Annual Meeting

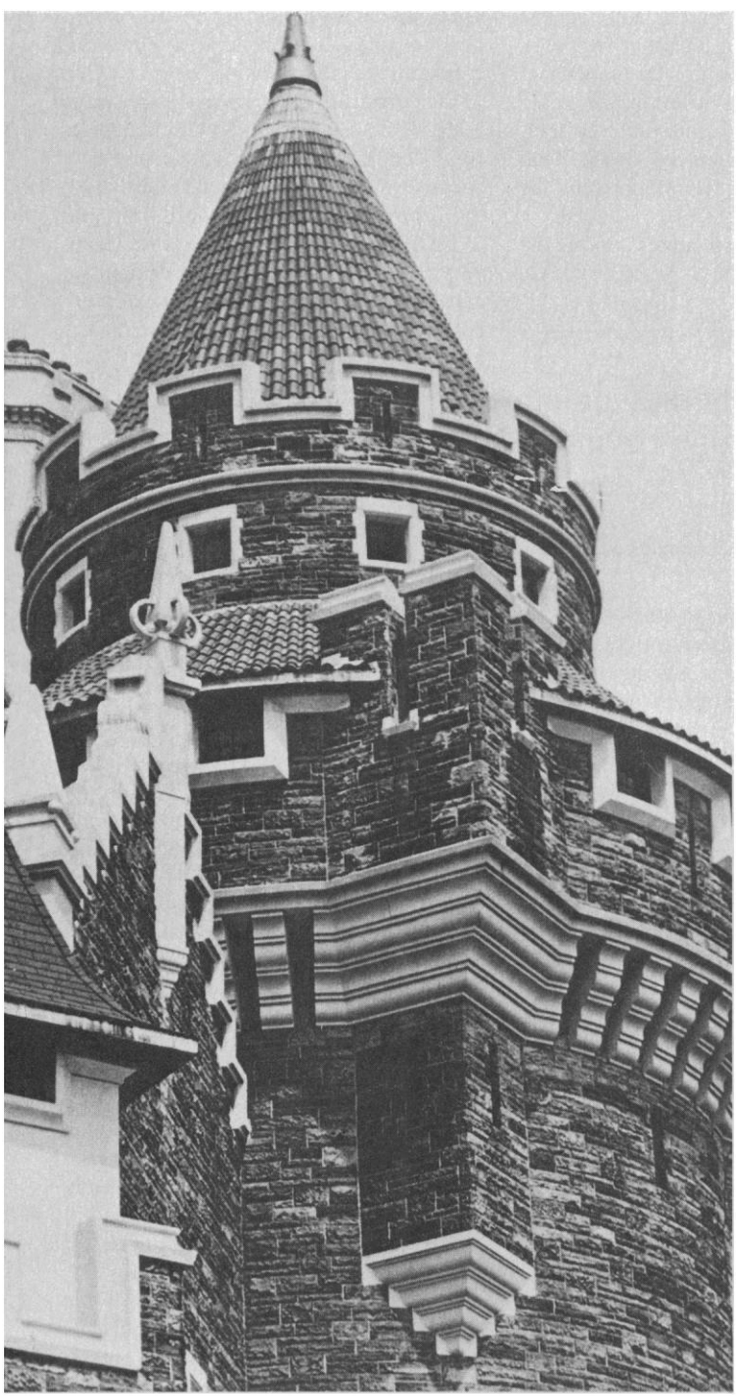
Toronto

3-8 January 1981

Meeting Program—Part I

Register in advance and receive a *free* 1981 AAAS Calendar with your Program; housing, registration, and air travel forms can be found on pages 312 through 314. For further details, see the Preliminary Program, *Science*, 12 September, pages 1221 to 1233, and Tours, *Science*, 3 October, pages 47 and 48.

HOTEL CODES: Sheraton Centre . . . (SH); Royal York . . . (RY)



[Courtesy Metropolitan Toronto Library Board]

For our 147th national meeting we return to Canada after an absence of 17 years and to the city of Toronto after an absence of 60 years, a city which over this long period has become one of the leading cultural centers of North America. In cooperation with many of our Canadian colleagues, we have arranged a very rich and varied program which deals with many of the most important topics in the natural and social sciences and their applications to and implications for social needs. The first part of this program is listed below (the second part will appear in the 31 October issue); read it through, you will find much of direct interest to you. In addition to the symposia listed, we will have nine distinguished Public Lecturers (see the Preliminary Program in the 12 September issue), a Film Festival, an all new Exhibit, many interesting tours (see the 3 October issue), and much hospitality. Taken together with the charming ambience which Toronto has to offer, we modestly believe that the AAAS Annual Meeting in Toronto will be the most important scientific and cultural event of the year; you cannot afford *not* to come. Make your reservations early on the forms on pages 312 through 314 and avoid the holiday rush.

