At a Meeting of the Faculty of Arts and Sciences on May 5, 2009, the following Minute was placed upon the records.

JEREMY RANDALL KNOWLES

Born: April 28, 1935
Died: April 3, 2008

Jeremy Knowles, former Dean of the Harvard Faculty of Arts and Sciences, a longtime professor of chemistry and biochemistry, and a world leader in the study of catalysis by enzymes, died of cancer at his home in Cambridge, on April 3, 2008, at the age of 72. He was deeply respected and admired by colleagues at Harvard and around the world.

Jeremy Randall Knowles was born in Rugby (UK) on April 28, 1935, and received his secondary education at Magdalen College School in Oxford just after World War II. After serving in the Royal Air Force as a Pilot Officer from 1953 to 1955, he attended Balliol College, Oxford, graduating with First Class Honors in 1959 and then continued at Oxford to the Ph.D. degree in physical organic chemistry in 1961. After postdoctoral work at the California Institute of Technology, Jeremy returned to Oxford and held various posts before becoming University Lecturer (1966–1974). He held visiting professorships at Yale (1969 and 1971) and at Harvard (1973) before joining the Harvard Faculty as Professor of Chemistry in 1974. Five years later, he was named Amory Houghton Professor of Chemistry and Biochemistry.

During his early independent career at Oxford, Jeremy's research interests turned from traditional organic chemistry to the understanding of protein catalysis at the atomic level of detail using the principles and methods of physical organic chemistry. He quickly became an international leader in this new and fast-moving field, one being propelled by an explosion of knowledge and the first glimpses into the three-dimensional structure of proteins as a result of the combined power of computers and X-ray crystallographic analysis. Jeremy's interests went beyond structure for, as he remarked in 1966, "Taking a photograph of a horse does not necessarily tell you how fast it can run." His move from Oxford, where his father served on the faculty, to Harvard, was astonishing to some, but perhaps not to those who knew him best. His description of the move to Harvard revealed an eagerness to discover and take on weighty challenges that would surprise few who knew him.

> Why am I going? Having been in Oxford for so long, I was very happily settled, both departmentally and socially, and Oxford is a splendid place to live. But the challenge of a new and exciting environment in the end became dominant. Am I going to stay? The mark of a very good department (also of a very bad one) is when its turnover among staff is very small. I think it's true that, despite alluring offers from elsewhere, nobody in the history of Harvard's Chemistry Department has ever left, except for one man—Conant—who left to become President of Harvard!

As fate would have it, Jeremy would later follow the path of Conant to high administrative

office, in Jeremy's case as Dean of Harvard's Faculty of Arts and Sciences (1991–2002 and 2006–2007).

Once at Harvard, Jeremy's research program thrived and grew to encompass a wide range of subjects from the chemical end of the spectrum—including entirely new general methods for probing fundamental chemical reaction pathways—to the understanding of enzyme catalysis in biochemistry, and to distinctly biological topics. For instance, in the last area he provided the first direct evidence for the importance of the hypervariable regions of the immune system's antibodies.

In the early 1970s, Knowles's work led to the first complete description of the energetics of an enzyme-catalyzed reaction using extraordinarily subtle and elegant analyses and experiments. This research attracted great attention since it showed that the enzyme had reached the limit of catalytic efficiency in the sense that further lowering of the energy barriers of the chemical steps could not result in faster rates of conversion of biochemical substrate to reaction product. The precision and rigor of thinking behind these advances is quite remarkable even from the vantage of the present, three decades later. Jeremy's scientific work reflects the qualities so apparent to those who knew him: a powerful and deep intellect, a relentlessly logical and thorough style of research, and great care in selecting and executing projects.

In the classroom, Jeremy was no less effective. His courses and lectures became very popular with science students at both undergraduate and graduate levels. They have been described as exacting and challenging, but clear, engaging, and witty. Jeremy's research students were devoted and highly motivated. Many graduates from his laboratory have gone on to positions of leadership in academia and in the pharmaceutical and biotechnology sectors. Jeremy's influence and wisdom were of great value in his departmental home, Chemistry, which he chaired from 1980 to 1983, and in his other Harvard affiliation, the Department of Biochemistry and Molecular Biology. He was an extraordinarily well organized, efficient, eloquent, and perceptive administrator, a consensus builder, and a sympathetic colleague.

