

**BIOGRAPHICAL SKETCHES**

**OF**

**PANEL MEMBERS**

## NORMAN E. BORLAUG

### Education

- B.S. (forestry), University of Minnesota, 1937
- M.S. (plant pathology), University of Minnesota, 1940
- Ph.D. (plant pathology), University of Minnesota, 1941

### Employment

- U. S. Forest Service (field assistant and junior forester, Massachusetts and Idaho), 1935-38
- University of Minnesota (instructor), 1941
- E.I. DuPont de Nemours (microbiologist), 1942-44
- Rockefeller Foundation
  - Cooperative Mexican Agricultural Program, Mexico (research scientist), 1944-60
  - Inter-American Food Crop Program (associate director), 1960-63
  - Wheat Research and Production Program, International Maize and Wheat Improvement Center, Mexico City (director), 1964-1981
  - Rockefeller Foundation (associate director) 1964-1981
- Consultant/collaborator to many governments in Latin America, Africa, and Asia
- Senior Consultant, International Maize and Wheat Improvement Center (Mexico City) 1981-

### Honors, Awards

Outstanding Achievement Award, University of Minnesota, 1959  
Elvin Charles Stakman Award, University of Minnesota, 1961  
Golden Spike of Wheat Award, Wheat Farmers of the Northwest of Mexico, 1962  
"M" Club Outstanding Achievement Award, University of Minnesota, 1966  
National Distinguished Service Award, American Agricultural Editors Association, 1967  
Naming of the Norman E. Borlaug Street, Citizens of the State of Sonora, and City and Rotary Club of Ciudad Obregon, Mexico, 1968  
Sitara-i-Imtiaz (Star of Distinction), Government of Pakistan, 1968  
First International Service Award in Agronomy, American Society of Agronomy, 1968  
Distinguished Service Award, Wheat Farmers of the States of Punjab, Haryana, and Himachal Pradesh, India, 1969  
Nobel Peace Prize, Nobel Foundation, 1970  
Aztec Eagle, Government of Mexico, 1970  
Professional Achievement Award, Sons of Norway, U.S.A., 1970  
Governor's Distinguished Service Award, State of Iowa, 1970  
Governor's Outstanding Services Award and proclamation of Norman E. Borlaug Day, State of Minnesota, 1971  
Golden Plate Award, American Academy of Achievement, 1971  
First Honorary Life Membership, American Society of Agronomy; Crop Science Society of America; Soil Science Society of America, 1971

## Honors, Awards

Honorary Consultant, West Pakistan Agricultural University of Lyallpur, 1971  
Honorary Academician, Academia Nacional de Agronomia Y Veterinaria,  
Argentina, 1971  
Award for Service to Agriculture, American Farm Bureau Federation, 1971  
Outstanding Agricultural Achievement Award, World Farm Foundation, 1971  
Medal of Merit, Italian Wheat Scientists, 1971  
Service Award for outstanding contributions to alleviation of world hunger,  
8th Latin American Food Production Conference, 1972  
First Medical Medal of Merit and Bestowal of Knighthood, Knights of Malta,  
U.S.A., 1973  
Golden Medal, Gremial Nacional de Trigueros, Guatemala, 1973  
Profesor Honorario, Universidad Nacional Agraria La Molina, Peru, 1974  
Bernardo O'Higgins Award, Government of Chile, 1974  
Centennial Foreign Fellow, American Chemical Society, 1976  
Presidential Medal of Freedom, 1977  
Numerous other awards and honors from governments, educational institutions,  
and citizens groups

## Academies of Science

Membership, National Academy of Sciences, 1968  
Foreign Member, The Royal Swedish Academy of Agriculture and Forestry, 1971  
Honorary Foreign Academician, N.I. Vavilov Academy of Agricultural Sciences  
of the Lenin Order, U.S.S.R., 1971 (1972?)  
Foreign Member, Indian National Science Academy, India, 1973  
Distinguished Fellowship, Iowa Academy of Sciences, 1975  
The American Society of Arts and Sciences, 1976  
Honorary Member, The Royal Society of Edinburgh, 1977  
Others

## Honorary Degrees

Doctor of Science: Punjab Agricultural University, India, 1969  
Royal Norwegian Agricultural College, Norway, 1970  
Luther College, 1970  
Uttar Pradesh Agricultural University, India, 1971  
Kanpur University, India, 1971  
Michigan State University, 1971  
Universidad de la Plata, Argentina, 1971  
University of Arizona, 1972  
University of Florida, 1973  
Universidad Catolica de Chile, Chile, 1974  
Universitat Hohenheim, Germany, 1976

Doctor of Humane Letters: Gustavus Adolphys College, 1971

Doctor of Laws: New Mexico State University, 1973

## D. Allan Bromley.

D. Allan Bromley is Henry Ford II Professor of Physics and Director of the A.W. Wright Nuclear Structure Laboratory at Yale University. He is internationally known for his work in nuclear physics where his interests have spanned nuclear structure, nuclear interaction mechanisms and the development of new accelerators and other frontier nuclear instrumentation. His current special areas of interest concern interactions of complex nuclei, nuclear molecular phenomena, and the application of nuclear concepts and techniques to other sciences. His laboratory, over the last several decades, has graduated more doctoral level nuclear scientists than any other institution in the world.

