Marshall Holloway were largely responsible for the final readiness and assembly of the plutonium bombs. He escorted the first ''Fat Man'' core out to the Trinity test site and observed the explosion from a distance at which the most overwhelming feature was the heat. Morrison was on Tinian in the South Pacific to help assemble the Nagasaki bomb and was part of the group of US physicists who first flew over and then visited Hiroshima and Nagasaki a month later. His formal and informal reports make clear that the damage was overwhelming, that he found it a devastating experience, and that his easily-recognizable writing style was already in place.

From then onward, Morrison was in the vanguard of the ''no third bomb'' movement. Indeed he had been the leader of a group of young Los Alamos physicists who favored a public demonstration of the bomb prior to any use in Japan. Oppenheimer firmly discouraged them. After WWII, Morrison became a founder of the Federation of American Scientists (chair 1973-76) and of the Bulletin of the Atomic Scientists, both entities strongly opposed to nuclear war and indeed war in general.

Morrison's post-war careers in science, education, and much else took place first at Cornell University (1946- 65), which firmly supported him against an ouster effort during the McCarthy era, and later at the Massachusetts Institute of Technology (1965 to official retirement in 1986). The switch was associated with the break-up of his first (1938) marriage to Emily Kramer, and remarriage in 1964 to Phylis Singer, who predeceased him in 2002. Emily had been a collaborator on a few magazine articles and so forth. Phylis became a full partner on several of his books and television programs, and, most charmingly, on an annual set of Christmas reviews of books for children.

Morrison the educator appears first as co-author with Hans Bethe of the text Elementary Nuclear Physics in 1952. A subset of other achievements in this territory include: (a) co-authorship of the Physical Sciences Study Committee text for high school physics in 1962 (prepublication versions existed in 1960); (b) the film, Powers of Ten, produced by Charles and Ray Eames in 1979, narrated by Phil, and seen by a large fraction of all the students in ″astronomy for poets″ classes since; (c) television programs including Whisper from Space (Nova, 1977, on the microwave background) and the six-part series Ring of Truth (PBS, 1987, on scientific method); and (d) literally hundreds of book reviews written for Scientific American from 1965 into the late 1990s, in every one of which you can hear his voice, in contrast to frequent Scientific American editorial practice. He produced a few late reviews and commentaries for American Scientist, but was not entirely pleased with the relationship. Among his graduate students who remained in cosmic-ray and astrophysics were Howard Laster, Kenneth Brecher, James Felten, Robert Gould, Leo Sartori, Alberto Sadun, and Minas Kafatos. Several of them describe Phil as a very ″hands off″ advisor, who would suggest a project and leave them to get on with it, which was rather different from the Oppenheimer style.

A 1959 paper by Guiseppe Cocconi and Morrison was the first suggestion that one might communicate with extraterrestrial civilizations using radio waves close to the 1421 GHz (21 cm) frequency of neutral hydrogen, though he had thought even earlier about gamma rays for this purpose. Phil was a SETI optimist from the beginning, writing and participating in conferences on the subject for many years (somehow often as the conference summarizer). He was an early exponent of the idea of convergent evolution, meaning that structures (including intelligence) with similar functions might arise from very different beginnings.

Morrison thought and wrote (often with students) about an enormous range of topics in astrophysics. This list, in fairness, includes both some successes and some false starts: (1) predictions of gamma ray emission from active galaxies, supernova remnants, and the general interstellar medium (long before any extra-solar gamma rays had been seen); (2) cooling of stellar remnants by neutrino emission (with Hong Yee Chiu); (3) possible X-ray emission mechanisms for clusters of galaxies (with James Felten); (4) a fluorescent theory of supernova light emission (akin at least to the current Ni-56 decay scenario); (5) the inevitable ''Are quasars giant Crab Nebulas?'' question; (6) a suggestion (with Ken Brecher) that the emission from gamma-ray bursts must be beamed into a narrow cone (now known to be true); (7) the association of a subset of active galaxies (including M82) with star formation fueled by recent infall of new gas rather than with a central black hole; (8) prediction of X-ray emission from the Crab Nebula and radio galaxies (later seen, though the mechanism is probably different); and (9) a shadowing mechanism to account for the jet found to be sticking out of the edge of the Crab Nebula in the 1980s.