—ARTHUR HERSCHMAN

1. General Interest

AAAS Annual Youth Symposium (3 Jan., 9:00 a.m., 1:30 p.m., SH): New developments in genetics, flying circus of physics, the prepared mind, soap bubbles, UFO's, computers, relativity, whales, the planets, star clusters, continental drift, Darwin and evolution, what we see, ancient materials, elementary particles.

John F. Fowles, David Suzuki, Jearl Walker, Hubert Alyea, George Vanderkuur, Robert Hudek, Jim Butterfield, Eustace Mendis, Peter Beamish, Bob MacDonald, Helen Hogg, J. Tuzo Wilson, William Swinton, E. Llewellyn-Thomas, Ursula M. Franklin, Jim Prentice.

Mount St. Helens (4 Jan., 9:00 a.m., SH): Geologic impact, sedimentation, tephra, climate, hazard.

Robert I. Tilling, Donald W. Peterson, Richard J. Janda, John A. Westgate, J. Murray Mitchell, Jr., Richard A. Warrick.

Successful Innovation in Meeting Urban Transportation Needs (4 Jan., 2:30 p.m., SH). Arranged by:

Margaret Scrivener.

The Other Frontiers of Science (5 Jan., 9:00 a.m., SH): University, industry, international science, development.

D. Allan Bromley, Claude Fortier, Allan R. Crawford, Larkin Kerwin, Louis Berlinguet.

Frontiers in the Social Sciences: New Directions in the Study of Cognition (5 Jan., 2:30 p.m., SH): Social organization, behavioral theories, decision-making, language, anthropology of thought.

Peter B. Read, David L. Sills, Aaron V. Cicourel, James G. March, George A. Miller, Richard A. Shweder, Roy G. D'Andrade.

Frontiers in Medical Genetics and Immunogenetics (6 Jan., 9:00 a.m., SH): Transplantation antigens, radiation hazards, recombinant DNA.

Richard M. Krause, Thomas J. Kindt, J. Donald Capra, Paul S. Russell, James Van Gundia Neel, Frank E. Young.

Microsurgery and Herbal Medicine (6 Jan., 2:30 p.m., SH): Natural product chemistry, synthesis of natural products, extremity replantation, microsurgery.

Huang Jiasi, Liang Xiao-tian, Xie Yu-Yuan, Chen Zhong Wei, Chen Xuxi.

The Frontiers of the Natural Sciences (7 Jan., 9:00 a.m., 2:30 p.m., SH): Center of the earth, harp seal, proton, inorganic chemistry, mathematics and art, the universe.

Rolf M. Sinclair, Rene J. A. Levesque, Peter M. Bell, Ho Kwang Mao, Keith Ronald, Maurice Goldhaber, Fred Basolo, H. S. M. Coxeter, Sidney van den Bergh.

2. Directing Science Toward Peace

Trends in Strategic Weapons and Doctrines and Their Implications for Arms Control (4 Jan., 9:00 a.m., SH): Strategic vulnerability, MX missile, beam weapons, weapons in space.

Bernard T. Feld, Jack P. Ruina, Herbert Scoville, Jr., Kosta Tsipis, Richard L. Garwin.

Negotiations as an Approach to Arms Control and Disarmament (4 Jan., 2:30 p.m., SH). Arranged by:

George Ignatieff and George Rathjens.

The Problems of Nonproliferation (5 Jan., 9:00 a.m., SH). Arranged by:

Abram Chayes and George Rathjens.

Psychological and Bureaucratic Dynamics of Arms Races and Peace Races (5 Jan., 2:30 p.m., SH): Strategy for survival, bureaucratic and political interplay, intergroup conflict, political and technological factors.

Charles E. Osgood, Adam Yarmolinsky, Svenn Lindskold, George Rathjens.

Enlarging the Arms Control Constituency (6 Jan., 9:00 a.m., SH): The media, physicians' efforts, curricula, nongovernmental organizations.

