

# Twenty-Second Annual Alumni Seminar

*Saturday, April 11, 1959*

## THEME — THE SPACE AGE

### Nationally Famous Evening Speaker

The evening speaker, Major General John B. Medaris, U.S.A., is an outstanding authority in the field of missiles and has been concerned with ordnance phases of the Army since 1926. He is now Commanding General, United States Army, Ordnance Missile Command. His subject will be, "The Exploration of Space."

### Special Two-Hour Tours of the Jet Propulsion Laboratory

Tours will be started from the Caltech campus with all persons being transported to and from JPL by bus. Tours will be taken in groups of from 15 to 20 people. A bus carrying 50 persons will leave the campus every 15 minutes, between 8:30 a.m. and 2:15 p.m.

### Thirteen Outstanding Lectures

A group of 13 lectures will be given during three periods in the morning, and will be repeated during three periods in the afternoon in order to accommodate those who take the JPL tours.

*Alumni outside of southern California who wish to attend the Seminar should write the Alumni Office for reservations.*

## SEMINAR LECTURES

### WHAT WILL SPACE VEHICLES BE MADE OF ?

*Pol Duwez, Professor of Mechanical Engineering*

New environmental conditions encountered in space flights have created new problems in the field of materials. In addition to the much publicized cone reentry problem, in which extremely high temperatures are generated by aerodynamic heating, other unusual conditions exist in space. The experimental study of materials under such conditions is obviously very difficult since the only laboratory in which the experiments can be performed is space.

### CARBON-14 AND SOCIETY

*Linus Pauling, Professor of Chemistry*

There has been considerable difference of opinion as to the harmful effects of radioactive fallout from testing of nuclear weapons. There is evidence that this fallout will cause leukemia, bone cancer, and other radiation diseases. It may also cause stillbirth, childhood deaths and physical and mental defects at birth. Dr. Pauling will discuss the genetic and physiological effects of Carbon-14, a by-product of nuclear weapons testing.

### MESSENGERS FROM SPACE

*H. V. Neher, Professor of Physics*

Space beyond the earth is not empty. It contains electromagnetic radiations and high-speed particles or nuclei of the atoms, which we call cosmic rays. In addition it contains gas in the form of ionized clouds or plasmas. Such clouds from the sun have pronounced effects on the aurora, the ionosphere and on cosmic rays. They may also be the source of the radiation in the newly discovered Van Allen bands around the earth. Cosmic ray particles are probes that feel out this space and have given considerable information on its properties.

### INDIA — GROWING PAINS OF A NEW NATION

*Robert A. Huttenback, Lecturer in History*

*Master of Student Houses*

Mr. Huttenback has just returned from India where he spent a year conducting research on a Ford Foundation grant. He will make some observations based on his experiences which will include a discussion of the attitudes behind Indian foreign policy, domestic development and social evolution.

## PARTY LINES TO SPACE VEHICLES

*Roy W. Gould, Associate Professor of  
Electrical Engineering*

Current techniques for relaying information from satellites to ground stations will be described and a look taken at future systems. The ultimate limitations of communication systems will be discussed — and how these limitations will affect our ability to communicate with space vehicles.

## SCOTT FITZGERALD : THE COST OF FAME

*Henry Dan Piper, Associate Professor of English*

Dr. Piper is completing a book about this well-known American novelist who died forgotten in Hollywood in 1940. Since then, Fitzgerald has been the object of a spectacular revival of interest. This lecture will strip away the aura of myth from Fitzgerald's life and work, and will explain why he has become such a legendary figure in our culture.

## CARE AND FEEDING OF SPACEMEN

*James A. Lockhart, Research Fellow in Biology*

To support human life in a space vehicle or on another planet, we must provide the type of biological cycle prevalent on earth. This requires that the vehicle carry all necessary physical equipment to make available a continuous supply of food and oxygen. Dr. Lockhart will explore such a system.

## NEW ORGANS FOR OLD

*Elizabeth S. Russell, Research Fellow in Biology*

Man has long sought means to replace diseased or defective human tissues or organs. Dr. Russell will discuss her experiments in transplantation of blood-forming tissues in mice as a possible cure for constitutional diseases. She will take a look into the future possibilities of extending transplantation to human organs.

## WILL WORLD LEADERSHIP LEAD US TO THE POORHOUSE?

*Alan R. Sweezy, Professor of Economics*

What is the impact of the budget on the economy? What is the relation between taxes and economic welfare? In what ways and under what conditions does the budget contribute to the danger of inflation? What is the relation between the budget and economic growth? When is it safe to use deficit financing? Is the budget already too large for safety or could we manage to absorb further increases if necessary?

## PROPULSION FOR INTERPLANETARY FLIGHT

*Frank E. Marble, Professor of Jet Propulsion and  
Mechanical Engineering*

One of the most demanding requirements in the fascinating field of space exploration is that of propelling instrument packages or men over the enormous distances involved. A brief look will be taken at these distances and at the times required for some interplanetary trips. Conventional rockets will be examined to see what sizes are needed for these missions. Some of the novel space-propulsion devices will be discussed, such as ion, plasma, and nuclear propulsion units, to show what part they may play in the future exploration of space.

## THE CLOCK PARADOX

*H. P. Robertson, Professor of Mathematical Physics*

The theory of relativity predicts that a clock in motion loses time in comparison with one at rest. This leads the true believer to the startling conclusion that a traveler to outer space would, on his return to the earth, be younger than his stay-at-home twin; and the heretic to the paradoxical conclusion that, since motion is relative, the earth-bound brother could as cogently deny the rejuvenating effects of travel! Dr. Robertson will discuss the theoretical background and experimental verification of this and related effects. The seminar will, it is hoped, conclude with King John that "This was sometime a paradox, but now the time gives it proof."

## NUCLEAR EXPLOSION? CAN YOU BE SURE?

*Frank Press, Professor of Geophysics*

*Director of the Seismological Laboratory*

Our negotiations with the Russians on the control of nuclear tests depend to an overwhelming extent on the detection of nuclear explosions. The principal methods of detection will be described, and Dr. Press, who made a recent visit to Russia, will discuss Russian capabilities in this field. The probability of future peaceful control will be explored.

## WILL THE SPACE PROGRAM EXPLAIN THE EVOLUTION OF OUR SOLAR SYSTEM?

*Harrison Brown, Professor of Geochemistry*

Using lunar and planetary probes, which are planned in our space program, we can learn a great deal about the origin and evolution of the planets. Dr. Brown will review some of the major problems concerning the solar system, and he will describe the kinds of observations from space vehicles which can help in the solution of these problems.