Like any charismatic scientist, he was surrounded by a ''cloud'' of Morrison stories, many included on the web sites, so here are only four ''micros:'' (a) about the discovery of gamma ray bursters with the Vela (bomb test monitoring) satellites and the evidence for plate tectonics from underground test monitoring seismometers, he said: ''Well, it's hard to waste 10^8 dollars;'' (b) explaining why it was okay to pretend to confuse the real and dummy bomb cores en route to the Trinity test site: ''The real one was warm;'' (c) concerning the enormous extent of the facilities at Los Alamos: ''They won't need a heating system. If it gets cold, they can just burn part of it down;″ and (d) because his book reviewing resulted in an enormous accumulation of unreviewed books in his downstairs library-study, such that anyone who visited the Morrisons had to take at least one volume away: ″Do you like books?″ he would ask ingenuously.

To the end, Morrison maintained his hopes for the future

of humanity (the last book, with Kostas Tsipis, was Reason Enough to Hope, a nominee for the Phi Beta Kappa writing award), his interest in the science of the future (including a special enthusiasm for the planet-finding mission ''Kepler''), and his gift for friendship and willingness to accept and offer affection. Very near the end of his life, Phil joined with Robert Christy to sponsor an Oppenheimer lecture, which will take place at the April 2006 meeting of the American Physical Society. His favorite holiday was the winter solstice. He received a handful of honorary degrees, was a member of the U.S. National Academy of Sciences, and won prizes from Sigma Xi, the Astronomical Society of the Pacific, the American Association of Physics Teachers, and a number of other organizations.

[Technical articles on Philip Morrison will appear in the *BiographicalEncyclopedia of Astronomy* (forthcoming 2006, ed. T.A. Hockey, et al.) and the *Biographical Memoires of the National Academy of Sciences*. Additional, informal information appears on the web sites http://www.memoriesofmorrison.org/ and http://web.mit.edu/newsoffice/2005/morrison.html.]

Virginia Trimble
University of California, Irvine

ALBERT G. PETSCHEK, 1928–2004

Albert G. Petschek died suddenly 8 July 2004. He enjoyed good health and was very active professionally and personally until his death. He was highly respected, particularly in theoretical physics, for his deep, broad-ranging analytical powers, which resulted in contributions to nuclear physics, astrophysics, atmospheric physics, quantum mechanics, and quantum computing.

Albert was born in Prague, Czechoslovakia in 1928. His extended family left Czechoslovakia when its sovereignty was threatened by Germany in 1938 and settled throughout the Western Hemisphere. Albert's father, a banker, settled in Scarsdale, near New York City. Albert graduated from White Plains High School and obtained his BS from MIT in a program accelerated during World War II. While getting his masters degree at the University of Michigan, Albert met his wife, Marilyn, also a physics masters student. In 1953, Albert obtained his PhD from the University of Rochester working with Robert Marshak on aspects of nuclear theory, and joined Los Alamos National Laboratory (LANL), then Los Alamos Scientific Laboratory. Soon thereafter, Albert's younger brother, Harry, also became a PhD physicist. Harry is now well known in plasma physics for reconnection theory.

At Los Alamos, Albert worked closely with Carson Mark, Marshall Rosenbluth, and Conrad Longmire designing the first thermonuclear weapons. His derivation of several radiation diffusion solutions, later published as LAMS 2421, remains a classic in its field, as does work on nuclear theory done with Baird Brandow and Hans Bethe during a sabbatical at Cornell in 1961. Bethe was a frequent visitor to Los Alamos and a close friend. A devoted family man, Albert also valued Los Alamos as a safe, stimulating environment for raising an active family. Like many of the scientists at Los Alamos, Albert enjoyed its ready access to outdoor activities such as hiking and skiing. Albert often combined his passions for intellectual activity and the outdoors – discussing Lie groups around a camp fire or the controversies concerning the origin of lightning in electrical storms while hiking through a high mountain pass, watching a thundercloud form. Albert's son Rolfe was inspired in part by such outings to become a professional physicist.

For more than a decade following his PhD, Albert's primary scientific work was secret, contributing to the security of his adopted country, and he published little in the open literature. However, by the time of his death, Albert's broad interests and scientific rigor had resulted in 69 cited papers on such diverse topics as nuclear theory, plasma physics, radiation, numerical hydrodynamics and plastic flow, astrophysics (supernovae, quasars, gamma-ray bursts), chemical kinetics, atmospheric physics (plumes, electrification), geotectonics, nuclear weapons effects, inertial fusion and quantum computing. Even this list understates Albert's intellectual breadth: while his scientific publications are all in physics, he was also very knowledgeable in some aspects of biology and finance, and his broad-ranging analytical powers were appreciated by practitioners of many professions. In an increasingly specialized world, Albert's broad interests, wide knowledge, and willingness to think deeply about many problems are inspiring.