Trained as both an electrical engineer and physicist, he received his undergraduate education from Queen's University in Canada in 1948 and his Ph.D. in physics from the University of Rochester in 1952. He holds M.Sc., M.S. and M.A. degrees respectively from Queens, Rochester and Yale and honorary doctorates from the following Universities: D.Sc. [Queens University 1981, University of the Witwatersrand 1982], Sc.D [Notre Dama 1982], Dr. Nat. Phil. [University of Frankfurt, 1978], Dr. Phys. [University of Strasbourg 1950] and Litt.D. [University of Bridgeport 1981].

He is a Fellow of the American Academy of Arts and Sciences, a Benjamin Franklin Fellow of the Royal Society of Arts (London), a Fellow of the American Physical Society and of the American Association for the Advancement of Science. He has been awarded the Governor General of Canada Medal (1948), a Guggenheim Fellowship (1978) and a Humboldt Prize (1979 and 1982).

He is also known for his work in science policy having chaired the U.S. National Academy of Sciences Physics Survey Committee that produced the so called "Bromley

Reports, Physics in Perspective in five volumes in the early 1970's. He is currently a member of the U.S. White House Science Council, Chairman of the Board of the American Association for the Advancement of Science (AAAS), President-elect of the International Union of Pure and Applied Physics (IUPAP) and a member of the Executive Board of the International Council of Scientific Unions (ICSU). He also serves on a number of advisory committees to U.S. governmental agencies.

He headed the official delegation of U.S. nuclear scientists who visited the People's Republic of China in 1978 and has been a member of the U.S.-USSR Joint Coordinating Committee for Research in the Fundamental Properties of Matter since its founding in 1972.

He has published more than 325 papers in the scientific and technical literature and edited fourteen books. He serves on the Editorial Boards of seven international journals and on the Board of Directors of four New York Stock Exchange Corporations.

Robert H. Burris

Born April 13, 1914, Brookings, S. Dak.

Father, Edward T. Burris; Mother, Mabel C. Harza Burris

Education: Brookings, S. Dak. grade and high schools

B.S., S. Dak. State College, Brookings (Chemistry) 1936

M.S. (1938), Ph.D. (1940) Univ. of Wisconsin (Bacteriology)

D.Sc. (1966) S. Dak. State College

Married Katherine E. Brusse Sept. 12, 1945

Children: Jean Carol, John Edward, Ellen Louise

Positions: Research Asst. U. Wis. 1936-40

Natl. Res. Council Fellow, Columbia Univ. 1940-41

Instructor, Dept. Bacteriology, Univ. Wis.-Madison 1941-44

Asst. Prof., Dept. Biochemistry, Univ. Wis.-Madison 1944-46,

Assoc. Prof. 1946-41, Prof. 1951-- Chm. Dept. 1958-70

Guggenheim Fellow 1954 (Helsinki, Finland; Cambridge, England)

Memberships: Am. Soc. Biol. Chem., Natl. Acad. Sci., Am. Acad. Arts and Sci., Am. Soc. Plant Physiol. (Pres. 1960), A.A.A.S. (fellow), Am. Chem. Soc., Biochem. Soc., Am. Soc. Microbiol., Japanese Soc. Plant Physiol., Sigma Xi, Gamma Alpha, Am. Phil. Soc.

Publications: Coauthor of Manometric and Biochemical Techniques, coeditor of 3 symposium volumes. 272 publications in scientific journals.

Awards: Stephen Hales award and Charles Reid Barnes award from Am. Soc. Plant Physiol., Merit award of Botanical Soc. Am.; Thom award of Soc. Ind. Microbiol.; Browning award of Am. Soc. Agron., National Medal of Science

Research interests: Biological N<sub>2</sub> fixation, photosynthesis, plant respiration, hydrogenase, organic acid metabolism

Address: Dept. of Biochemistry, 420 Henry Mall, Univ. of Wis., Madison, Wis. 53706

Title: W.H. Peterson and Hilledale Professor of Biochemistry

## HENRY EHRENREICH

Henry Ehrenreich was born in Germany in 1928, and has lived in the United States since 1940. He was educated at Cornell and Columbia Universities, receiving the A. B. and Ph. D. in Physics from Cornell in 1950 and 1955 respectively. After eight years at the General Electric Research Laboratory, he became Gordon McKay Professor of Applied Physics in the Division of Applied Sciences at Harvard University in 1963. In 1982 Harvard named him to the newly established Clowes Professorship of Science. During the interim he also held visiting professorships at Brandeis University, The Université de Paris, and the University of Pennsylvania. Recently he became Director of Harvard's Materials Research Laboratory.

