

IN MEMORIAM

GÉRARD DE VAUCOULEURS

De Vaucouleurs went on to invent an entirely new cosmic distance system in competition with Sandage's. He added a whole raft of novel distance indicators, like the diameters of so-called ring galaxies, the brightest star clusters, and something called the luminosity index, to supplement and supplant the classic tried-and-true methods that went back to Hubble and Shapley. Some of them he used to determine distances, others he used to check his distance indicators. The whole scheme made Sandage and Tammann's look simple. His diagram of it was designed to look like the Eiffel Tower: several ladders of measurements rising to a pinnacle of truth, intricately cross braced by cross-checks, a posteriori comparisons, calibrations, linearity checks. In one respect his method was simple: Trusting no intuition or principle above any other, de Vaucouleurs used every way he could think of—no matter how half-cocked—to measure distances and then averaged all the results. Wily old nature wouldn't be able to hide from such a wide assault. He called it "spreading the risks."

The inevitable result of this new campaign, undertaken mostly by reanalyzing the vast amounts of data already published, was that de Vaucouleurs's Hubble constant rose even higher—to around 100. Which meant his version of the universe was half as big and half as old as Sandage and Tammann's.

— *Lonely Hearts of the Cosmos*, by Dennis Overbye,
HarperPerennial, 1992, pp. 268–9
(quoted with permission of the publisher)

Gérard Henri de Vaucouleurs was born on April 25, 1918, in Paris, France. His interest in astronomy was evident early in his life. As a boy of ten he observed the Moon from the balcony of his family's apartment using a marine telescope borrowed from a friend. A few years later, his mother purchased a telescope for him. He received his undergraduate degree in 1939 and his graduate degree in 1949 from the University of Paris, working in the Sorbonne Physics Research Laboratory and the Institut d'Astrophysique. It was in Paris that he met his first wife, Antoinette Pietra, who also became a celebrated astronomer and who worked closely with de Vaucouleurs until her untimely death in 1987. His dissertation involved research on molecular (Rayleigh) scattering of light in gases and liquids. De Vaucouleurs' real passion, however, was astronomy, which occupied most of his research career. After getting his degree, the couple

went to England for a while, where Gérard ran a weekly program on the BBC and worked at Mill Hill Observatory of the University of London. They then moved to Australia where they were attached to the Mt. Stromlo Observatory. De Vaucouleurs received a Doctor of Science degree from the Australian National University in 1957, for research in molecular physics, optics, photography, astronomy, and astrophysics. He came to the United States in 1957, working at both Lowell and Harvard College observatories before joining the faculty of the University of Texas at Austin in 1960. He soon became acclimated to Texas, and was typically seen on campus wearing a large Texas-style Stetson hat. He became a naturalized U.S. citizen in 1962. After Antoinette's death, in 1988 he married his second wife, the former Elysabeth Bardavid of Paris, whom he had known for many years and who survives him.

Gérard de Vaucouleurs was an observer who was meticulous with the data he collected and had an extraordinary knowledge of galaxies, recognizing hundreds of them by sight. During his 50-year career, he authored or co-authored more than 360 research and technical papers, 20 books, and 100 popular articles, a phenomenal production. His research was characterized by a respect—even reverence—for the data and a reluctance to produce grand theories. Initially, he did considerable research on photography as a tool to study galaxies. Among his many contributions, he was the first person to calculate the cosmic background light due to galaxies (1949). He established (1953–1956) the reality of the Local Supercluster (or Local Supergalaxy) and the effect of its mass concentration on the motion of nearby galaxies (1958–1964). He developed standard parameters to describe the luminosity distributions and angular diameters of galaxies. He discovered the " $r^{1/4}$ law" of the luminosity distribution of elliptical galaxies (1948) and was the first to use the general technique of photometric decomposition of spirals into bulge and disk components. He discovered (1953–1956) the spiral structure and (with Frank J. Kerr) the rotation of the Large and Small Magellanic Clouds, the nearest external galaxies, systems once thought to be "irregular" galaxies lacking rotational symmetry. With Allan Sandage, he developed (1956–1959) a personal revision of Hubble's original galaxy classification system, a three-dimensional scheme whose main dimension he showed to correlate well with measured global parameters such as bulge-to-disk ratio, integrated colors, hydrogen mass-to-light ratios, and mean surface brightness. With Antoinette de Vaucouleurs, he made the first quantitative analysis (1957) of the composite radiation of a stellar system (the bar of the Large Magellanic Cloud). He also discovered secondary or "nuclear bars" in barred galaxies (1974) and recognized the importance of rings and especially "pseudo-rings" in spiral galaxy morphology. He was the first to propose that the Milky Way is a barred spiral with a broken inner pseudo-ring

(1963–1969), and (with William D. Pence) he derived the first quantitative 2D model of the Milky Way (1978–79). His work on the Local Supercluster and the Milky Way bar was so controversial that it was more than two decades before either idea became generally accepted.