Anne H. Cahn, Daniel Schorr, Eric S. Chivian, Elise Boulding, Nancy Ramsey.

The Political Economy of Reversal of the Arms Race (6 Jan., 2:30 p.m., SH): Military economy—the U.S., the U.S.S.R.; industrial technology; organized labor.

Lloyd J. Dumas, Seymour Melman, David F. Noble, William Winpisinger.

International Analysis of International Problems: Science in the Service of Peace (7 Jan., 9:00 a.m., SH): Energy system, urbanization and development, ecology and environment.

Roger E. Levien, Wolf Haefele, Verne Chant, Andrei Rogers, Crawford S. Holling.

The First Nuclear Weapons: Scientists' Response and Responsibility (7 Jan., 2:30 p.m., SH): Los Alamos, Hiroshima, H-Bomb.

Charles Weiner, Spencer R. Weart, Alice Kimball Smith, Martin J. Sherwin.

3. Physical Sciences

The Revolution in Experimental Techniques in the Sciences (4 Jan., 9:00 a.m., SH): Limits of perception, testing gravitation, understanding molecules, and lasers at frontiers of research.

William M. Fairbank, William Peter Trower, C. W. Francis Everitt, Gerhard Herzberg, Theodor W. Hansch.

The Age and the "Size" of the Universe (5 Jan., 9:00 a.m., SH): Distance scale, oldest stars, nuclear physics.

Bruce Partridge, Sidney van den Bergh, Gustav Tammann, John P. Huchra, Icko Iben, David N. Schramm.

Chemically Solvable Problems (5 Jan., 9:00 a.m., 2:30 p.m.; 6 Jan., 9:00 a.m., SH): Agriculture, feedstocks, nonfuel utilization, profit from a pollutant, adequate diets, air quality, medicine, fertility control, cancer chemotherapy, hypertension, diagnostics.

Jean'ne M. Shreeve, Helen M. Free, Raymond J. Miller, Arthur E. Humphrey, Peter S. Shenkin, Michael E. D. Raymont, Kenneth A. Laurence, D. Mark Hegsted, Thomas E. Graedel, Leland C. Clark, Koert Gerzon, Harold E. Zaugg.

Exploration of the Solar System (5 Jan., 2:30 p.m., SH): Saturn, Titan, and Jupiter; larger satellites; rings of Saturn; inner planets.

Tobias C. Owen, David Morrison, Bradford A. Smith, Harold Masursky.

Astronomical Crossroads of Science and the Unity of the Universe (6 Jan., 9:00 a.m., SH): Galaxies, cosmic optics, cosmology, laws of physics.

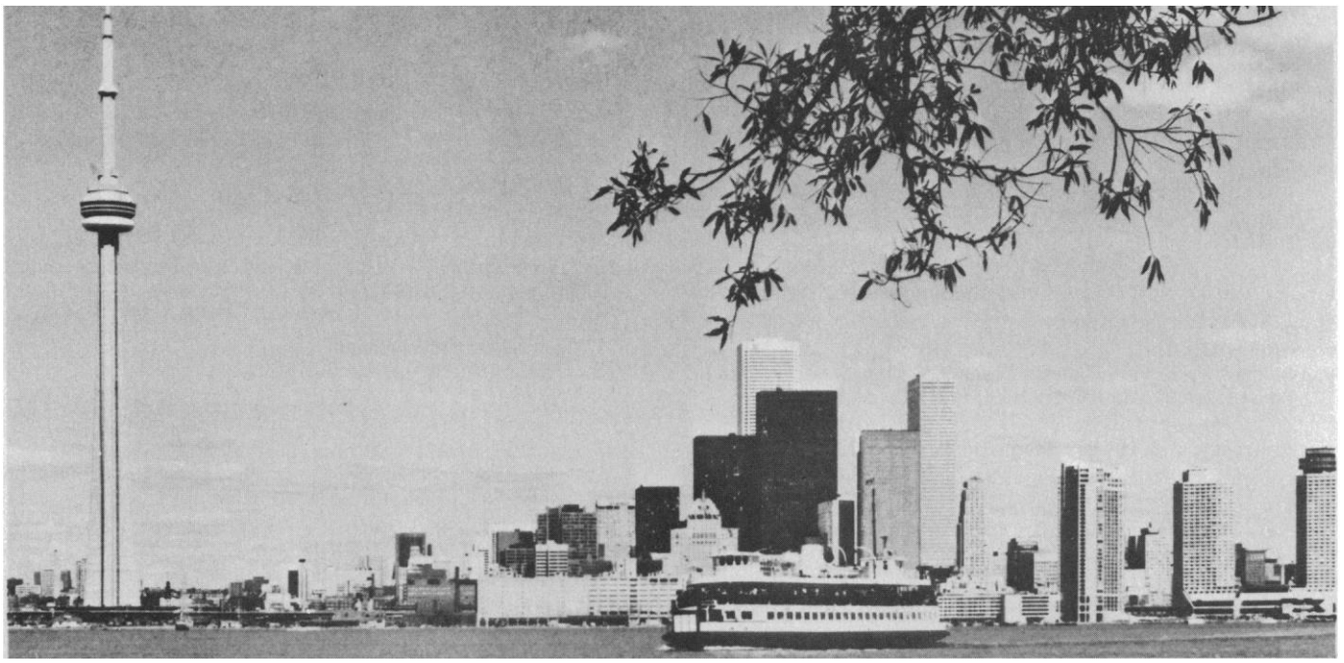
Kenneth Brecher, Philip E. Seiden, Robert C. Roeder, Ira M. Wasserman.

