At a meeting of the FACULTY OF ARTS AND SCIENCES on September 27, 2005, the following tribute to the life and service of the late Fred Lawrence Whipple was spread upon the permanent records of the Faculty.

FRED LAWRENCE WHIPPLE

BORN: November 5, 1906
DIED: August 30, 2004

Fred Lawrence Whipple, internationally known for his "dirty snowball" model of comets, was the man in large part responsible for bringing the Smithsonian Astrophysical Observatory to Cambridge. He thereby laid the foundation for the Harvard-Smithsonian Center for Astrophysics, which has become the world's largest astronomical establishment.

Born in Red Oak, Iowa in 1906, Whipple and his family soon followed many Hawkeyes to California, where he enrolled at UCLA to pursue his interest in mathematics. A mild bout of polio dashed his dreams of becoming a professional tennis player. In graduate work at Berkeley he became skilled in celestial mechanics. In 1930, with a fellow graduate student, he became the first to compute an orbit for the newly discovered planet Pluto. Soon thereafter, in 1931, he came to Harvard Observatory to head up the observing program. The following year, he was appointed instructor in the astronomy graduate program, then recently organized by Harlow Shapley. In 1938 he became Lecturer in Astronomy, in 1945 Associate Professor, and in 1950 Professor of Astronomy and chair of the Astronomy Department.

As a skilled orbit computer, Whipple was particularly interested in comets, and he took it upon himself to carefully examine every new plate in the observatory's rapidly expanding collection of astronomical photographs. By inspecting plates roughly equivalent in area to a city block, he sometimes declared, you could be pretty sure to discover a comet. His attention to details netted him six new comets between 1932 and 1942. In 1936, he established a system of telescopic cameras to photograph meteors simultaneously from the headquarters in Cambridge and from the Oak Ridge Observatory, 26 miles to the west. By triangulation he could establish not only the heights and speeds of the meteors, but their spatial orbits as well, finding that all of them originated from within the solar system, contrary to some vociferously expressed views at the time. Much later, during the 1960s, he created a vast system of cameras spread across the American Midwest, which for ten years recorded fireballs and meteors and which succeeded in recording an actual meteorite fall, one of only three cases where the prior orbit in space is now known for a meteorite in hand.

In 1950, Whipple introduced his "dirty snowball" model of a comet's nucleus, at a time when many astronomers thought of comets as loosely-organized orbiting gravel banks. His model was confirmed by the close-up images made in 1986 of Halley's comet and is now almost universally accepted.

In 1955, on the eve of the International Geophysical Year (the IGY), the secretary of the Smithsonian Institution found himself in a quandary: what to do about the nearly moribund Astrophysical Observatory, which occupied a rather unsuitable space on the mall in Washington. With coaching from Donald Menzel, who had long before been Whipple's thesis advisor in California and had recently advanced to the directorship of Harvard Observatory, Secretary Carmichael agreed to move the observatory to Harvard, with Whipple as its director. Thus began a collaboration that has worked to the great benefit of both institutions.

Almost immediately, Whipple—who had long held an interest in space astronomy—plunged into plans for tracking the satellites that were expected to be launched during the IGY. This involved commissioning a new telescopic camera for twelve strategically placed worldwide tracking stations, as well as enlisting over a thousand amateur astronomers in the so-called "Moonwatch" program. Five days after the Soviet Union startled the world with the launch of Sputnik 1 on October 4, 1957, Smithsonian astronomers announced the computation of its orbit, based mainly on Moonwatch observations. In June 1963, Whipple received the President's Award for Distinguished Public Service, the highest civilian honor for a government employee.

Whipple's administrative style was to hire outstanding people, provide the research support they needed, and give them free reign to follow their own ideas. The Smithsonian Observatory grew rapidly, sometimes to the frustration of its Harvard Observatory hosts, but it provided ample opportunities for the support of Harvard graduate students. Its computer facilities, for many years the most powerful in New England, served the needs of Harvard as well as Smithsonian scientists.

In the mid-60s, Whipple turned his attention to building a "real" observatory, preferably in the Southwest with its clear, dark skies. He found what he believed to be the best remaining site in North America: Mt. Hopkins, south of Tucson, Arizona. The site was dedicated there in 1968, a 60-inch reflector was in operation by 1970 and, as he put it, "At last the SAO had earned the 'O' in its title." But Whipple was not yet satisfied, and when he learned that the US Air Force had seven surplus 1.8-meter fused quartz mirrors, he proceeded to erect a multiple-mirror telescope whose light-gathering power was second only to the Palomar 200-inch. Much as he would have liked to remain director of the SAO until the multiple-mirror telescope was operational, Harvard rules regarding administrators helped force his retirement from Smithsonian in 1973, when he had reached the age of 67, although he remained Phillips Professor of Astronomy until 1977. But a year after his retirement as director, he remarked, "That shift in jobs was the best thing that has happened to me. I could not be happier doing

my own work, free of administrative duties!"

Whipple's own work included continuing studies of comets, and in his nineties he became the oldest scientist ever to serve on one of NASA's science teams, for a space mission to comet Wild 2. In 1982 the Mount Hopkins Observatory was rededicated as the Fred Lawrence Whipple Observatory, and in 2000 the Library of Congress honored him as one of 78 of the country's "Living Legends."

For almost 73 years, continuing long after his formal retirement in 1973, Whipple cycled the 22 miles from his home in Belmont to the observatory six days a week, until the frailties of extreme age made this no longer possible. He died in Cambridge on August 30, 2004, after a brief illness, and his ashes have been interred in Mount Auburn Cemetery.

Respectfully submitted,

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Alex Dalgarno
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