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COUNCIL FOR THE ADVANCEMENT OF SCIENCE WRITING, INC.

NEW HORIZONS IN SCIENCE

Seventeenth Annual Briefing

November 4 through 9, 1979

Rickey's Hyatt Hotel
Palo Alto, California

Co-Chairmen:

Jerry Bishop - Ben Patrusky

Made Possible by Grants from:

Stanford University
Stanford University Medical Center
National Science Foundation

SUNDAY, NOVEMBER 4

Registration and Welcome Cocktail Party
6:00 to 9:00 P.M.
Rickey's Hyatt Hotel

MONDAY, NOVEMBER 5
8:30 A.M. to 11:30 A.M.

THE HIDDEN COST OF SURVIVAL OF THE FITTEST

HUGH O. McDEVITT, M.D., Professor of Medical Microbiology and Medicine, Stanford University Medical Center

It seems like a biological double-cross: certain genes that enable us to mount an immune response to foreign invaders also leave us susceptible to a wide variety of so-called "autoimmune diseases" (e.g. rheumatoid arthritis, multiple sclerosis, juvenile-onset diabetes). Why this treachery? One argument: it represents an evolutionary trade-off, the price we pay to survive into our reproductive years.

THE DEBATE OVER ENERGY RISK

HERBERT INHABER, Ph.D., Scientific Adviser, Atomic Energy Control Board of Canada, Ottawa

JOHN P. HOLDREN, Ph.D., Professor of Engery and Resources, University of California, Berkeley

A study by Dr. Inhaber suggests that solar or wind power, oil and coal may pose a greater safety risk than atomic energy. The report has met with heated opposition, with Dr. Holdren among the more impassioned critics.

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

THE STORY OF EBLA

ROBERT BIGGS, Ph.D., Professor of Assyriology, Oriental Institute, University of Chicago

Unearthing, in Syria, of a 4500-year-old library of clay tablets inscribed with a mysterious language has provoked a controversy concerning the homeland of the Jews. Now specialists in language and cuneiform script have come along to help put the finds into reasonable context.

NEW ADVANCES IN CLIMATE PREDICTION

RICHARD C. J. SOMERVILLE, Ph.D., Professor of Meteorology and Head, Climate Research Group, Scripps Institution of Oceanography, University of California, San Diego

Scientists are getting better at modeling global weather patterns. Much-improved data collection kindles hope that we will soon be able to predict potentially devastating climatic events--e.g. the Peruvian "El Nino," monsoons, and, perhaps, severe winters in the U.S. and Canada.

6:00 P.M. to 7:30 P.M.
Hospitality Suite Open

TUESDAY, NOVEMBER 6
8:30 A.M. to 11:30 A.M.

SPLIT GENES AND JUMPING GENES

LEE HOOD, M.D., Ph.D., Ethel Wilson Bowles and Robert Bowles Professor of Biology, California Institute of Technology, Pasadena

The body's immune system can manufacture antibodies tailor-made to repel invasion by any one of millions of foreign agents. With the recent discovery of "jumping genes"--a natural rearrangement of segments of DNA--scientists have a handle on how this astonishing immunological repetoire is possible. The discovery coincides with another startling surprise: the genetic machinery of higher organisms is organized in a way profoundly different from that of the bacteria E. coli on which much of classic genetic theory is based.

FACTS AND FANCIES OF HUMAN EVOLUTION

VINCENT SARICH, Ph.D., Professor of Anthropology, University of California, Berkeley

Molecular anthropology, a powerful new discipline based on the discovery of an evolutionary "clock", has prompted a significant revision in the story of human evolution. But despite hard evidence developed by clock proponents, some investigators cling to outmoded scenarios of humankind's emergence.

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

FROM MOLECULE TO MIND

RICHARD F. THOMPSON, Ph.D., Professor of Psychobiology, University of California, Irvine

With 50 billion nerve cells a single human brain has more possible connections than the total number of atomic particles in the universe. In recent years, neuroscientists have come up with ingenious techniques for penetrating this awesome tangle. From such efforts have come a number of dramatic advances in understanding brain function--e.g. memory and learning--at a fundamental level.

SOCIAL SKIN

TERENCE S. TURNER, Ph.D., Associate Professor of Anthropology, University of Chicago.

The surface of the body is the frontier of the social self. By deciphering its "dress code," scientists are discovering important insights into society's values.

6:00 P.M. to 7:30 P.M.
Hospitality Suite Open

WEDNESDAY, NOVEMBER 7
8:30 A.M. to 11:30 A.M.
(The morning session will be held at the Stanford Linear Accelerator Center. Transportation will depart from Rickey's at 8:00 A.M.)

