

NEW HORIZONS IN SCIENCE

Sixteenth Annual Briefing

November 12 through 17, 1978

Glenstone Lodge Gatlinburg, Tennessee

Co-Chairmen: Edward Edelson – Ben Patrusky

Made Possible by Grants from:

Nuclear Division, Union Carbide Corporation Department of Energy Gannett Newspaper Foundation

SUNDAY, NOVEMBER 12

Registration and Cocktail Party 6:00 to 9:00 P.M. Glenstone Lodge

MONDAY, NOVEMBER 13 8:30 A.M. to 11:30 A.M.

ARCHAEOASTRONOMY

EDWIN C. KRUPP, Ph.D., Director, Griffith Observatory, Los Angeles

Archaeoastronomy sites laden with significance continue to be uncovered in many parts of the Old and New Worlds -- including California and the Midwest.

HISTORY OF THE INNER SOLAR SYSTEM

N. MAFI TOKSOZ, Ph.D., Professor of Geophysics, and Director, George R. Wallace, Jr. Geophysical Observatory, Massachusetts Institute of Technology, Cambridge.

Almost a decade has passed since the U.S. acquired its first lunar samples. The rocks, together with data from the Viking missions, have contributed to a new scenario of the evolution of the planets.

2:30 P.M. to 5:30 P.M.

VIRAL HEPATITIS - THE NEW LOOK

ROBERT H. PURCELL, M.D., Head, Hepatitis Viruses Section, Laboratory of Infectious Diseases, National Institute of Allergy and Infectious Disease, Bethesda

Enormous progress has been made in understanding the clinical and epidemiological features of hepatitis types A, B and non-A/non-B. The advances point toward a number of realistic expectations relating to treatment and immunization.

EMBRYO TRANSFER

DUANE C. KRAEMER, D.V.M., Ph.D., Professor of Veterinary Physiology and Pharmacology, Texas A & M University, College Station

Following the birth of the first test-tube infant, the next major event in human reproduction will probably involve transfer of an embryo from one female to another. Efforts to develop methods for implanting primate embryos without surgery have met with initial success.

6:00 P.M. to 8:00 P.M.

Hospitality Suite Open

TUESDAY, NOVEMBER 14 8:30 A.M. to 11:30 A.M.

THE UNIVERSE - PRESENT STATE AND FUTURE FATE

ALLAN SANDAGE, Ph.D., Astronomer, Hale Observatories, Pasadena

January 1979 marks the 50th anniversary of one of the most fundamental discoveries in physical science: the fact that the universe is expanding. But toward what end? Cosmologists are acquiring the wherewithal to tackle this fabulous riddle.

THE NEW DATING GAME

HARRY E. GOVE, Ph.D., Professor of Physics and Director, Nuclear Structure Research Laboratory, University of Rochester, New York

An ingenious method for measuring radioactive isotopes counts the ticks of these chemical clocks BEFORE they occur. It offers new applications relating to predicting earthquakes and other natural disasters, climatology, ocean paleontology, cosmology, and dating of archeological artifacts such as the Shroud of Turin.

2:30 P.M. to 5:30 P.M.

INFLAMMATION: THE HIGH COST OF DEFENSE

GERALD WEISSMAN, M.D., Professor of Medicine, Director, Division of Rheumatology, New York University School of Medicine, New York City

"Stimulate the phagocyte," said George Bernard Shaw. He knew of what he spoke. Phagocytes are the first line of defense against injury and infection. But there's a dark side to these white blood cells. Recent studies have shown that they can "overreact" and damage the host they are intended to protect.

STOPPING BIOLOGICAL TIME

PETER MAZUR, Ph.D., Unit Leader, Theoretical and Applied Cryobiology, Biology Division, Oak Ridge National Laboratory, Oak Ridge

Theory says that cells will remain visible and unchanged at -196°C for 10,000 years. Recently, a number of exciting advances bring theory closer to reality that offers humans "the potential to control time, rather than the reverse."

6:30 P.M.

COCKTAILS AND BANQUET

Speaker: ROBERT D. THORNE, Assistant Secretary for Energy Technology, Department of Energy, Washington, D.C.

WEDNESDAY, NOVEMBER 15

9:00 A.M. to 12:00 P.M.

(The morning session will be held at the headquarters of the Oak Ridge Associated Universities in Oak Ridge. Transportation will depart at 7:15 A.M.)

