Thirtieth Annual Alumni Seminar

Saturday, April 22, 1967

Dinner and Evening Program

Huntington-Sheraton Hotel, Pasadena

AN AEROSPACE EXECUTIVE VIEWS
THE CHALLENGE OF INNOVATION

L. Eugene Root
President, Lockheed Missiles & Space Company

By "innovation" is meant the deliberate attempt to create new products which will affect the lives of large segments of society. As such, it is a process playing a key role in our civilization, intimately connected with the principle of free enterprise. In the context of today's aerospace industry, it is conducted in partnership with our government and directed primarily toward national safety. Innovation is essential, risky, and expensive. The industry-government partnership must show strong discipline as it is increasingly forced to exhibit technological excellence, timeliness of meeting national problems, and enlightened and early screening alternatives. These general principles will be illustrated by specific examples drawn from actual weapon system histories.

Special Lecture

Beckman Auditorium, 11:45 A.M.

DESIGNING FOR PEOPLE
(Human Factors Engineering Applied to Automobile Design)

Peter Kyropoulos
Technical Director, General Motors Styling Staff

Human Factors Engineering is a truly interdisciplinary endeavor. It combines the efforts of the engineer, industrial designer, psychologist, anthropologist, and life scientist. Just how these people work in solving the problem of man-machine-environment relationships will be illustrated in some detail.

Seminar Lectures

THE NEW GREEN THUMB
9:30 A.M. and 10:45 A.M.
Arie J. Haagen-Smit, Professor of Bio-organic Chemistry

With our rapidly increasing population, the factors affecting production of our basic food elements cannot be left to incomplete observations and individual judgment. Unraveling the factors influencing plant behavior is possible in Caltech's "Phytotron," a plant laboratory in which various climates can be reproduced. The regulation of growth processes and the adaption of plants to their environment will be illustrated with films produced by the *Encyclopedia Brittanica* at Caltech and the Los Angeles County Arboretum.

NUCLEAR POWER
9:30 A.M. and 2:15 P.M.
Jack E. McKee, Professor of Environmental Health Engineering

In recent years there has been a marked surge toward nuclear power in the U. S. and elsewhere. Nuclear reactors will soon mushroom on our landscapes. Will they be economical? Are they safe? As a member of AEC's influential Advisory Committee on Reactor Safeguards, Dr. McKee has been following these developments closely.

THROUGH A FLY'S EYE
9:30 A.M. and 2:15 P.M.
Gilbert D. McCann, Professor of Applied Science; Director, Willis H. Booth Computing Center

Important facets of research in information science are concerned with studies of the visual nervous system. There are basic similarities between the principles of sight sensory systems and those of information processing. Results obtained from insect vision research, the computer system concepts used, and new types of visual communication principles will be presented.

BBC FILM—MEN AT THE HEART
OF THE MATTER
9:30 A.M. and 2:15 P.M.

This film deals with the nature of particle physics and theoretical physicists. Richard P. Feynman, Richard Chace Tolman Professor of Theoretical Physics, is featured.

CRACKED CLOCKS AND CONTINENTS
9:30 A.M. and 3:15 P.M.
Leon T. Silver, Professor of Geology

Data on the natural radioactive isotope systems U and Th found in natural mineral clocks can be organized to read the precise time of mineral forma-

tion, even when disturbed by younger geologic processes. Investigations of minerals in ancient rocks in California and adjacent areas are providing valuable information on the nature of displacements of the crust along the great fault systems of southwestern North America.

YOUR CHEATING HEART
9:30 A.M. and 4:15 P.M.
Sheldon K. Friedlander, Professor of Chemical and Environmental Health Engineering

Plastic hearts, membrane lungs, and artificial kidneys are currently the subjects of intensive research and development efforts by bioengineering groups. While some successes have been achieved with each type of artificial organ, many obstacles remain before really satisfactory designs can be produced. Some of the characteristics of these devices and the engineering problems encountered in dealing with blood flowing over the surfaces of non-biological materials will be discussed.

