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John A. Garraty
Mark C. Carnes

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Lewy remained active in mathematics after his 1972 retirement and lectured in Cortona, Italy, only ten weeks before his death. He died in Berkeley, California.

• A collection of Lewy's personal and professional papers is in the Manuscript Division of the Bancroft Library at the University of California, Berkeley. An interview containing numerous pictures, with some personal comments, is given in *More Mathematical People*, ed. Donald J. Albers et al. (1990); and a biographical sketch by Constance Reid appears in *Miscellanea Mathematica*, ed. Peter Hilton et al. (1991). Brief obituary notices are in the *California Monthly* (Nov. 1988) and *In Memoriam* (1988), both publications of the University of California at Berkeley.

JOSEPH D. ZUND

LEY, Willy (2 Oct. 1906–24 June 1969), science journalist and spaceflight publicist, was born in Berlin, Germany, the son of Julius Otto Ley, a wine merchant, and Frida May. Educated in primary and secondary schools in Berlin, he studied paleontology, physics, and astronomy at the Universities of Berlin and Königsburg. While he did not obtain a degree, Ley developed a broad command of the sciences and became fluent in a variety of languages.

Ley was nineteen years old when he read the book that would change his life, *Die Rakete zu den Planetenräumen* (1923), by the Rumanian physicist Hermann Oberth. Ley immediately decided that this treatise, filled with dense mathematical equations proving the possibility of spaceflight and outlining the means by which it might be accomplished, should be made available to an audience of general readers. Ley's first two books, *Fahrt ins Weltall (Trip into Space)* (1926), and *Die Möglichkeit der Weltraumfahrt (The Possibility of Interplanetary Travel)* (1928), achieved that goal and marked the author as an emerging leader in the field.

The work of Oberth, Ley, and other writers, including the rocket experimenter Max Valier, sparked a flurry of interest in spaceflight. In June 1927 a small group of enthusiasts formed the Verein für Raumschiffahrt (Society for Space Travel). The members of the VfR, Ley later explained to an American correspondent, were determined "to spread the thought that the planets were within reach of humanity, if humanity was only willing to struggle a bit for that goal." Ley was elected vice president of the organization early in 1929.

The members of the VfR conducted pioneering experiments with liquid propellant rockets between March 1931 and April 1932. According to Ley's account, they completed 270 static engine tests; 87 flights; 23 demonstrations for other organizations; and 9 presentations for the press. Their rockets reached altitudes of up to 4,922 feet. Ley, the single most visible member of the VfR, communicated news of the organization's research program to other rocket enthusiasts around the world. He wrote articles, lectured, corresponded widely, and hosted young rocketeers from other nations, such as G. Edward Pendray of the American Rocket Society.

By 1933, a series of problems brought an end to the golden age of VfR rocketry. The death of several rocket experimenters, including Valier and Reinhard Tillig, underscored the dangers inherent in liquid propellant rockets. Moreover, Rudolph Nebel, the man in charge of VfR rocket experiments, was creating problems for the organization. In the spring of 1933 Ley and VfR president Major Hans-Wolf von Dickhuth-Harrach discovered that Nebel had signed a contract with the city fathers of Magdeburg, promising to launch a man-carrying rocket to high altitude. Fearing that the VfR might be charged with fraud, Ley and Dickhuth-Harrach attempted to force Nebel out of the organization. Failing that, the two men announced their own resignations and attempted, unsuccessfully, to establish a new society.

Split by internal dissension, the VfR finally succumbed to government pressure. German army interest in rocket weapons had resulted in the creation of a small military rocket research team headed by the young Wernher von Braun, whom Ley had drawn into VfR membership. A curtain of military secrecy was drawn across all rocket experiments. Private individuals were forbidden to build or launch rockets, or to write articles on the subject.

By the end of 1934, Ley, barred from writing on his favorite subject, had decided to leave Germany. He made use of his broad contacts in the international astronomical community, traveling first to England in January 1935. There he stayed at the Liverpool home of Phillip Cleator, a member of the British Interplanetary Society, while waiting for passage to the United States. He arrived in the United States in late February and lived for a time with Pendray, whose letters of support had convinced U.S. officials to provide Ley, who was almost blind in one eye, with a tourist visa.

With the assistance of Pendray and other American friends, Ley made the acquaintance of a number of important engineers interested in rocket propulsion, including Alexander Klemin of New York University. As a result of these contacts, Ley was hired to serve as flight operations supervisor for an experimental winged rocket designed to carry small packets of mail across frozen Greenwood Lake, in upstate New York. Two of the rockets were flown on 23 February 1936. The first rocket climbed to an altitude of 1,000 feet, then spun to the ground when the combustion chamber burned through. The wings of the second rocket ripped off after only fifteen seconds in the air.

Forbidden by immigration regulations from accepting full-time employment, Ley made his living as a freelance writer and lecturer. He spent the years 1936 to 1940, as he later explained to a *New York Times* reporter, "writing day and night, turning out articles for scores of publications both here and in Europe." A friend estimated that he contributed at least ninety articles to science fiction magazines alone between 1935 and 1950. Most of these treated aspects of science, although he did write a few science fiction stories under the pseudonym Robert Wiley.