The Laser Revolution in Chemistry (6 Jan., 2:30 p.m., SH): Molecular motions, picosecond reactions, photodetachment, tunable diode lasers.

George W. Flynn, John C. Polanyi, Peter M. Rentzepis, W. Carl Lineberger, Arlan W. Mantz.

Recent Developments in Lasers and Their Uses (7 Jan., 9:00 a.m., SH): Frequency stabilized lasers, interaction with matter, communications spectroscopy.

Boris P. Stoicheff, John L. Hall, A. John Alcock, Joseph A. Giordmaine, Arthur L. Schawlow.



Toronto skyline. [Convention and Tourist Bureau of Metropolitan Toronto]

Applications of Ultrasensitive Mass Spectrometry with Accelerators (7 Jan., 2:30 p.m., SH): Cosmogenic radioisotope production, ^{36}Cl and ^{129}I, rare element assay, nuclear physics and astrophysics, radiocarbon dating, future applications.

Albert E. Litherland, Kenneth H. Purser, Grant Raisbeck, Roelf Beukens, John C. Rucklidge, Walter Kutschera, Edward T. Hall.

Science for the Naked Eye: Or, the Physics of Everyday Experience, VIII (8 Jan., 9:00 a.m., 1:30 p.m., SH): The Arctic, medicine, computer games, sensory abilities of birds, sea shells, mod art.

Rolf M. Sinclair, H. Leonard Sawatzky, Dee B. Crouch, Hans Berliner, Melvin Kreithen, Robert M. Linsley, Susan Jane Colley.

4. Engineering and Technology

New Directions and Applications for Nondestructive Evaluation (4 Jan., 9:00 a.m., SH): New directions, flaw characterization, ultrasonic applications, eddy current flaw detection.

Donald O. Thompson, Clifford H. Wells, M. J. Buckley, James Lankford, Jr., S. D. Hudak, R. Bruce Thompson, M. V. K. Chari, T. G. Kincaid.

The Emerging Field of Biomechanics: Theory, Method, and Applications (4 Jan., 2:30 p.m., SH): Method and measurement, occupational biomechanics, gait, performance of sport, consumer products.

Harold P. Van Cott, Peter R. Cavanaugh, Donald B. Chaffin, Robert W. Mann, Doris I. Miller, Carl O. Muehlhause.

The Application of Bifurcation Theory to Urban and Regional Analysis (6 Jan., 2:30 p.m., SH): Self-organizing systems, urban spatial structure, aggregate urban evolution, systemic communications and control.

Robert W. Crosby, Robert M. Thrall, Peter M. Allen, J. R. Beamont, M. Clarke, A. G. Wilson, Dimitrios S. Dendrinos, Barbara Abbott Segraves-Whallon.

Sulfur—New Uses for an Ancient Material (7 Jan., 9:00 a.m., SH): Historical overview, future supply, plasticized sulfur, extended asphalt, building with sulfur.

Gerald D. Love, Marion D. Barnes, Harold L. Fike, John Dale, Gerhard J. A. Kennepohl, Witold Rybczynski.