In 1966 Albert joined the faculty of New Mexico Institute of Mining and Technology (New Mexico Tech) in Socorro, New Mexico, as a full professor. In 1968 he left Tech to spend three years at Science, Systems and Software, a scientific consulting firm in San Diego California, and then returned to New Mexico Tech. Albert's intellectual leadership, the courses he taught in theoretical physics, and his frequent, insightful questions at seminars will long be remembered by those with whom he interacted at New Mexico Tech. Of his 69 published works, 39 were published in collaboration with Stirling Colgate. Colgate, at that time New Mexico Tech's president, had helped recruit Albert there. Albert's PhD students at New Mexico Tech keenly remember his patience, kindness and availability. His office door was always open, and he was eager to lead them through difficulties in their research.

Albert maintained his connection to LANL while at New Mexico Tech, consulting at LANL during many holidays and summers. In 1981 he became one of the first Fellows of Los Alamos National Laboratories. Albert also enjoyed service to the science community, editing a book on supernovae (1990), routinely judging local and regional science fairs, and advising LANL on the recipients of the Los Alamos prize. In 1987, Albert retired from New Mexico Tech and returned full time to Los Alamos in the Physics division. Although he subsequently retired from LANL in 1994, he remained very active at LANL until his death, spending three to four days there most weeks as an emeritus fellow, consultant, and frequent attendee of, and questioner at, seminars and colloquia. During this period his published scientific contributions were primarily to quantum computing and numerical hydrodynamics.

While he was retired Albert's part time status allowed him to spend yet more time with his family and he explored

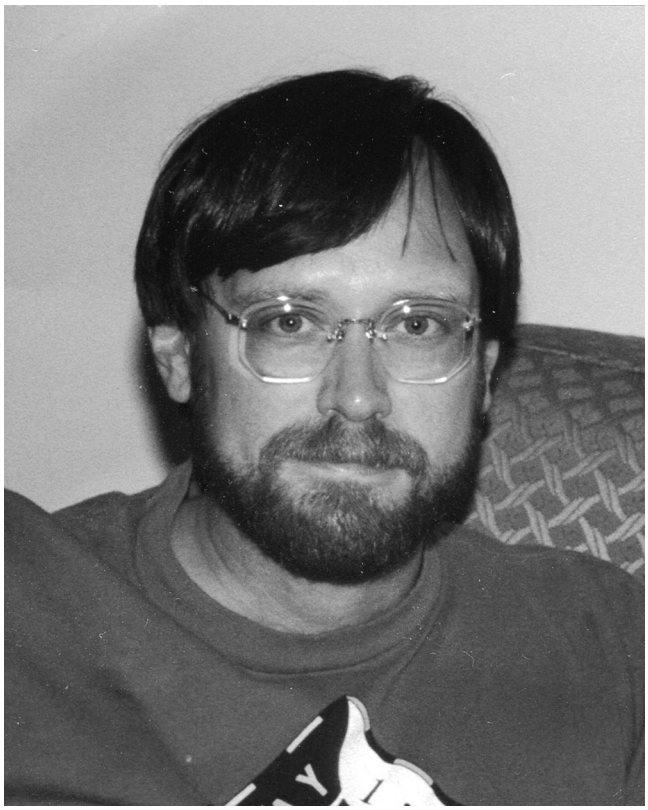
many parts of the world with them. Albert was an avid hiker, cross country skier, mushroom gatherer, gardener, and bicyclist. He commuted by bicycle between his home in La Senda and the Lab, an elevation change of 200 meters, in almost any weather, until his death. He is survived by Marilyn, his wife of 55 years, his brother Harry, his four children, Evelyn, Rolfe, Elaine, and Mark and three grandchildren.

Stirling A. Colgate
Los Alamos National Laboratory
Rolfe G. Petschek
Case Western Reserve University
Larry D. Libersky
Los Alamos National Laboratory

JASON G. PORTER, 1954 – 2005

Jason Porter, a solar astronomer at NASA's Marshall Space Flight Center (MSFC), died on 23 July 2005 from complications associated with his 18-year battle with a form of non-Hodgkin's lymphoma. He was born on 28 June 1954.