De Vaucouleurs is probably best known for his extensive work on the cosmic distance scale and for his production of three *Reference Catalogues* of bright galaxies in 1964, 1976, and 1991. The hallmark of the reference catalogues was homogenization of data from widely different sources, so that the catalogues would not be merely finding lists or data collection lists, but astrophysically useful databases. Much of the data on morphology, magnitudes, colors, and radial velocities that went into these catalogues was obtained by Gérard himself and his co-workers over many years. (Students and co-workers became well-familiar with his “Galaxymeter” designed for obtaining photometry, spectra, direct photography, and interferometry of galaxies at McDonald Observatory.) Using data in the *Reference Catalogues*, Gérard was able to develop new distance indicators and refine many others that were already known. He had a unique philosophy on distance matters of “spreading the risks,” that is, not putting all weight on a few distance indicators but applying as many different and independent techniques as possible to check for scale and zero-point errors. He favored a large value of the “Hubble constant” and a short time scale for the cosmological expansion. He wrote many detailed publications highlighting his methods and in particular distinguishing them from those of other leading distance scale workers at the time.

De Vaucouleurs was the recipient of many awards and honors during his career. He received the Herschel Medal from the Royal Astronomical Society in 1980 and an Ashbel Smith Professorship from the University of Texas in 1980–82, was made a member of the U.S. National Academy of Sciences in 1986, and received the Henry Norris Russell Prize of the American Astronomical Society in 1988.

A few years after arriving at Texas, de Vaucouleurs helped bring to Austin material from the Périquier Observatory at Le Houga, France, where he had worked for a time. The owner, an advanced amateur astronomer, had an extensive library and several telescopes, and de Vaucouleurs was instrumental in convincing the University to purchase these items. The library became the nucleus of the Astronomy Department library, and one of the telescopes is still in service at the Bee Cave Observatory west of Austin, where it is used for teaching and to serve the general public.

De Vaucouleurs' commitment to astronomy was total, and he expected no less from his students. One student recalls what happened when he attended an Astronomy Department picnic and, while playing volleyball, broke his index finger, which put him in a cast for several weeks. When de Vaucouleurs learned of this, he became rather upset, referring to the volleyball game as a "frivolous activity" that had interfered with more important astronomical work. However, Antoinette reminded him that it was, after all, the "astronomy picnic," and so the matter was dropped. Despite this stern exterior, de Vaucouleurs cared very much for his students. Many years after graduation, this same student fell during an observing run at Mt. Stromlo Observatory, in Australia, and broke bones in both legs. De Vaucouleurs found out about the accident and attempted to contact his former student by trans-Pacific telephone, but the nurses, apparently unable to understand his accent, would not let the call go through. This student always treasured the memory of de Vaucouleurs' concern for his welfare as it was revealed by this incident.

De Vaucouleurs' wit was dry and reserved. One student of his, after many years, managed to overcome his natural reticence and call his former teacher by his first name. De Vaucouleurs' comment was that it was about time! He loved good food, and once, while on sabbatical from the University of Texas, in Edinburgh, Scotland, after having been taken to lunch at one of the better restaurants, was asked if he had dined well. He replied that he had not dined since he left France! And upon hearing about the colossal number of papers (700) authored by another distinguished astronomer, he turned to Antoinette and asked how many papers he had written. When the answer came back (several hundred by then), he replied, "We must work harder!"

In 1988, a group of Gérard's friends and colleagues prepared a book about his work that was presented to him in Paris on the occasion of his 70th birthday. This book, entitled *Gérard and Antoinette de Vaucouleurs: A Life for Astronomy* (edited by Massimo Capaccioli and Harold G. Corwin, Jr.), provides a much deeper picture of his contributions than we can give here. In addition to Gérard's extragalactic work, the book describes his considerable research on the planet Mars, which was a major effort of his until the mid-1970s.

Gérard de Vaucouleurs life-long commitment to astronomy was an inspiration to all who knew him. He knew more about galaxies than anyone who ever lived. He will be long remembered for his contributions and greatly missed by all who follow in his footsteps.

Larry R. Faulkner, President
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This Memorial Resolution was prepared by a special committee consisting of Professors Frank Bash (chair), William Jefferys, and James Douglas.