The CANDU Heavy Water Reactor System (7 Jan., 2:30 p.m., SH): Operation and performance, power plants, heavy water reactors.

F. Kenneth Hare, W. Bennett Lewis, William G. Morison, Jan B. van Erp, Charles E. Till, I. Y. Chang.

Innovations in Measurement for Scientists and Consumers (7 Jan., 2:30 p.m., SH): Canadian program, change and society, laser wavelength and frequency measurements, computers.

Frances J. Laner, Paul C. Boire, Sydney D. Andrews, Howard P. Layer, Kenneth M. Evenson, Howard M. Faulkner, Louis F. Sokol, John M. Sargent, Mario Iona, L. A. Zadeh.

5. Energy

Health Risk Associated with Energy Technologies (4 Jan., 9:00 a.m., SH): Subjective judgments, nuclear power, coal energy, unconventional technologies, global risks.

Curtis C. Travis, Elizabeth L. Etnier, Baruch Fischhoff, Reginald L. Gotchy, Samuel C. Morris, John P. Holdren, Frank von Hippel.

Biological Energy Conversion (4 Jan., 2:30 p.m., SH): Photosynthesis, solar cells, hydrogen production, tandem photoelectrolysis, oil from microbes.

James R. Bolton, Michael Seibert, Elias Greenbaum, Robert E. Schwerzel, Morris Wayman.

Beyond Conventional Crude Oil (5 Jan., 9:00 a.m., 2:30 p.m., SH). Arranged by:

George B. Mellon and Robert E. Landry.

Energy Policy Overview (6 Jan., 9:00 a.m., SH): Canada, U.S. view; future oil prices; environmental and water limitations; future generations.

S. Fred Singer, F. Kenneth Hare, Wilbert H. Hopper, John C. Sawhill, Steven C. Ballard, Michael D. Devine, David A. Penn, Douglas E. MacLean, Lewis J. Perelman.

North American Energy Systems (6 Jan., 2:30 p.m., SH): Manageable energy future, political perspective, energy supply, Canadian perspective.

F. Kenneth Hare, Hans H. Landsberg, Ray Hnatyshyn, Arlon R. Tussing, W. Edmund Clark.

Solar Energy and Conservation: How Well Are We Doing? How Well Can We Expect to Do? (7 Jan., 9:00 a.m., 2:30 p.m., SH): Current look, solar commercialization, California experience, solar futures, legislative past, congressional view.

Jon M. Veigel, Bruce Anderson, Donald E. Anderson, Ronald Doctor, Amory Lovins, L. Hunter Lovins, Denis Hayes, Richard Ottinger.

The Future of Transportation Fuel (8 Jan., 9:00 a.m., SH): Fuel economy improvement, substitution for liquid fuel, coal and oil shale, biomass liquids, refining challenges.

Michael D. Devine, Martin R. Cines, S. Fred Singer, William G. Agnew, Allan R. Evans, Michael A. Chartock, Steven E. Plotkin, Thomas E. Bull, Dennis L. Ripley.

Engineering and Health Science With Respect to Energy Conservation (8 Jan., 1:30 p.m., SH). Arranged by:

Tamami Kusuda and Samuel Silberstein.

