Council for the Advancement of Science Writing
Third Annual Briefing on NEW HORIZONS IN SCIENCE, La Jolla, Nov. 15-19

PROGRAM

SUNDAY, Nov. 14 -- Informal get-together and reception, all evening

MONDAY, Nov. 15 -- Physics and Astronomy
Murray Gell-Mann, California Institute of Technology
Bernd Matthias, University of California, San Diego, and Bell Telephone Laboratories
Allan R. Sandage, California Institute of Technology and Carnegie Institution of Washington
Maarten Schmidt, California Institute of Technology

TUESDAY, Nov. 16 -- Planets and the Origin of Life
James R. Arnold, University of California, San Diego
Stanley L. Miller, University of California, San Diego
Leslie E. Orgel, The Salk Institute for Biological Studies
William H. Pickering, Jet Propulsion Laboratory, California Institute of Technology
Harold C. Urey, University of California, San Diego

WEDNESDAY, Nov. 17 -- (Half-day program, afternoon for tours, or free)
Earth Sciences
John D. Isaacs, Scripps Institution of Oceanography
Gordon J. F. MacDonald, University of California, Los Angeles
Walter H. Munk, Scripps Institution of Oceanography

THURSDAY, Nov. 18 -- Biology and Medicine
J. Bronowski, The Salk Institute for Biological Studies
Renato Dulbecco, The Salk Institute for Biological Studies
Clifford Grobstein, University of California, San Diego
Jonas Salk, The Salk Institute for Biological Studies
Paul Saltman, University of Southern California
S. J. Singer, University of California, San Diego

DINNER -- Use of Aerospace Systems Research to Solve the State's Social Problems -- Governor Edmund G. (Pat) Brown

FRIDAY, Nov. 19 -- Brain and Behavior
W. Ross Adey, University of California, Los Angeles
Richard Bellman, University of Southern California
Richard Farson, Western Behavioral Sciences Institute
J. Paul Guilford, University of Southern California
George Mandler, University of California, San Diego
Carl R. Rogers, Western Behavioral Sciences Institute

JAMES R. ARNOLD, Professor of Chemistry at the University of California, San Diego, has done research in the field of geochemistry, meteorites, cosmochemistry, origin of the solar system, cosmic dust, and composition of the lunar surfaces determined by gamma ray spectrometry. He was born in Metuchen, New Jersey, in 1923 and took his B.S. and Ph.D. degrees at Princeton University. In 1946, when he completed his doctorate, he joined the newly formed Institute of Nuclear Studies at the University of Chicago. After a year's research fellowship at Harvard University, he returned to Chicago to work with Willard F. Libby on radiocarbon dating. He then joined the faculty at Chicago. From 1955 to 1958, Dr. Arnold was on the staff of the Chemistry Department of Princeton University. He has been in San Diego since 1958. Dr. Arnold is a consultant to NASA, has been Associate Editor of the Journal of Chemical Physics, and was elected to the National Academy of Sciences in 1964.

J. BRONOWSKI, Senior Fellow at the Salk Institute for Biological Studies, is a historian and literary critic as well as a philosopher of science. Born in Poland in 1908, he was educated in English schools and read mathematics at Cambridge University from 1927 to 1930. He took his Ph.D. at Cambridge in 1933 and was Senior Lecturer at the University of Hull from 1934 to 1942. During World War II Dr. Bronowski was a pioneer in the development of operations research methods and, as Scientific Deputy to the British Chiefs of Staff Mission to Japan in 1945, he wrote the British report, The Effects of the Atomic Bomb on Hiroshima and Nagasaki. From 1945 to 1950 Dr. Bronowski led research for the British Government in applying statistical methods to the economics of industry. From 1950 until 1963 he was Director of Research to the National Coal Board in Great Britain. In 1953, he was Carnegie Visiting Professor at the Massachusetts Institute of Technology where he delivered a series of lectures that initiated the discussion of the "two cultures" and later were published in the book, Science and Human Values. In March, 1965, he delivered the inaugural Man and Nature lectures at the American Museum of History, which has just been published as the Identity of Man. In addition Dr. Bronowski has written books on literature and two books on intellectual history.