Jason was Texas born and bred. He received his Bachelor's degree from Texas A&M in 1976 and then went to the University of Colorado for his graduate work. He received his PhD from the Department of Astrophysical, Planetary, and Atmospheric Sciences in 1984. His thesis, ''Ultraviolet Spectral Diagnostics of Solar Flares and Heating Events,'' was written under the guidance of Katharine Gebbie and Juri Toomre. The ideas behind his thesis and much of his later work were formulated while he was a Graduate Research Assistant at Goddard Space Flight Center (GSFC) working on analysis of data from the Ultraviolet Spectrometer and Polarimeter, a major instrument on the Solar Maximum Mission (SMM). While at Goddard, he met his wife-to-be, Linda Zimmerman, who was working as a computer system administrator at the SMM Operations Center. They married and moved to Huntsville, Alabama in 1984 where Jason had an appointment as an NAS/NRC Resident Research Associate in the Solar Physics Branch of MSFC and Linda was a system administrator for the Space Science Laboratory. After a short stint at the University of Alabama in Huntsville, Jason joined NASA as a Senior Scientist in the Space Science Laboratory in 1987, a position he still held at the time of his death.



Jason G. Porter

Jason's early work brought forth the idea that ''microflares'' make a significant contribution to the heating of the solar corona, an idea which he continued to champion throughout his career. He also searched for coronal emission from white dwarf stars using the ROSAT and Chandra Space Observatories, and served as the NASA Project Scientist for a lunar based ultraviolet telescope. More recently he was leading a team of engineers and scientists, from MSFC, GSFC, and the National Solar Observatory on the development of a solar ultraviolet magnetograph instrument (SUMI) capable of measuring vector magnetic fields in the upper chromosphere and transition region where the magnetic reconnection that powers solar flares and CMEs is believed to occur. He continued to provide inspiring leadership to the development of SUMI up until the last month of his life.

Jason was admired by his colleagues on both a professional and personal level. He also had a rich life outside of his professional work. He loved the outdoors – hiking, camping, and fishing in particular. He loved music. Bluegrass was one of his favorites. He played the steel guitar, the Dobro, and the trombone, and spent many evenings playing in a local bluegrass band. He also loved finely crafted lagers and ales and would occasionally bring some strange brew to liven up an evening of poker. Jason and Linda have two sons, Graham (13) and Allen (11).

All who knew him well will miss him dearly.

David H. Hathaway
NASA Marshall Space Flight Center

KEVIN H. PRENDERGAST, 1929-2004

Kevin H. Prendergast, Emeritus Professor of Astronomy at Columbia University, died 8 September 2004 at the age of 75 from complications of lung cancer. He had been at Columbia for more than fifty years.

I first met Kevin in the summer of 1955, during a brief visit to the Yerkes Observatory. I had gotten into a heated discussion about double stars with a fellow graduate student, who suggested that we seek arbitration from a postdoc who was just then passing by. That postdoc was Kevin Prendergast. Kevin went straight to the blackboard, unleashed a learned and insightful lecture on binary stars, and then continued on his way. He wasted no motion, then nor ever, in our long association. Kevin was not at the time particularly concerned with double stars, though he made two significant contributions to their study somewhat after our meeting. The first of these was an early discussion (1960) of the dynamics of gaseous streams in binary systems that made use of theory gleaned from a book on the gulf stream by Henry Stommel

(himself a former astronomer). The second was the important suggestion, made with G.R. Burbidge, that X-rays from binary stars are produced when gas from one star falls onto a compact companion (1968).

Kevin was a native of Brooklyn and, after a stint at Brooklyn Technical High School, he attended Columbia University for his undergraduate and graduate studies. He received the PhD in 1954 for an astrometry thesis under Jan Schilt. While attending Columbia, Kevin also studied at the Julliard School of Music, and he became a very accomplished musician. As a pianist, he was about as good as one can get and still be called an amateur, according to my musically knowledgeable friends.

From Columbia, he went to the Yerkes Observatory for postdoctoral work with S. Chandrasekhar and developed an interest in MHD. His model of a magnetic star with a global force-free field holds an important place in the subject of stellar magnetism. The relativistic solution for a magnetized expanding sphere that he later developed has recently been published posthumously through the efforts of Donald Lynden-Bell (MNRAS 359, 725).

By 1956, Kevin was an assistant professor at the University of Chicago and began teaching at the Yerkes Observatory. Norman Lebovitz, who was in one of his classes, has told me that often when the time came for Kevin's afternoon class, the students had to go and roust him out of bed so that he could give his lecture. Around then (1958) he produced another memorable paper, this one on the role of dissipation in the elastic tumbling of asteroids which led to a better understanding of their interesting light curves. This was one of seven papers that he published in the 1954-58 period, of which three were with Chandrasekhar. The productivity increased in 1959 when Kevin began a collaboration with the Burbidges on the determination and interpretation of rotation curves of galaxies. They produced well over twenty papers in the next eight years on this topic.