FUSION POWER: THE ROAD AHEAD

JOHN F. CLARKE, *Ph.D., Deputy Director, Office of Fusion Energy, Department of Energy, Washington, D.C.*

Recent experiments at Princeton – and data from work in the U.S., U.S.S.R., Japan and Europe – suggest that controlled fusion is a feasible source of energy. Critical experiments underway at Oak Ridge should help establish economic practicality. Other approaches to controlled fusion also improve prospects for fusion power to supply a significant fraction of the world's energy in the next century.

MAKING OUR NUCLEAR FUTURE ACCEPTABLE

ALVIN WEINBERG, Ph.D., Director, Institute for Energy Analysis, Oak Ridge Associated Universities, Oak Ridge

Nuclear energy based on burner reactors is self-limiting because of dwindling uranium supplies. Breeder reactors might solve this problem, but can they be introduced successfully? Dr. Weinberg tells how this might be accomplished.

1:30 P.M. to 4:30 P.M.

OAK RIDGE NATIONAL LABORATORY TOURS

An opportunity to visit ORNL investigators and to explore various energy, medical and other facilities.

7:00 P.M. to 9:00 P.M.

Hospitality Suite Open (Glenstone Lodge)

THURSDAY, NOVEMBER 16

8:30 A.M. to 11:30 A.M.

EVOLOTION: GRADUALISM VS. PUNCTUATIONALISM

NILES ELDREDGE, Ph.D., Associate Curator, Department of Invertebrates, The American Museum of Natural History, New York City

"Natura non facit saltum" (natures does not proceed by leaps). Darwinian theory embraced this proposition, proposing that evolution involves steady and gradual change. But there's an alternative theory that could explain discrepancies in the fossil record. This theory of "punctuated equilibria" holds that most species stay much the same once they become established. The history of lineage is one of equilibrium, punctuated by rapid origin of new species that may challenge their surviving ancestors.

SECRETS OF THE SPIDER

PETER N. WITT, M.D., Chief, Mental Health Research, North Carolina Department of Human Resources, Raleigh

Until recently, spiders were regarded as ecologically "irrelevant" creatures, vestigial threads in the web of life. But new studies show that they are critical contributors to the balance of countless terrestrial ecosystems. Certain rare species may provide a model for answering fundamental questions about the social behavior of vertebrates, man among them.

2:30 P.M. to 5:30 P.M.

THE CHANGING CHEMISTRY OF THE ATMOSPHERE

JACK FISHMAN, Ph.D., Research Associate, Department of Atmospheric Science, Colorado State University, Fort Collins

Recent advances make possible measurement of gases in the atmosphere at concentrations of less than one part in a trillion. Investigators have confirmed the presence of the hydroxyl radical (OH), which plays a crucial role in the origin and fate of gases such as methane and carbon monoxide. Measurements to date clearly indicate that man's activities have significantly altered the chemical composition of the atmosphere globally, with potentially threatening implications.

THE GREAT ICE MELT: HOW IMMINENT?

JOHN H. MERCER, Ph.D., Research Associate, Institute of Polar Studies, Ohio State University, Columbus

There's reason to think that the amount of carbon dioxide in the atmosphere will double in the next 50 years. The most advanced climatic modeling suggests that the temperature rise would be sufficient to destroy the West Antarctic ice sheet, leading to a rapid 15 to 20-foot increase in sea level. Possible consequence: major dislocations in coastal cities.

6:00 P.M. to 8:00 P.M.

Hospitality Suite Open

9:00 P.M.

Informal Get-Together at Ski Lodge Ober Gatlinburg. Cash bar.

FRIDAY, NOVEMBER 17

8:30 A.M. to 11:30 A.M.

THE EMERGENCE OF BIOTECHNOLOGY

CHARLES D. SCOTT, Ph.D., Associate Director, Chemical Technology Division, Oak Ridge National Laboratory

Using biological agents to achieve a desirable change was probably the first technology to be exploited effectively. Example: making alcohol. Now there's a rekindling of interest that involves microorganisms or their enzymes in a variety of modern laboratory and industrial processes, including production of fuel from waste materials, manufacture of feedstocks, and recovery of valuable minerals such as uranium and copper.

THE DOWNBURST PHENOMENON

T. THEODORE FUJITA, Ph.D., Professor of Geophysical Sciences, University of Chicago

Tornado-like, thunderstorm-linked downdrafts of violent intensity pose a major hazard to aircraft during approach and climb-out. They've been clearly identified as the agents of catastrophe in several commerical airline disasters. Not all thunderstorms breed them, and when they arise they are detectable on Doppler radar. Properly warned, pilots can ride out the storm.

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