RICHARD FARSON, Director, Western Behavioral Sciences Institute, San Diego, has done research in the area of small-group process, leadership and social power, and organizational behavior. He is particularly interested in developing new ways of dealing with community mental-health problems, and in the application and communication of behavioral sciences knowledge. Dr. Farson was born in Chicago in 1926, took his Ph.D. in psychology at the University of Chicago, after receiving his B.A. and M.A. from Occidental College. He was a Ford Fellow at the Harvard University Human Relation Faculty, Research Associate of the University of Chicago, served in the Navy as Research Officer, studying the problems of leadership, motivation, and morale, and is presently associated with the National Training Laboratories. He is the author of a number of papers and is editor of the forthcoming book, Science and Human Affairs.

MURRAY GELL-MANN, Professor of Theoretical Physics, California Institute of Technology, is known for his researches into strangeness, dispersion relations, symmetries of weak interactions, "the eightfold way," and current algebra and higher symmetries. He was born in 1929 in New York City, educated at Columbia Grammar School, Yale University, (B.S. 1948), Massachusetts Institute of Technology (Ph.D. 1951), and taught at the University of Chicago from 1952 to 1955. He has been at Cal Tech since 1955, and became a full professor in 1956. He holds an honorary doctorate from Yale University.

J. PAUL GUILFORD, Professor of Psychology at the University of Southern California since 1940, is also Director of the Aptitudes Research Project. His area of specialization has been psychological measurement, with major research on factor analysis of intelligence and other aspects of personality. He took his Ph. D. at Cornell University and during World War II he served as Aviation Psychologist in the Army Air Forces. He is the author of a number of books and many articles, and is a former President of the American Psychological Association and a member of the National Academy of Sciences.

JOHN D. ISAACS is Professor of Oceanography and Program Director of Marine Life Research at the University of California, San Diego. His achievements have included the discovery of new ways of determining growth and mortality rates in some pelagic marine species; discovery of a sedimentary record allowing reconstruction of a calendar of recent prehistorical oceanographic and biological events; and development of a number of new instruments, in particular collectors and deep-moored unmanned instrument stations. Dr. Isaacs was born in Spokane, Washington, in 1913. He took his B.S. degree in engineering from the University of California. In 1948 he joined Scripps Institution of Oceanography and in 1957 was named Program Director of Marine Life Research, a long-term study of the ecology of the eastern North Pacific and its living resources. He serves in advisory and consulting positions for various societies and organizations, including the President's Advisory Panel on Pakistan.

GORDON J. F. MACDONALD is Chairman of the newly formed Department of Planetary and Space Physics at UCLA as well as Associate Director of the Institute of Geophysics and Planetary Physics and Director of the Atmospheric Research Laboratory at the University. His special interests are dynamics and evolution of the solar system, the interiors of planets, and the theory of time series analyses. He was born in Mexico City in 1929 and took his A.B., A.M., and Ph.D. at Harvard University. Dr. MacDonald is active in many Government advisory groups including the President's Science Advisory Committee, the Commerce Technology Advisory Board, the Space Science Board of the National Academy of Sciences, the Science and Technology Committee of NASA, and the U.S.-Japan Committee on Scientific Cooperation. He holds membership in 15 professional and scientific groups including the American Academy of Arts and Sciences, American Philosophical Society, and the National Academy of Sciences. He is Editor of the Journal of Atmospheric Sciences and the Reviews of Geophysics. Dr. MacDonald is the author of over 70 contributions to professional journals. In April, 1965 he was the recipient of the James B. Macelwane Award of the American Geophysical Union.

BERND T. MATTHIAS, Professor of Physics and Director of the Institute for the Study of Matter, University of California, San Diego, is known for his work in superconductivity and ferro-electricity. He was born in Frankfurt, Germany, in 1918, took his Ph. D. in physics from the Federal Institute of Technology, Zurich, Switzerland, in 1943, and served there as a Scientific Collaborator from 1942 to 1947. He came to the United States in 1947 and worked at the Massachusetts Institute of Technology, then joined the technical staff of the Bell Telephone Laboratories in 1948. He became a Professor of Physics at the University of California, San Diego, in 1961. He received the Research Corporation Award of 1962 and the John Price Wetherill Medal from the Franklin Institute. When Dr. Matthias originally became interested in superconductors, there were about 30 known superconducting metals. By 1963 this number had increased to more than 500, primarily through the efforts of Dr. Matthias and his co-workers from the Bell Telephone Laboratories and University of California, San Diego.