Ley joined the staff of the liberal tabloid newspaper *PM* as science editor in 1940. The following year he married ballet dancer Olga Feldman, a Russian immigrant who wrote a physical fitness column for *PM*; they were to have two children, both daughters. The year 1941 also marked Ley's emergence as an author of popular books on science. His earliest such books included *The Lungfish, the Dodo, and the Unicorn* (1941); *Bombs and Bombing* (1941); *Shells and Shelling* (1942); and *The Days of Creation* (1941).

In 1944 Ley became a naturalized U.S. citizen and published the first edition of his best-known and most influential book, *Rockets*. Based on the author's twenty-year search for material on the subject, his own experience in Germany, and his correspondence with virtually all of the pioneering figures in the field, the book traced the history of rocketry from the black powder era through the 1930s and explained the basic physical principles that would govern spaceflight. Over the next twenty-eight years, Ley would produce three major new editions of the book: *Rockets and Space Travel* (1948); *Rockets, Missiles and Space Travel* (1951); and *Rockets, Missiles and Men in Space* (1968). In all, the book went through twenty printings during Ley's lifetime.

For all of his expertise, the advent of the space age took Ley by surprise. A. V. Cleavor, a British weapons expert visiting the United States in the fall of 1944, remembered that Ley refused to believe reports that long-range German rockets were falling in London. His old colleagues, Ley argued, "were most unlikely to have developed such a weapon, which would be inaccurate and uneconomical, and probably impossible to achieve at that date, in any case."

Ley had underestimated the German rocketeers. During the nine years since his departure from Germany, the Nazi government had established a great research center at Peenemunde, on the Baltic Coast. There the rocket team headed by von Braun had succeeded in developing the A-4, or V-2, the world's first large ballistic missile.

The wartime record of the V-2, and well-publicized postwar rocket tests at White Sands, New Mexico, fueled public interest in spaceflight. Ley remained a leading commentator on the subject for the rest of his life. He held a variety of positions during the early postwar years, serving for a time as a research engineer with the Washington Institute of Technology in College Park, Maryland; a lecturer on scientific topics at Farleigh Dickinson University; an information specialist with the Office of Technical Services, U.S. Department of Commerce; a technical consultant to the producers of the pioneering science fiction television series "Tom Corbett, Space Cadet"; and, from 1950 to the end of his life, as science editor of the science fiction magazine *Galaxy*.

In 1951 Ley and Haydon Planetarium director Robert Coles organized the First Annual Symposium on Space Travel. Held in New York on 12 October 1951, the symposium featured papers on spaceflight by leading American scientists and engineers. Intrigued by

the gathering, Cornelius Ryan, a writer for *Collier's* magazine, began work on what would become a series of eight feature articles on spaceflight. Ryan drew on the expertise of a large number of leaders in the field, but Ley and von Braun were the central figures in the project. With illustrations by artists Chesley Bonestell, Fred Freeman, and Rolf Klep, the articles, which appeared between March 1952 and April 1954, were an enormous success.

Viking Press, which had published Ley's *The Conquest of Space* (1949), transformed the *Collier's* articles into three bestselling books, *Across the Space Frontier* (1952); *The Conquest of the Moon* (1953); and *The Exploration of Mars* (1956). Ley was also an important contributor to three Walt Disney television programs on spaceflight that were inspired by the *Collier's* article. "Man in Space," "Man and the Moon," and "Mars and Beyond" aired on the "Disneyland" television program beginning in September 1955.

Ley continued to produce popular books on science and aspects of spaceflight, including *Dragons in Amber* (1951); *Lands Beyond* (1952); *Salamanders and Other Wonders* (1955); *Exotic Zoology* (1959); *Harnessing Space* (1963); *Beyond the Solar System* (1964); *Watchers of the Skies: An Informal History of Astronomy from Babylon to the Space Age* (1963); *Ranger to the Moon* (1965); and *Mariner IV to Mars* (1966). He served as an adviser to the National Aeronautics and Space Administration and was preparing to leave for the launch of Apollo 11 at Cape Kennedy, Florida, when he died of a heart attack at his home in Jackson Heights, Queens, New York.

Reporting his death, the *New York Times* remarked that Ley had "helped usher in the age of rocketry and then became perhaps its chief popularizer." Captivated as a youth by the dream of spaceflight, he communicated that dream to others in the more than thirty books and countless articles that he produced during his forty-year career as a writer. He was the first important historian of the space age, and one of its most eloquent spokesmen.

- The papers of Ley are in the archives of the National Air and Space Museum, Smithsonian Institution. The Special Collections Department of the library at the University of Alabama, Huntsville, has preserved the 5,000 books and journals that made up Ley's private library. Both institutions maintain additional extensive biographical and bibliographic files on Ley. Additional files of Ley correspondence are in the papers of G. Edward Pendray at Princeton University, and of Wernher von Braun at the University of Alabama, Huntsville. Biographical material appears in "Willy Ley," *Die Rakete*, 15 Aug. 1928, p. 128; Steve Bland, "Sky Guy," *Philadelphia Inquirer Magazine*, 9 Sept. 1951, p. 12; P. E. Cleaton, "A Tribute to Willy Ley," *Spaceflight* 11, no. 11 (Nov. 1969): 408-9; and Lester del Rey, "The First Citizen of the Moon," *Galaxy Magazine*, Sept. 1969, pp. 151-57. An obituary is in the *New York Times*, 25 June 1969.

TOM D. CROUCH

LEYDA, Jay (12 Feb. 1910-15 Feb. 1988), translator, writer, filmmaker, and photographer, was born in Detroit, Michigan. His parents' names are not known.