Kevin spent 1961-62 at the Institute for Advanced Studies in Princeton and 1962-63 at the Goddard Institute for Space Studies on a National Academy Fellowship. He returned to Columbia in 1963 as an associate professor. He was made full professor in 1966 and, when Lo Woltjer left to direct ESO in 1976, Kevin became Chairman of the Department of Astronomy, a position he held on two occasions for a total of seven years.

In 1968, with R.H. Miller, Kevin began developing numerical schemes to study dynamics in disk galaxies. One of their main ideas was to discretize the phase space so as to remove the irreversibility found in many simulations of stellar dynamics. They also developed a gas dynamical procedure (''the beam scheme'') which made clever use of the moments of the discretized kinetic equation. With Kevin's student W.J. Quirk, they put together a simulation with gas and stars, and even introduced a star formation algorthim. They produced films of galactic evolution that were shown quite widely in colloquia and symposia. The films revealed phenomena of qualitative interest such as mergers, bridges, and tails, and the formation of bars. Similar results were also being obtained by Hohl around that time and both pieces of work were no doubt influential in shaping the thinking of people working in this field. One striking feature of the calculations was that spiral arms formed initially but were transient. To keep the spiral patterns from collapsing it seemed necessary to artificially heat the disks. Only later, when the existence of massive halos was recognized (by Ostriker and Peebles), could the true cause of stability be surmised.

From the mid-seventies on, Kevin worked on topics in astrophysical fluid dynamics and applied mathematics, largely with students. Some of this work was published, but it has to be said that much of his best work was not. A good example of the latter is his three-part handwritten manuscript on the dynamics of barred spirals that he distributed to several people over thirty years ago. Many of his other unpublished calculations have been deposited in the Columbia Library, and there are no doubt several things of interest to be found among his papers.

While one can only speculate on why so much of his work went unpublished, I find a remark by de Kooning quite helpful in thinking about it. In a review of book about the painter, Peter Schjeldahl reported that ''He [de Kooning] made ...paintings...and destroyed nearly all of them, to his subsequent regret....He explained 'I was so modest then that I was vain.''' When I accused Kevin of a similar mindset, he chuckled and said ''You are right, but don't tell anyone.''

Kevin was widely read and he had a remarkable awareness of literature. He was especially devoted to the work of P.G. Wodehouse. He also loved the Marx Brothers and late in life discovered Zero Mostel of whom he became an instant fan. He was a sailor and a snorkler, and enjoyed trading quips with anyone who was worthy of his steel. He was, in short, a person worth knowing.

Kevin is survived by his wife Jane, two daughters, Laura and Cathy, and a younger brother, Robert, an emeritus professor of medicine from Johns Hopkins who rowed too much.

Edward Spiegel
Columbia University

GIBSON REAVES, 1923-2005

Gibson Reaves died on 8 April 2005 in Torrance, California, from advanced metastatic prostate cancer. He contributed to the early study of dwarf galaxies in the Virgo cluster, but his greatest contribution to astronomy lives in the students whom he taught at the Department of Astronomy at the University of Southern California.

Gibson was born on 26 December 1923 in Chicago, Illinois. His mother is Helen Gibson Reaves, from Little Rock, Arkansas, and his father is Hart Walker Reaves, co-founder of Reaves & Hay Insurance Adjusters. Since 1928 his family lived in Los Angeles, where Gibson received all of his undergraduate education from public schools which at that time were among the best in the country. From their home in rural West Los Angeles, he could see the Milky Way easily and built his own telescopes at home. In 1941 he entered UCLA with a dual major: Astronomy and Military Science, and Tactics and Seacoast Artillery (ROTC). He was trained as a T 5 radio operator, CW and code, and radio repairman. He served with the combat engineers on Panay in the Philippines. Luckily he saw no combat.

Gibson Reaves

He completed a BA in Astronomy at UCLA in 1947, and entered the PhD program at the University of California Berkeley, during which time he was a Lick Observatory Fellow in residence on Mount Hamilton. His PhD Thesis was on the on dwarf galaxies in the Virgo Cluster. After his graduation in 1952, he joined the faculty at the University of Southern California and remained there until he retired in 1997.