STANLEY L. MILLER, Associate Professor of Chemistry at the University of California, San Diego, is primarily interested in the synthesis of organic compounds under primitive earth conditions, and related problems. A native of Oakland, California, he took his B.S. at the University of California, Berkeley, in 1951, and his Ph.D. at the University of Chicago in 1954. After a year's postdoctoral work at the California Institute of Technology, he spent five years in the Department of Biochemistry, College of Physicians and Surgeons, Columbia University. He came to the University of California, San Diego, in 1960 in the newly formed Chemistry Department. In addition to his major interest, he also studies the mechanism of action of general anesthetics.

WALTER H. MUNK is Professor of Geophysics and Associate Director of the Institute of Geophysics and Planetary Physics, University of California, San Diego. Dr. Munk has made many fundamental contributions to understanding of ocean currents and waves. He is also one of the leading authorities on the reasons why the earth wobbles on its axis, and changes its speed of rotation. Born in Vienna in 1917, he received his B.S. and M.S. degrees from the California Institute of Technology and in 1947 took his Ph.D. at the Scripps Institution of Oceanography. Dr. Munk has been associated with Scripps since his years as a graduate student. While he was a student, he and the late Harald Sverdrup developed a system for forecasting breakers and surf on beaches, a system that proved of importance during World War II. Dr. Munk has made important contributions in the use of high-speed electronic computing machines for analyzing geophysical data. Two years ago he and a number of others collaborated in a global expedition to measure the attenuation of ocean swell. This resulted in part in the formulation of a new method for predicting tides. He has held two Guggenheim Fellowships, is a member of the National Academy of Sciences, the American Academy of Arts and Sciences, and other associations, and has been awarded the Arthur L. Day Medal of the Geological Society.

LESLIE E. ORGEL, Resident Fellow at the Salk Institute and Professor in Residence at the University of California, San Diego, studies especially "the relatively simple chemical reactions that are presumed to have produced the small molecules essential for the origin of life and the evolution of the highly specific interactions between them that form the molecular basis of heredity." Born in London, England in 1927, he took his B.A. in chemistry with first-class honors at the University of Oxford in 1949, and his Ph.D. there in 1951. In 1950 he was elected a Fellow of Magdalen College. A theoretical organic chemist at the beginning of his career, he has studied this field in the U.S. as well as in England. In 1955 he joined the Chemistry Department at the University of Cambridge. His work earned him the Harrison Prize in 1957, and he was elected a Fellow in the Royal Society in 1962. He has held his present position in San Diego since September 1, 1964.

WILLIAM H. PICKERING, Director since 1954 of the Jet Propulsion Laboratory of the California Institute of Technology, is in charge of research and development programs in unmanned exploration of the moon, the planets, and interplanetary space. Born in New Zealand in 1910, he came to the U.S. in 1929 and entered Cal Tech, taking his B.S. in 1932, his M.S. in 1933, and his Ph.D. in physics in 1936. He then joined the faculty and in 1946 became a full professor. He traveled throughout the world with Robert A. Millikan, studying cosmic rays. Dr. Pickering first became associated with JPL in 1944, has worked on the development of various rockets and missiles, and has won many U.S. and foreign awards. Under Dr. Pickering, JPL has had primary responsibility for the Mariner II spacecraft that successfully flew past Venus in 1962, the Ranger flights that have photographed the moon, and the Mariner IV craft that photographed Mars last July. He is a member of numerous scientific societies in the U.S. and abroad, and serves on various advisory and other committees of the Government.

CARL ROGERS, a Resident Fellow at the Western Behavioral Sciences Institute since 1964, is widely known for his contributions to theory, practice, and research in psychotherapy, and was responsible for the development of the "client centered" approach. Dr. Rogers was born in Oak Park, Illinois in 1902, took his B.A. at the University of Washington, and his M.A. and Ph.D. at Columbia University. He was active in the field of child guidance from 1927 to 1940, and was Director of the Rochester Guidance Center. After five years as Professor of Psychology at the Ohio State University, he served at the University of Chicago from 1945 to 1957 as Professor of Psychology and Executive Secretary of the Counseling Center, and at the University of Wisconsin, from 1957 to 1963, as Professor of Psychology and Psychiatry. Past president of several professional societies, including the American Psychological Association, Dr. Rogers has received many honors, among them the A.P.A. award for distinguished scientific contribution. He was elected to fellowship in the American Academy of Arts and Sciences in 1961, and in 1964 was selected Humanist of the Year by the American Humanist Association. He is the author of more than 130 publications; his eight books, among which On Becoming a Person is the latest, have reached an international audience, lay as well as professional. Dr. Rogers' interest has recently focussed on the intensive group experience as a means of facilitating change in personality and behavior; on devising freer and more innovative approaches to education; and on the development of a philosophy of science appropriate to the behavioral sciences.