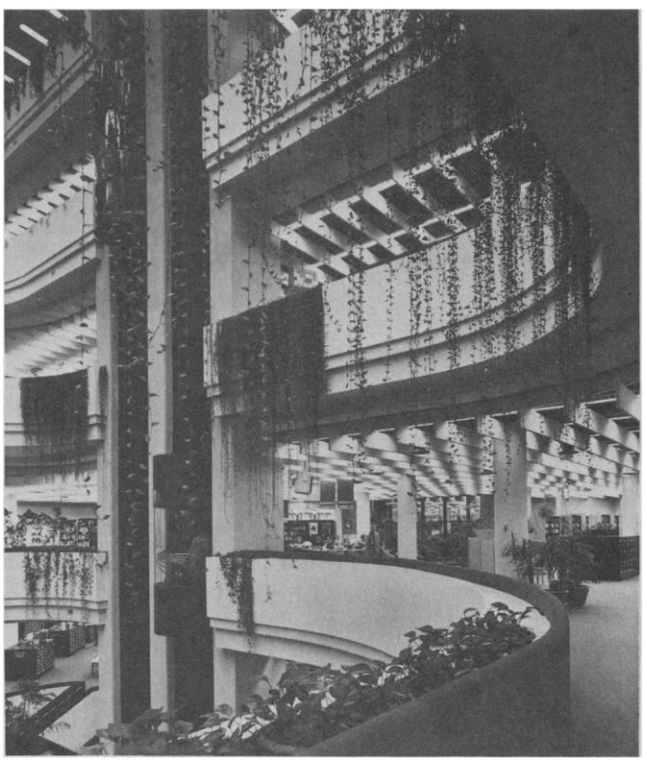
6. Environment

Acid Precipitation: Ecological and Societal Effects (4 Jan., 9:00 a.m., 2:30 p.m., RY): Ecological effects, cloud water and ion deposition, snow melt and water quality, terrestrial ecosystems, scrubber technology, sulfur dioxide emissions, public policy problem, U.S. perspectives and coordination, bilateral agreements, activist viewpoint, state actions.

George H. Tomlinson II, Phyllis Kahn, Donald Chant, John A. Kadlacek, Carl L. Schofield, Thomas C. Hutchinson, William L. Wells, The Honourable John Roberts, Richard Dowd, Harry H. Hovey, Anne Park, Rick Pratt, Arlene I. Lehto, Ian Marceau.

Lead in the Environment (5 Jan., 9:00 a.m., RY): Human influence, ILZRO research, dietary exposure, neurobehavioral effects, neurochemical effects.

Jerome O. Nriagu, Robert W. Elias, Jerome F. Cole, Kathryn R. Mahaffey, Herbert L. Needleman, Ellen K. Silbergeld.



Metropolitan Toronto Library. [Courtesy Metropolitan Toronto Library Board]

The Natural Environment and Renewable Resources—Current Problems in Ontario (5 Jan., 2:30 p.m., RY): Once-through cooling, ecosystem planning, acidification, impact assessment, risk assessment.

Henry A. Regier, Thomas H. Owen, Alan E. Christie, Robert S. Dorney, Douglas W. Hoffman, Paul F. J. Eagles, Harold H. Harvey, R. E. (Ted) Munn, David Estrin, George R. Francis, Ian Burton, Anne V. Whyte.

The Great Lakes: Contamination Trends and Consequences (6 Jan., 9:00 a.m., 2:30 p.m., RY): Mineral fiber, Lake Superior, Lake Michigan, base metal processing, Lake Huron, atmospheric deposition, health effects, organics, DDT and PCS, fish-eating birds, xenobiotic compounds.

Helen L. Cannon, William M. J. Strachan, Arthur Flynn, Philip M. Cook, Richard A. Cahill, Neil F. Shimp, Nels Conroy, James R. Kramer, Eugene V. D. K. Perrin, Anthony R. Davis, P. Brooksbank, David E. Armstrong, Richard L. Thomas, Douglas J. Hallett, R. J. Norstrom, D. V. Weseloh, P. Mineau, Wayland R. Swain.

Hazardous Waste Management: Some Key Issues (7 Jan., 9:00 a.m., 2:30 p.m., RY): Resource Conservation and Recovery Act, Canadian perspective, management options, recycling, public involvement, evaluating human health, remedial cleanup, detoxification, selecting repository sites, waste management.

Michalann Harthill, John P. Lehman, D. Stewart Hay, Lawrence P. Beer, Carl G. Schwarzer, Bill S. Forcade, Beverly J. Paigen, Stephen U. Lester, Sam K. Lee, Charles D. Hollister, Charles L. Sercu.

Radicals and the Biosphere (8 Jan., 9:00 a.m., RY). Arranged by:

Anne P. Autor.

The Proper Role of Inexpensive, Short-Term Biological Tests in Environmental Toxicological Testing (8 Jan., 1:30 p.m., RY): Mutagenic/carcinogenic substances, product safety, regulatory approaches, exposure limits, human health.

R. Daniel Benz, Michael F. Salamone, Frederick J. de Serres, Mark Hite, Robert H. Haynes, Albert C. Kolbye, Jr., Arthur D. Bloom.

7. Climate and Ecology

Problems of Arctic Wildlife Associated with Increases in Human Population and Technological Development (4 Jan., 9:00 a.m., 2:30 p.m., RY): Natural resources, wildlife refuge systems, land uses and transportation problems, special interest technologies, political aspects, demographic predictions, socioeconomic developments, future developments.