Jeremy's professional contributions were recognized by many honors and awards including the Charmian Medal, the Bader Award, the Repligen Award, the Prelog Medal, the Robert A. Welch Award in Chemistry, and the Nakanishi Prize. He was awarded the Davy Medal of the Royal Society and was an honorary fellow of Balliol College and of Wadham College, Oxford. He received honorary degrees from the University of Edinburgh and the Eidgenössische Technische Hochschule in Zürich, and he was appointed Commander of the Order of the British Empire in the Queen's Birthday Honours of 1993. For nearly a decade he was a Trustee of the Howard Hughes Medical Institute, where he was deeply engaged in both the Institute's scientific and educational activities.

In 1991 Jeremy assumed office as Dean of Harvard's Faculty of Arts and Sciences. Jeremy's acceptance of this post, in several respects more than a full-time occupation, came as a surprise to many of his friends because he was so devoted to teaching and research. To others, it seemed a very logical move given Jeremy's multiplicity of skills, his personal warmth and, above all, his devotion to Harvard.

He took up what he later called a "wet-weather deanship," marked by significant academic challenges and substantial financial deficits. Although the early Knowles era was one of comparative frugality, academic challenges were met and the deficit was retired. Renovation of the eleven freshman dorms and the gathering of seventeen humanities departments into Barker and Boylston were only the beginning of a great run of physical improvements over his eleven years as dean. His deep concern for undergraduate education was manifest in the creation of the Educational Policy Committee in 1992, an early analytic report on the College administration and subsequent reforms, a review of the Core, and toward the end of his deanship, a reinvigoration of the Freshman Seminar Program. He later taught in the program he had revived: first a course on right-left asymmetries in science and then one on implications of the global use of antibiotics.

By the late 1990s, money worries had eased with successful fund raising and gains in the financial markets. New faculty appointments were made. Science was strengthened by the creation of centers for genomics, nanoscale systems, systems biology, and brain science. The last of the buildings he planned were for the sciences, and he lived to see the Naito Laboratory, Bauer Genomics Center, the Northwest Science Building, and the Laboratory for Integrated Science and Engineering rise along Oxford Street. The Center for Government and International Studies brought together the Government department with international research centers. Jeremy often said that he wished he had accomplished more for the graduate students and more for science sooner. Nonetheless, he was, not the least by the testimony of Harvard presidents past and present, a very good dean, and perhaps one of the truly great ones.

One of the undersigned (Neil L. Rudenstine) characterized Jeremy's tenure as dean:

> Deans and leaders like Jeremy come only rarely. He had a penetrating mind. He had wit and charm and taste. Above all, he understood the nature of a university and what it meant to search for knowledge, or discover even a single truth. The standard could never be too high. Many other things mattered, of course. But if learning, teaching, and research were not the heart of the matter, why were we here? Once he had decided to leave his lab and serve the University in more than chemistry, nothing less than all his energy and stamina would do. He was no less a friend. If there was a need for more than mere intelligence or skill, he was there, with his strength and his commitment.

Harvard's President Drew Faust wrote:

> Jeremy was my friend and mentor. He set the standard for selfless service, inspiring us with his dedication even as he delighted us with his wit and intelligence. The purpose of deans, he once remarked, is making things right, and he gave himself fully to that effort. We are profoundly in his debt.

Jeremy was called back to be dean again, in 2006. Living with illness, he nevertheless carried

off his last year as dean with characteristic focus and grace. Former President Derek Bok, who with Rudenstine and Faust called Jeremy a friend, said:

> His final year of service as a dean must surely rank as one of the most selfless acts of loyalty in Harvard's history. Under very trying circumstances, he succeeded in restoring a badly needed sense of momentum and progress at a critical time for his Faculty. We all owe him an enormous debt.

Jeremy Knowles had an extraordinarily large circle of friends and admirers at Harvard, worldwide in the sciences, and beyond, and at many educational, corporate, and philanthropic institutions. He is survived by his wife Jane, a gifted person and wonderful friend to so many at Harvard; three sons, Sebastian, Julius and Timothy; and seven grandchildren.

Respectfully submitted,

Andrew G. Myers
Neil L. Rudenstine
Michael D. Smith
E. J. Corey, Chair