JONAS SALK, Director and Fellow of The Salk Institute for Biological Studies, received his M. D. in 1939 from New York University College of Medicine. He spent a year with Dr. Thomas Francis, Jr., at New York University before his two-year internship at Mt. Sinai Hospital, New York City. In 1942 he rejoined Dr. Francis at the University of Michigan, under a National Research Council Fellowship, where he was engaged in studies on the immunology of influenza and immunization against the disease. In 1947 he went to the University of Pittsburgh as Associate Research Professor of Bacteriology and Director of the Virus Research Laboratory. He became a full professor in 1949 and in 1954 was named Chairman of the Department of Preventive Medicine. In 1955 the State of Pennsylvania created the Commonwealth Professorship of Experimental Medicine, which he occupied until 1963 when he took up his present position as Director and Fellow of The Salk Institute for Biological Studies in San Diego, California. His special interest continues to be in the field of immunology.

PAUL SALTMAN, Professor of Biochemistry at the University of Southern California, Los Angeles, studies diseases of humans at the molecular level. He also teaches biochemistry to graduate and undergraduate students, and is extremely interested in the communication of scientific knowledge to the non-scientific public. He earned his B.S. in chemistry in 1949 and his Ph.D. in biochemistry in 1953 at the California Institute of Technology. He has been at the University of Southern California since 1953. He spent a year in research and graduate study at the College de France in Paris. In 1960 he was appointed Career Investigator by the National Institutes of Health and spent the first year in Copenhagen studying transport mechanism in cells. His studies have helped clarify the mechanisms by which essential trace metals, such as iron, copper, and zinc, move in and out of cells. Some of the work has proved beneficial in the treatment of iron-deficiency anemias. He is also interested in the pathways of CO_2 fixation by green plants. Among his many activities in the field of the public understanding of science is a series of 13 half-hour television films called Patterns of Life, shown throughout the country on educational television stations. A sports enthusiast, he skis with his wife and two children in the mountains and rides the surfboard on the local beaches. In 1964 the trustees of the University of Southern California named him the Teacher of the Year.

MAARTEN SCHMIDT is Professor of Astronomy at the California Institute of Technology and a staff member of the Mount Wilson and Palomar Observatories. His special interests include galactic structure, dynamics and evolution; radio galaxies and quasi-stellar radio sources. Born in Groningen, Holland, in 1929, he took his Ph. D. at Leiden in 1956. He was a Scientific Officer at Leiden University from 1949 to 1959, a Carnegie Post-Doctoral Fellow from 1956 to 1958. He came to Cal Tech in 1959.

S. J. SINGER, Professor of Biology, the University of California, San Diego, has wide interests in molecular biology and biochemical genetics and cytology. He was co-discoverer with Linus Pauling and Harvey Itano of the characteristic properties of the hemoglobin of sickle-cell anemia and is the originator of the ferritin-antibody staining method for electron microscopy. Dr. Singer completed both undergraduate and graduate work at Columbia University and received his Ph.D. in chemistry from Polytechnic Institute of Brooklyn. He has held du Pont, Abbott Laboratories, Public Health Service, and Guggenheim Foundation fellowships. He has been a member of the Advisory Panel on Molecular Biology of the National Science Foundation, and of the Study Section on Allergy and Immunology of the United States Public Health Service. He has also taught at Yale University.

HAROLD C. UREY, Professor of Chemistry-at-Large, the University of California, San Diego, lists as his fields of interest entropy of gases, atomic structure, absorption spectra and structure of molecules; discovery of deuterium; properties and separation of isotopes, exchange reactions; measurement of paleotemperatures; chemical problems of the origin of the earth, the meteorites, the moon and the solar system. Winner of the Nobel Prize in chemistry in 1934, he has also received 13 other important prizes and medals. In addition, he holds 21 honorary degrees and is a member of 26 scientific societies, including 14 foreign societies. Born in Walkerton, Indiana in 1893, he took his B.S. in zoology and chemistry at the University of Montana in 1917, his Ph.D. in chemistry, with a minor in physics, at the University of California in 1923. He held a fellowship in Copenhagen in 1923-24. He has been a member of the faculty of the University of Montana, The Johns Hopkins University, Columbia University, and the University of Chicago, and has been a visiting professor at Oxford. Dr. Urey has also edited chemical journals. He has held his present position since 1958.