Donald J. Zinn, Thomas L. Kimball, Lynn A. Greenwalt, Andrew R. Thompson, Andrew H. McPherson, Ian McTaggart Cowan, Ronald O. Skoog, Wayne Speller, David R. Klein.

Macrodevelopment in the Tropical Forest and Arid Zones: Social and Environmental Impacts and Problems (4 Jan., 2:30 p.m., RY). Arranged by:

John W. Bennett.

Forest Utilization: Past, Present, and Future (5 Jan., 9:00 a.m., RY): Wood products and science, forests and economic and social development, rational utilization.

John M. Yavorsky, Theodore S. McKnight, Robert L. Youngs, Marion Clawson, Marcel Lortie, Pierre R. Gendron, John S. Spears.

Unmet Requirements of Irrigation Project Development for Native People in the U.S. Four Corners Area (5 Jan., 2:30 p.m.,

RY): Resource constraints and opportunities, Navajo project, development opportunities, social patterns, educational and training needs.

Cyrus M. McKell, Lora Mangum Shields, Philip R. Ogden, Bahe Billy, Philip Reno, Harris Arthur, John W. Hernández.

Planning for Uncertainty: Climate Change and the Study of Impacts (6 Jan., 9:00 a.m., SH): Atmospheric CO_2, energy use, CO_2-induced climate change, constructing scenarios.

David M. Burns, Roger Revelle, Walter Orr Roberts, Gordon A. McKay, Lester B. Lave.

Climate and Food: Case Studies in Vulnerability and Response (6 Jan., 2:30 p.m., RY). Arranged by:

John G. Corbett.

CO_2-Induced Climate Change and the Dynamics of Antarctic Ice (7 Jan., 9:00 a.m., RY): Antarctic ice sheet collapse, polar ice sheets and future climatic changes, sea ice, Ross ice shelf.

Charles Bentley, David M. Burns, Terry Hughes, Uwe Radok, Gunter Weller.

Testing Climate Models (7 Jan., 2:30 p.m., RY): Solar variability, geologic data, glaciation, Milankovitch hypothesis, faunal extinctions, effects on human populations, testing theories.

Alan D. Hecht, Minze Stuiver, William F. Ruddiman, Andrew McIntyre, James D. Hays, John Imbrie, Thomas J. M. Schopf, Robert W. Kates, Richard A. Warrick.

The Global Atmospheric Research Program (GARP): A Significant International Scientific Undertaking of the 1970's (8 Jan., 9:00 a.m., 1:30 p.m., RY): International organizations, scientific objectives, satellites and computers, field experiments, tropical atmospheric phenomena, numerical atmospheric models, global observations and forecasting, world climate program.

Eugene W. Bierly, Richard S. Greenfield, Oliver M. Ashford, Robert W. Stewart, Verner E. Suomi, Joachim P. Kuettner, Joshua Z. Holland, T. N. Krishnamurti, Richard E. Hallgren, Robert M. White.

8. Agriculture

Animal Agriculture Research: Social and Economic Priorities (4 Jan., 9:00 a.m., RY): Production, marketing and distribution, resources and the environment, public policy, research.

Larry J. Connor, Henry A. Fitzhugh, Roy N. Van Arsdall, Wesley B. Sundquist, Gerald W. Thomas, James T. Bonnen, Richard O. Wheeler.

National Impacts of Recommended Dietary Changes (4 Jan., 2:30 p.m., RY): Human health, quality of land and water, energy and minerals, the economy.

Alex Hershaft, John Scharffenberg, Georg A. Borgstrom, David Pimentel, J. B. Penn.

Energy Dimensions of Small-Scale Food-Processing Technologies (4 Jan., 2:30 p.m., RY): Limited-resource processing, indigenous fermented foods, energy saving technologies, food residues.