QUARKS AND THE BIG BANG

GORDON LASHER, Ph.D., IBM Thomas J. Watson Research Center, Yorktown Heights, N.Y.

Astrophysicists are striving to bridge the new physics of elementary particles with models of the early universe and the Big Bang theory. One research avenue seeks an explanation of the excess of matter in the universe. Another avenue seeks to determine how, in the first 1,000 seconds after the cosmos began, "free" quarks gave rise to atomic nuclei and so to galaxies, stars, and planets.

QUARKS, GLUONS, AND UNIFICATION

SIDNEY D. DRELL, Ph.D., Lewis M. Terman Professor, Deputy Director, and Executive Head of Theoretical Physics, Stanford Linear Accelerator Center, Stanford University

In high-energy physics discoveries are coming at a dizzying pace. Recently, in a matter of weeks: detection of a fifth (b for "beauty") quark, and the first experimental evidence of the existence of gluons (particles that hold together the centers of atoms). It means that science is beginning to understand nature's basic blueprint, and it gives impetus to hopes for a grand unification theory--a single explanation for the four natural forces.

11:30 A.M. to 1:30 P.M.

TOUR OF SLAC

An opportunity to see Stanford's two-mile-long accelerator, the most powerful electron accelerator ever built, along with a preview of the new PEP (positron-electron project) ring that's about to go operational. Also: a picnic lunch after which buses will take you back to Rickey's or the Stanford campus.

2:00 P.M. to 4:30 P.M.

Optional tour of Stanford University and a chance to visit with a number of investigators.

7:00 P.M.
COCKTAILS AND BANQUET
(Faculty Club on the Stanford campus)

Presentation of the National Association of Science Writers' Science-in-Society Journalism Awards.

Guest speaker: ELLIOTT C. LEVINTHAL, Ph.D., Adjunct Professor, Department of Genetics, Stanford University Medical Center.
Subject: "Mars in 3-D"

THURSDAY, NOVEMBER 8
8:30 A.M. to 11:30 A.M.

DEEP-SEA HOT SPRINGS

TJEERD H. VAN ANDEL, Professor of Oceanography, Stanford University

ROBERT R. HESSLER, Ph.D., Professor and Research Oceanographer, Scripps Institution of Oceanography, University of California, San Diego

Expeditions in the submersible ALVIN have turned up ocean-bottom hot springs at the Galapagos Ridge and the East Pacific Rise off Mexico. Among the discoveries: rich lodes of metals and exotic life based on the energy of brimstone rather than sunlight.

BY JUPITER, BY SATURN

EDWARD C. STONE, Ph.D., Professor of Physics, California Institute of Technology, Pasadena

A new history of the solar system is emerging from data sent back by the Pioneer and Voyager spacecrafts during their tours of the outer planets. The Voyager's chief scientist describes the implications of such discoveries as volcanoes and lava flows, sulphur-dioxide ice and invisible planetary rings, giant white spots, Jovian thunderstorms, and smog-shrouded clouds.

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

MONOCLONAL ANTIBODIES

LEONARD A. HERZENBERG, Ph.D., Professor of Genetics, Stanford University Medical Center

With the development of a new technique for "immortalizing" (clonging) antibody-making cells, scientists have a way of obtaining an unlimited supply of identical antibodies. These monoclonals have loosed a logjam of research on a variety of crucial biological questions.

PSYCHIC PHENOMENA: NEW DIMENSIONS OR OLD DELUSIONS?

ROBERT G. JAHN, Ph.D., Dean of the School of Engineering and Applied Science, Princeton University, Princeton, N.J.

No field of scholarly endeavor has proven more frustrating, or has been more abused and misunderstood, than the study of psychic phenomena. Once the overburden of questionable activity and irresponsible criticism is removed, does valid evidence exist to justify continued research? If so, how should the research be styled?

6:00 P.M. to 7:30 P.M.
Hospitality Suite Open

FRIDAY, NOVEMBER 9
8:30 A.M. to 11:30 A.M.

SINGLE ATOM DETECTION

MUNIR H. NAYFEH, Ph.D., Assistant Professor of Physics, University of Illinois at Urbana-Champaign

With a new laser-based technique (resonance ionization spectroscopy), researchers can detect one specific atom in the presence of 10 million trillion (10^{19}) other types of atoms. The technique is proving useful in such diverse fields as molecular chemistry and cosmology. One exciting application: the search for "free" quarks.

GRAVITY-WAVE ASTRONOMY

WILLIAM M. FAIRBANK, Ph.D., Professor of Physics, Stanford University

Efforts to demonstrate the existence of gravity waves, as predicted by the theory of general relativity, have proved unsuccessful. But a new generation of ultra-sensitive detectors is expected to produce the long-sought proof, along with new information about goings-on in the cosmos.

ADJOURNMENT

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