His areas of research have been centered around theoretical condensed matter physics and materials science. These include semiconductor physics, optical and magnetic properties of solids, theoretical metallurgy, the electronic properties of alloys (for which he is being awarded the Hume-Rothery Award of the AIME), and photovoltaics.

He has been involved in scientific assessments of several fields under the auspices of the National Research Council, the Office of Science and Technology Policy, and the Departments of Defense and Energy. He chaired a Committee on Amorphous Semiconductors (1970-1972) and the American Physical Society Study Group on Solar Photovoltaic Energy Conversion (1977-1981). He was also a member of the NRC Panel on Neutron Research on Condensed Matter (1977). He has belonged to and chaired the Materials Research Council of the Advanced Research Project Agency of DOD for the past decade. He has also been a member of the DOE Solar Photovoltaic Energy Advisory Committee.

He is a Fellow of the American Academy of Arts and Sciences, the American Physical Society, and the American Association for the Advancement of Science. He has served as Chairman of the American Physical Society's Division of Condensed Matter Physics, and as Secretary of the International Union of Pure and Applied Physics' Solid State Commission.

He is the author of more than one hundred papers and monographs, and serves, together with F. Seitz and D. Turnbull, as Editor of the Solid State Physics Series.

He is presently or has been an industrial scientific consultant or Science Board member to Sperry-Rand, Itek, Battelle, Brookhaven, IBM, GT &E, Exxon, Solar Power, and Los Alamos.

Richard M. Krause, M.D.

Dr. Richard M. Krause, director of the National Institute of Allergy and Infectious Diseases (NIAID) since November, 1975, is a physician and scientist who has achieved an international reputation for his work in immunology and microbiology. The persistent theme underlying his research concerns the chemical nature of substances in bacteria that stimulate the body's immune system and genetic factors that influence immunity to microbial substances.

Dr. Krause's studies initially concerned the cause and prevention of streptococcal sore throat and the more serious sequelae, rheumatic fever and glomerulonephritis. In the course of studies on the immune response to the streptococcus, he discovered in 1965 that rabbits and mice injected with certain bacterial antigens will produce a single or homogeneous type of antibody. Since that time, he -- and many other investigators in the field -- have used this animal model for studying chemical and genetic factors involved in the immune response. Genetic control of the antibody response to bacteria and viruses is important in health and disease, for example, in determining susceptibility or resistance to infection. In addition, Dr. Krause believes that genetically determined immune responses may also have other, far less predictable influences. Genetic control of the immune response might explain the emergence of abnormal antibodies, such as those implicated in the cause of rheumatoid arthritis, and lupus erythematosus.

Born in Marietta, Ohio, on January 4, 1925, Dr. Krause was educated in the Marietta public schools. He received a Bachelor of Arts degree from Marietta College in 1947 and in 1952 graduated from Western Reserve University School of Medicine.

Following medical school, Dr. Krause took his internship and residency in internal medicine at Barnes Hospital, St. Louis, Missouri, after which was appointed assistant physician at the Rockefeller Institute and Hospital (now Rockefeller University). In 1962, he assumed professorships in epidemiology and medicine at the Washington University School of Medicine in St. Louis. Four years later, he returned to Rockefeller University. He was a professor and senior physician at Rockefeller, prior to his arrival at the National Institutes of Health.

As NIAID director, Dr. Krause streamlined the Institute's major programs to assure that the maximum resources available would be channeled into meritorious research on the cause, treatment, and prevention of disease. Building upon the existing strengths of virology and immunology research, the Institute's intramural program was reorganized to emphasize other important areas, including basic studies on bacteria of major importance and clinical investigations on sexually transmitted diseases and allergies. One of his important initiatives was to create a research planning process that included broad participation from the scientific community. He established scientific advisory groups to assess the current status and make recommendations for future research in virology, asthma and other allergic diseases, immunology, and sexually transmitted diseases. These reports went well beyond the NIAID's immediate areas of responsibility and provided valu-



able information and recommendations for scientists and administrators in academia, other NIH institutes, government agencies, industry, and the international community.