As an undergraduate at UCLA, Gibson was fortunate to have two outstanding and extremely different professors, Frederick C. Leonard and Samuel Herrick at Berkeley and Lick Observatory. Looking back, we realize that, while he was an original scholar, he was not an exceptionally good student: He put much more effort into his own research than into his classes. At USC Gibson was fortunate to have as mentor Dr. John A. Russell, the epitome of a gentleman and a scholar. The mission of the department was to offer an undergraduate major appropriate for the student; no graduate work was permitted. Nearly all of Gibson's teaching, lectures, exercises and homework were based on the literature. He rarely followed a textbook.

In 1969 he was a visiting lecturer at the University of Basel. In 1971 he initiated the Astronomy-History- Philosophy interdivisional major. In 1974 he received the Excellence in Teaching award. His calculations of Jupiter's satellites were used by Jet Propulsion Laboratory. Asteroid 3007 was named for him in 1985, and the name of a favorite

research target in the Virgo cluster GR8 bears his initials. He served as an expert witness in several court cases. In 1987 he became an Associate Meritus of Lowell Observatory in Flagstaff, Arizona. He was a member of the International Astronomical Union, American Astronomical Society, Astronomical Society of the Pacific, and a Fellow of the Royal Astronomical Society, the Meteoritical Society, and the American Association for the Advancement of Science. He was a member of the Board of Advisors at Lowell Observatory.

He is survived by his wife Mary, his son Benjamin (b.1959 in Los Angeles), and his granddaughter, Grace (b. 1990 in Minoo, Japan).

Benjamin K. Reaves
Menlo Park, California
Merle F. Walker
University of California, Santa Cruz

DAMON P. SIMONELLI , 1959-2004

Damon Paul Simonelli died unexpectedly on 1 December 2004 after he collapsed of heart failure at his home near Pasadena, California. Damon led pioneering studies in the scientific exploration of the satellites of the Solar System with spacecraft. He was a longtime member of the AAS's Division for Planetary Sciences community. Only two weeks before his death he attended the 2004 DPS meeting in Louisville where he presented a paper on the surface roughness of Phoebe based on Cassini observations.

Damon was born in the Bronx, New York, on 15 August 1959. His father, Aldo Simonelli (d. 1990), was a clarinetist for the New York City Opera Company, and his mother, Alice Kennard Simonelli, was a secretary. His parents met while they were both students at the Julliard School. Family history has it that Damon's mother was an opera student, but she ruined her voice after singing when she had the flu. By junior high school, Damon had become a master at convincing his mother to wake him up at 3 AM to watch televised moonwalks, and to allow the entire family to view Star Trek episodes at the dinner table. Damon graduated from the Bronx High School of Science in 1976, with a composition on the New York State Regents exam that mentioned the significance of bicentennial toilet bowl lids. In addition to placing great emphasis on humor, the Simonelli family valued education. Damon's younger sister Danelle graduated from Vassar College and has served many years as a U. S. Park Ranger at Liberty Island.

Damon graduated with a BA *summa cum laude* in physics from Cornell in 1980, where he had begun working with Carl Sagan. Damon had painstakingly gone through all the Viking images to look for any possibility of sentient life on Mars (he didn't find any). Perhaps the arrival of data from the first great explorers of the outer Solar System - *Voyagers 1 and 2* - convinced Damon to continue at Cornell with Joe Veverka. While at Cornell, Damon began his pioneering work on the use of quantitative radiative transfer models to understand the physical character of planetary surfaces. He also became interested in post-eclipse brightening on the Galilean satellite Io, a phenomenon that was purported to be due to the condensation of the satellite's tenuous atmosphere during an eclipse by Jupiter. He carefully and skeptically studied this

phenomenon, as well as the related problem of night time atmospheric condensation. His thesis was on the microphysical nature and thermal properties of Io's surface. He graduated with a PhD in Astronomy and Space Sciences from Cornell in 1987.

Damon took on a new scientific challenge when he accepted a National Research Council Fellowship at NASA Ames Research Center with Jim Pollack. He worked with Pollack, Ray Reynolds, and Chris McKay on the interior structure of the Pluto/Charon system, and the carbon budget in the outer Solar System. Using new data on the density of Pluto derived from mutual events, Damon led a team that maintained the rockier composition of Pluto implied it formed in a CO-rich outer solar nebula rather than in a circumplanetary nebula. A paper by Simonelli and Reynolds suggested the possibility that Pluto was dense because it had lost its volatiles during an impact event that formed Charon, a suggestion that was later validated by Robin Canup's work. At the time of his death, Damon was a collaborator on the New Horizons Mission to Pluto, due to be launched in early 2006.