SURVEYOR-ING THE MOON
10:45 A.M. and 2:15 P.M.
R. J. Parks, Assistant Laboratory Director for Lunar and Planetary Projects

Surveyor I, the first American spacecraft to soft-land successfully on the moon, is the only vehicle thus far capable of photographing and measuring the effects of its landing on the lunar surface. Spectacular photographs will be viewed and discussed. Information about lunar bearing strength, soil characteristics, lunar topography, and local radio reflectivity, and their implications on the Apollo manned landing program will be covered.

IMPERIALISM, BRITISH STYLE
10:45 A.M. and 3:15 P.M.
Robert A. Huttenback, Professor of History

Historians have never agreed as to the nature of imperialism. Some of the motivations for imperial expansion, the nature of British imperialism, and the role of the imperial proconsul will be discussed. An attempt will be made to dissect the intellectual content of British imperialism, to determine whether there was a viable imperial philosophy dedicated to the betterment of man, or whether British imperialism was merely a manifestation of national ego.

BBC FILM—STRANGENESS MINUS THREE
10:45 A.M. and 3:15 P.M.

This film describes the discovery of the omega minus particle. Featured are Drs. Richard P. Feynman, Murray Gell-Mann, and Yuval Ne'eman.

NEW LIGHT ON THE UNIVERSE
10:45 A.M. and 3:15 P.M.
Wallace L. W. Sargent, Assistant Professor of Astronomy; Staff member, Mt. Wilson and Palomar Observatories

During the past 20 years enormous progress has been made in studying the universe in new regions of the electro-magnetic spectrum—in radio waves, in x-rays, and in the ultraviolet and the infrared. As a consequence, new kinds of objects have been discovered, ranging from "dark brown stars" to quasars, and new light has been shed on the problem of the large-scale structure and evolution of the universe. This talk surveys how Caltech astronomers and physicists are helping to explore these new fields.

ZANY CALIFORNIA POLITICS
10:45 A.M. and 4:15 P.M.
Robert L. Woodbury, Assistant Professor of History

Much of the nation views the political behavior of the most populous state as zany, baffling, and dominated by extremists. The characterization is not wholly mythical. Historically, California has responded to the pressures of a rapidly urbanizing society in a manner little different from the rest of the nation. Today, California may simply be the first to experience the agonies of new problems and new interest groups that will bring a new politics to other states as well.

BBC FILM—FRED HOYLE'S UNIVERSE
12:00 Noon and 4:15 P.M.

This film is concerned with cosmology and recent developments in radio and visual astronomy. Fred Hoyle, Visiting Associate in Physics, and Maarten Schmidt, Professor of Astronomy, are featured.

THEORY OF NUMBERS—OLD AND NEW PROBLEMS
2:15 P.M. and 3:15 P.M.
Tom M. Apostol, Professor of Mathematics

Speculations about the nature and properties of the whole numbers 1, 2, 3, 4, 5 . . . probably constitute the oldest form of mathematical thought. In time these speculations have grown into a vast and beautiful discipline called the Theory of Numbers, with ramifications linking it with every other branch of mathematics. This informal discussion describes some of the problems that have fascinated both professional and amateur mathematicians from ancient times to the present.

THE NEXT 90 YEARS
2:15 P.M. and 4:15 P.M.
James F. Bonner, Professor of Biology

1967 marks the tenth anniversary of the publication of *The Next 100 Years* by Drs. Harrison Brown, John Weir, and James Bonner. The book contained predictions on the course of industrial progress, material welfare, social changes, population and food problems, problems of urbanization, etc. This year's discussion reviews those projections and their accuracy to date and views the next 90 years.

WHAT IS LIFE?
3:15 P.M. and 4:15 P.M.
Robert L. Sinsheimer, Professor of Biophysics

The advances in biology of the past few decades have provided a much deeper understanding of the nature of life and its basis in molecular organization. From these concepts arise inferences and speculations concerning the origin and evolution of life on earth and, by extension, perhaps relevant to life anywhere. Considerations of the possibilities for life in other environments require us to seek new perspectives in which to view the only life we know. These concepts and quandaries will be discussed.