Dr. Krause's efforts were recognized in 1979 with the DHEW Distinguished Service Medal for outstanding leadership in guiding the complex programs of the Institute and for his contributions to immunology and microbiology. His achievements have won him many other awards and honors, including several honorary degrees (ScD, LL. D.). He is a member of numerous professional societies, including the National Academy of Sciences and its Institute of Medicine. He serves as chairman of Section 43, Microbiology and Immunology of the Academy.

Dr. Krause has served as a consultant and advisor on a broad range of health problems. In the late 1960's and early 1970's, he served first as chairman of the NIH Allergy and Immunology Study Section and then as a member of the NIAID's Infectious Disease Advisory Committee. He has been a member of the Albert Lasker Medical Research Awards Jury and a Consultant to the World Health Organization and to the Surgeon General of the U. S. Army. Dr. Krause has lectured widely, employing his special ability to express the intricate nature of biomedical science in everyday language. A collection of his popular essays has recently been published in a volume entitled The Restless Tide; The Persistent Challenge of the Microbial World. In addition he has served on the editorial boards of several journals, including Bacteriological Reviews, Clinical Immunology and Immunopathology, Immunochemistry, Infection and Immunity, and the Journal of Immunology. Previously an editor of the Journal for Experimental Medicine, he now serves as an advisory editor.

## Biographical Summary

Robert M. White

President

University Corporation for Atmospheric Research

Dr. Robert M. White is President of the University Corporation for Atmospheric Research, a consortium of 50 U.S. and Canadian universities responsible for the management of the National Center for Atmospheric Research, the largest atmospheric science research laboratory in the U.S. Dr. White also holds other posts. He is the co-chairman of the Commission on Physical Sciences, Mathematics, and Resources of the National Research Council of the National Academy of Sciences. In addition, he is a member of the U.S. National Advisory Committee on Oceans and Atmosphere, a presidential commission with oversight over oceanic and atmospheric affairs of the U.S. government and of the Advisory Committee on Science Technology for the Department of State. He is a member of the Harvard University Visiting Committees to the Kennedy School of Government and Division of Applied Sciences. He is a member of the Board of Directors of Resources for the Future and a member of the Draper Laboratories in Cambridge, Massachusetts, and of the Science Advisory Council for the Atlantic Richfield Corporation.

Upon leaving the government in 1977, Dr. White assumed the post of Executive Officer of the U.S. National Academy of Sciences and Administrator of the National Research Council prior to assuming his present post.

Dr. White has been active in scientific and technological affairs in the U.S. for the past two decades, having held many governmental and nongovernmental posts. He was first appointed Chief of the U.S. Weather Bureau in 1963, later advanced to the post of Administrator of the Environmental Science Services Administration and in 1970 became the first Administrator of the National Oceanic and Atmospheric Administration. In these posts his work contributed greatly to development of a wide spectrum of U.S. oceanic and atmospheric programs and policies. These activities saw him involved extensively in international affairs. He was the permanent representative of the U.S. to the World Meteorological Organization of the United Nations for 15 years. There he was deeply involved in development of the World Weather Watch and the Global Atmospheric Research Program. He represented the U.S. as the U.S. Commissioner to the International Whaling Commission, in which capacity he was instrumental in bringing about new conservation measures for the protection of the world's whaling population. He has also led U.S. delegations in the negotiation of key bilateral arrangements with France, the Soviet Union and other nations.

Dr. White's scientific work has centered on the problems of atmospheric and oceanic dynamics where he has contributed substantially to our understanding of the general circulation of the atmosphere and the ocean and to problems of long-range weather forecasting. For his scientific contributions and for his leadership in atmospheric and other environmental affairs, he has been the recipient of many awards and honors. He has been the recipient of the Jesse L. Rosenberger Medal of the University of Chicago in

1971; the Rockefeller Public Service Award for Natural Resources in 1974; the David B. Stone Award of the New England Aquarium for contributions to environmental problems; the Cleveland Abbe Award of the American Meteorological Society for contributions to meteorology; the International Conservation Award of the U. S. National Wildlife Federation; the International Meteorological Organization Prize of the World Meteorological Organization. He was recently made a Chevalier de la Legion d'Honneur of France for his work in international atmospheric and oceanic sciences. He has been granted honorary doctorates from the University of Long Island, the University of Wisconsin, and Johns Hopkins University. In 1968 he was elected as a member of the National Academy of Engineering. He was President of the American Meteorological Society in 1979.

Dr. White was born in 1923 in Boston, Massachusetts. He received his undergraduate education at Harvard University, receiving a Bachelor of Arts degree in 1944 and a Doctor of Science degree from the Massachusetts Institute of Technology in 1950.