Damon returned to Cornell in 1991 to embark on a third scientific career. With Veverka, Peter Thomas, and Paul Helfenstein, he led a team to study the nature of the small, formerly uninteresting bodies of the Solar System, including the inner satellites of Jupiter that were imaged by the Galileo camera. He applied Thomas's ''spud'' shape model and Helfenstein's Hapke model to derive the shapes, roughness, albedo, and surface texture of a wide range of small bodies, including Io, Phobos, Phoebe, the asteroids Gaspra and Ida, and Europa. Damon also became an expert at planning spacecraft observations and command sequences for Galileo. He was recognized for these efforts with a NASA Superior Performance Award. Damon became known as a patient mentor to undergraduate students, many of whom are coauthors on his papers.

In 2002, Damon left his home turf of Cornell to accept a Senior National Research Council Fellowship at NASA's Jet Propulsion Laboratory with Bonnie J. Buratti. Damon quickly became a key member of the Small Bodies Group at JPL, assuming responsibility for planning the Visual Infrared Mapping Spectrometer (VIMS) Cassini observations of Titan. Although Damon had spent many Friday nights as a Cornell undergraduate conducting open nights at the Campus observatory, his first professional astronomical observing experience was at JPL.

Damon's style in science was always the egoless pursuit of truth. Generous in showing data to competitors, he never took shortcuts when it came to matters of scientific integrity. This good man did not have a single enemy among his colleagues.

Damon was an avid cyclist, amateur actor, and hockey player, continuing his participation in a team even after his move from the great white north to sunny southern California. He had an encyclopedic knowledge of sports, movies, TV, and science fiction, and he owned a world class collection of Star Trek and other science fiction memorabilia, most of which has been distributed to his friends. His science fiction book collection is now part of the Palomar Observatory Library in the Monastery, and his Star Trek collection will be on view at the Altadena Public Library later in 2006.

Although Damon's contributions to science were substantial, and his personal attributes of honesty, selflessness, humor, and intelligence deeply affected his wide circle of friends, his early death left unwritten chapters in both his professional and personal life. The deluge of Cassini data he had intended to work on had just begun to come in, and he will not see the New Horizons launch and encounter. He was devoted to his parents and sister and to the families of his close friends. The Community's tribute to Damon's life will be to continue his work and to keep his spirit of scientific honesty alive. His unique and dry wit and keen scientific insights will be missed.

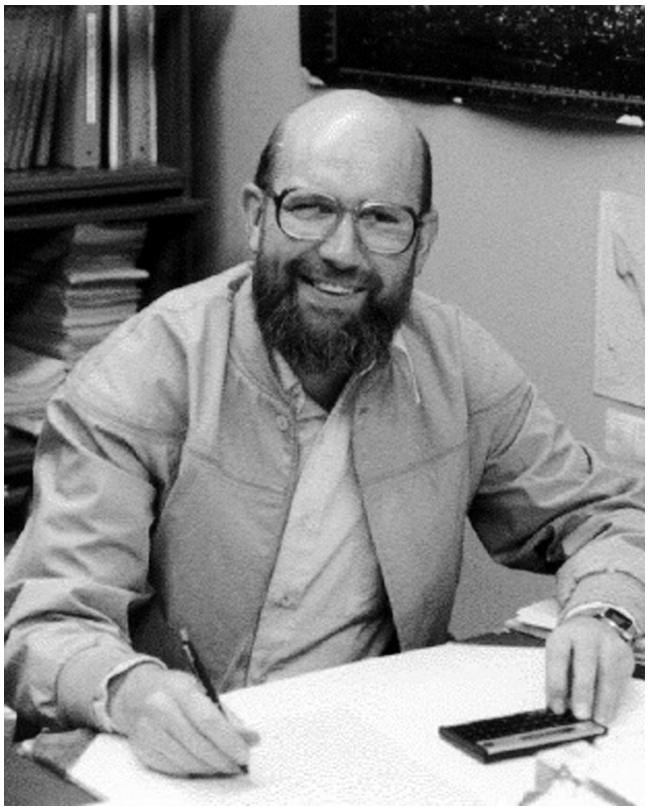
Damon's survivors include his mother Alice and sister Danelle.

Bonnie J. Buratti
NASA Jet Propulsion Laboratory
Jospeh Veverka
Cornell University

RICHARD L. (DICK) WALKER, JR., 1938-2005

Dick Walker, 67, died 30 March 2005 in Flagstaff, AZ, following a long illness. He was born on 9 March 1938 in Hampton, Iowa and grew up in Waterloo, Iowa.

