Thirty-first Annual Alumni Seminar

Saturday, May 4, 1968

Dinner and Evening Program

Huntington-Sheraton Hotel, Pasadena

THE CRUCIAL TIME FOR TECHNOLOGY

T. A. Wilson

Executive Vice President, The Boeing Company

The dinner speaker has been in the aeronautical and aerospace fields since he received his bachelor's degree from Iowa State University in 1943. After receiving his MS in aeronautics at Caltech in 1948, he became head of aerodynamics on the B-47 with the Boeing Company. Mr. Wilson has worked in the fields of preliminary design, wind tunnel design, and construction. He has held a variety of managerial positions within the company and has been a member of the Board of Directors since 1966.

General Session

Beckman Auditorium, 2:15 P.M.

PROVOST, PROTEINS, PROTESTS AND POT—
HIGHER EDUCATION IN AMERICA TODAY

Paul Saltman

Provost of Revelle College, University of California, San Diego

These are strange times in higher education. Perhaps they are no different than when universities were first created. But the focus of the ills, the problems, the concerns of our society, and the search for new and creative dimensions for man seems to be located on the campus. The interaction of the student, the professor, and the administrator in the microcosm of the university and their collective interaction with the world in which they live constitute the subject of this talk.

Seminar Lectures

THE BIRTH OF MATTER

9:30 A.M. and 10:45 A.M.

Jesse L. Greenstein, Professor of Astrophysics and Staff Member, Mount Wilson and Palomar Observatories, Owens Valley Radio Observatory; Executive Officer for Astronomy

New evidence strongly suggests that the early phases of our Universe involved a gigantic explosion from a very dense state, in which radiation rather than matter existed. Evolution of the chemical elements followed during the early stages of the expansion and was completed during the brief life of massive stars. Information on the chemical composition of the oldest objects in our Universe illuminates some of the problems in understanding the first billion years.

THE TWO BRAINS OF ADAM

9:30 A.M. and 11:45 A.M.

Jerre L. Agresti, Graduate Student in Biology

The two brains of Adam refer to the twin cerebral hemispheres which distinguish the mammalian brain. Massive fiber connections between these hemispheres allow the brain to function as a unified organ. Recent investigations have revealed that when the fiber connections are surgically divided, each half brain seems to possess a mind of its own, with its own perceptions, memories, and will.

THE FEEL OF THE MOON

9:30 A.M. and 11:45 A.M.

Ronald F. Scott, Professor of Civil Engineering

An important consideration to the landing of the Apollo Lunar Module on the moon's surface is the strength of the surface material. To determine this property, surface sampling devices were flown to the moon on Surveyor III and VII and employed in a variety of tasks, including testing the lunar soil, digging trenches, lifting rocks, and assisting the chemical experiment. Surface sampler operations will be illustrated.

MOLECULAR BIOLOGY, THE NEXT PHASE

9:30 A.M. and 3:15 P.M.

Max Delbrück, Professor of Biology

All organisms employ sensitive devices to process incoming signals (light, touch, smell) to control their behavior. On the molecular level, these transducer mechanisms are not understood and will challenge the next phase of molecular biology. The problems will be illustrated

with the microorganism *Phycomyces* whose single-celled fruiting organ responds sensitively to light and to stretch. *Phycomyces* samples will be available to the audience; a film and slides will illustrate the lecture.

MUSIC, MATHEMATICS, AND MEDIEVAL CHURCHES
9:30 A.M. and 4:15 P.M.
John F. Benton, Associate Professor of History

Proportions, geometry, and number series were used in the design of churches by medieval architects, who set out to build into stone the music of the spheres and the divine harmonies. Careful measurements reveal the principles of construction hidden in such great churches as the lost abbey of Cluny. Color slides.

ROBERT A. MILLIKAN: SPOKESMAN FOR SCIENCE IN THE TWENTIES
10:45 A.M. and 11:45 A.M.
Daniel J. Kevles, Assistant Professor of History

America of the 1920's was Ford, Freud, the flappers, and among other things, Millikan. He was a respected and well-known public figure not only because he won the Nobel Prize in 1923, but also because of his social and economic ideas. These contributed to his notoriety as much as his scientific accomplishments. His fame reflected the ascendant prestige and place of science in the business-minded, increasingly urban America of the decade.

OPIUM EATERS AND OPIUM SMOKERS
10:45 A.M. and 4:15 P.M.
Peter W. Fay, Associate Professor of History

Packed 40 to a mango-wood chest, the dark brown balls of raw opium left Calcutta by the shipload in the 19th century, most of it bound for the pipes of China. But in India itself, and in the West, it was eaten or drunk. Why was it taken one way one place, another way another? And why, Mr. Gladstone, was it produced, shipped, and taken at all?

THE AGES OF PLANETARY OBJECTS
11:45 A.M. and 3:15 P.M.
Gerald J. Wasserburg, Professor of Geology and Geophysics

The age of the formation of the earth and the "ages" of meteorites will be discussed. It will be shown that very precise ages of objects with obscure origin have been established. The ability to determine very precisely age relationships of objects left over as fossils from the formation of the solar system will be discussed, and the history of these objects will be presented.

THE MODERN MARINER
11:45 A.M. and 4:15 P.M.
Clarence R. Gates, Manager of Voyager Mission Operations Systems Division

Contemporary spacecraft can now be directed to land at a specified region on the surface of Mars or Venus. Navigation of Mariner-class spacecraft will be described, emphasizing how the oldest of all sciences, celestial mechanics, is combined with the modern developments of molecular resonance and high-speed digital computers to yield extraordinary accuracies.

AN EARTHSHAKING DISCOVERY
3:15 P.M. and 4:15 P.M.
Paul C. Jennings, Assistant Professor of Applied Mechanics

The startling discovery that earth vibrations were detected on Mount Wilson was one result of a series of tests conducted during the construction of Millikan Library. The building was shaken to examine its dynamic properties. This provided information to guide analytical studies of buildings and to interpret their earthquake response. Measurements of the building response and the soil motion in the Pasadena area resulting from the test will be presented.

PLASMA IN CHEMICAL ENGINEERING
10:45 A.M. and 3:15 P.M.
Frederick H. Shair, Assistant Professor of Chemical Engineering

Current investigations will be discussed concerning the use of glow discharges for purifying gases and for providing new paths for chemical synthesis. The basic aspects of electrical discharges are reviewed with the emphasis placed upon future commercial applications. A distinction is made between equilibrium and non-equilibrium plasmas. Most of the discussion will center upon no-equilibrium plasmas. The results of early experiments will be presented along with a short film strip.

HUMANITIES–CALTECH STYLE
10:45 A.M. and 3:15 P.M.
Hallett D. Smith, Professor of English and Chairman of the Division of Humanities and Social Sciences

During the last 20 years, the humanities division has changed its emphasis, introduced humanities options, and has become an integral part of the Caltech curriculum. A look back at the past, coupled with a glance at the alleged conflict between human values and technology, gives meaning to the hopes for the future.

Exhibits: MILLIKAN LIBRARY–Open continuously for inspection; MILLIKAN MEMORABILIA –Millikan Library Lounge; CONTEMPORARY SCULPTURE–Dabney Garden.