As a child, Dick was fascinated with astronomy and built his own telescope. He saved his pennies and bought and read every book on the subject he could find. He also raised pigeons, naming four of them Hertzsprung, Hoyle, Gamow, and Kron.



Richard L. (Dick) Walker, Jr.

In 1957, the year Sputnik was launched, Dick began his college studies at the University of Northern Iowa in Cedar Falls. In 1959, he transferred to the State University of Iowa (subsequently renamed the University of Iowa) in Iowa City, where he earned a BA degree in astronomy and physics in 1963. He joined the staff of the U.S. Naval Observatory in Washington, DC, where he worked in the Time Service Division for a year before his assignment to the Astrometry and Astrophysics Division. Dick relocated to Flagstaff, AZ, in 1966 to continue his Naval Observatory service at the Flagstaff Station. His retirement in May 1999, ended a thirty-six-year career with USNO.

Dick was first and foremost an observational astronomer. From the mid 1960s through the late 1970s, much of Dick's time was devoted to the measurement of binary stars, observing with the 12-inch and 26-inch refractors in Washington and later the 40-inch and 61-inch reflectors in Flagstaff. He also made many trips to Lick Observatory to work with the 36-inch Clark Refractor there. During this time he consulted with Charles Worley, who was observing on the 26-inch, to make sure time was well-spent examining doubles that could not be observed in Washington. This period of observing overlapped with the early years of speckle interferometry, and Dick's observations, made with the largest telescope used for micrometry at the time, were very important for ascertaining the veracity of this new technique.

He was a studious and very careful observer of doubles and made over 8,000 measures, resulting in almost 3,000 mean positions. While measuring known systems for orbital analysis, he discovered 22 pairs (mostly additional components to these systems) and moving pairs, and his highlighting the rapid motion of these systems resulted in them being placed on many programs and led to the more definitive orbits of today.

As a staff member of the Flagstaff Station, Dick was, for over 30 years, one of the principal observers on the 61-inch parallax program. He also ventured into other areas of astronomy, including planetary systems. He is credited with discovering the moon of Saturn, Epimetheus, in December 1966, with the USNO Flagstaff Station 61-inch Kaj Strand Astrometric Reflector. He also obtained photographic plates to determine accurate positions of the outer planets for the Voyager 2 approaches to Uranus in 1986 and Neptune in 1989.

It is interesting to note that Dick's career in observational astronomy spanned three different eras of astronomical instrumentation and technique. He began his career doing eyeball astronomy, using a filar micrometer to measure double star separations. Photographic astronomy then became dominant and he took many thousands of plates. During the last ten years of his career, electronic cameras, primarily CCDs, replaced photographic plates. He readily adapted to the changing technologies.

A man of many interests, Dick was fascinated by the history of astronomy, especially archeoastronomy, as well as Egyptology. He taught himself the language of hieroglyphics. In 1977, having accumulated several weeks of vacation time, he set off on a trek to walk the Nile for 500 miles from Aswan to Cairo. One night, in the town Asyut along the Nile, he was brought into the police station. The local inhabitants found it hard to credit his story that he was simply on a walk and questioned him as a possible Israeli spy.

Following his retirement from the Naval Observatory, Dick consulted in a couple of construction projects. He designed the analemma and the skywalk star fields for the Koch Center for Science, Math, and Technology at Deerfield Academy in Massachusetts. He also consulted with James Turrell, providing astronomical position information for the design of the Roden Crater Project outside of Flagstaff.

In addition to his numerous scientific publications, Dick was also an accomplished author of fiction and poetry.

While he will be remembered for his significant scientific contributions to the field of astronomy, those who knew Dick, both scientists and non-scientists alike, will probably remember him best for his humility, his humanity, and his loyal and abiding friendship. He was a man with a terrific sense of humor and an infectious laugh. It was always an honor and pleasure to be in his company.

Richard L. Walker, Jr. is survived by his wife, Patricia, two daughters from his first marriage: Brenda Walker of Las Vegas, NV, and Pamela Hepburn of Holland, OH, as well as four children from Patricia's first marriage: Doug Browning of Lake Havasu City, AZ, Michael Browning of Kingman, AZ, Kim Bructo of Orient, OH, and Jennifer Brown of Lake Havasu City, AZ. He is also survived by ten grandchildren and three great-grandchildren. He was preceded in death by his father Richard, mother Mary, and daughter, Paula Jean Elizabeth Stone.

Jeff Pier and Brian Mason
U.S. Naval Observatory