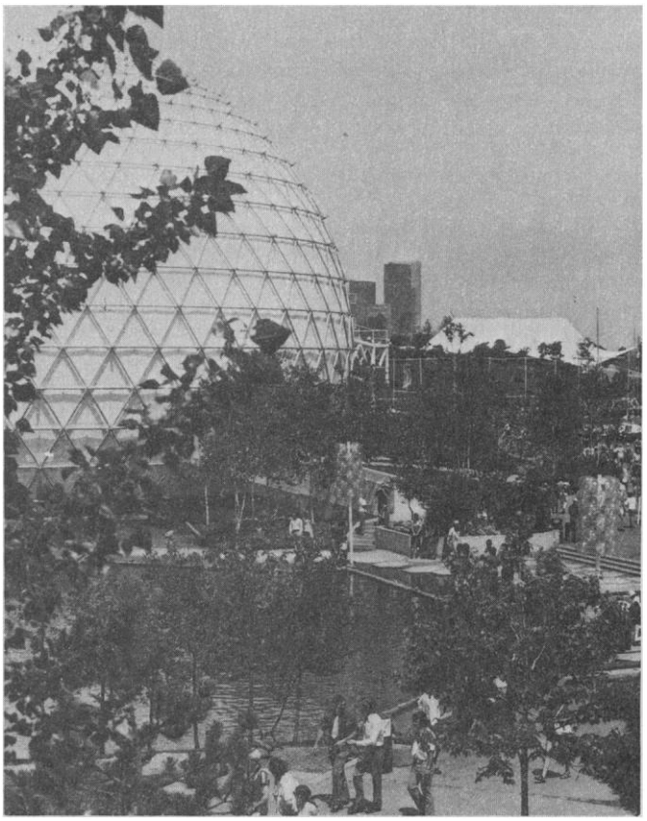
Irene Tinker, Carol I. Waslien, Robert P. Bates, Keith H. Steinkraus, Fred F. Barrett, Stanley M. Barnett.

Agriculture as a Producer and Consumer of Energy (5 Jan., 9:00 a.m., RY): Rising energy prices, conservation and substitution, alternatives, crop residues, alcohol fuels program.

William Lockeretz, Otto C. Doering III, Donald R. Price, Roger J. Blobaum, William E. Larson, Folke Dovring.

Future Food-Fuel Conflicts (5 Jan., 2:30 p.m., RY): Overview of bioenergy; agricultural biomass; food versus fuel; fuel alcohol industry; international conflicts: Brazil, world's food supply.

Bill A. Stout, Thomas E. Bull, Wallace E. Tyner, Marilyn J. Herman, Milton L. David, Norman Rask, János P. Hrabovszky.



Ontario Place. [Courtesy Canadian Government Office of Tourism]

U.S. Agriculture in the 1980's: Continued Abundance or Scarcity? (6 Jan., 9:00 a.m., RY): Agricultural inputs, government regulation, productivity and technical progress, demand for food.

Joseph D. Coffey, David L. Debertin, Angelos Pagoulatos, Sterling Brubaker, Earl R. Swanson, Oral Capps, Jr., James G. Horsfall.

Agricultural Lands: World Pressures on Food Production (6 Jan., 2:30 p.m., RY): North American land base, food crisis outlook, economic and institutional stress, foreign policy.

Gail S. Ludwig, N. R. Richards, Michael F. Brewer, Harold F. Breimyer, Don Paarlberg, Barry L. Flinchbaugh.

Gene Resource Conservation in Agriculture and Forestry: Policies and Strategies (7 Jan., 9:00 a.m., RY): Canadian program, California program, forest management, genetic diversity in breeding, new and potential crops.

Christopher W. Yeatman, David Kafton, Roland Loiselle, Stanley L. Krugman, Lyndon W. Kannenberg, H. Garrison Wilkes.

Chemical Communication in Insects: From Basic Principles to Pest Control (7 Jan., 2:30 p.m., RY): Stored-product beetles, ants and bees, moths, bark beetles.

Robert M. Silverstein, Wendell E. Burkholder, Murray S. Blum, Ring T. Cardé, David L. Wood.

The Ecology of Agriculture and Biological Pest Control (8 Jan., 9:00 a.m., 1:30 p.m., RY): Natural succession, tropical agroecosystems, ecology of overyielding, food resource use, resource management, group farming, changes in the world

economy, biological control, pest-stable systems, intercropping, weeds, variability of yields.

Douglas H. Boucher, S. W. T. Batra, John Ewel, Moises Amador, Judith Espinosa, Stephen R. Gliessman, John H. Vandermeer, Katherine Yih, Kathryn G. Dewey, Michael Gertler, Phillip Ehrensaft, Helen Boudier, J. S. Kelleher, Miguel A. Altieri, Stephen Risch, Alan K. Watson, Richard Levins.

9. Biological Sciences

Trophic Dynamics of Aquatic Ecosystems (4 Jan., 9:00 a.m., 2:30 p.m., RY): Phytoplankton communities, encounter with zooplankton, microcrustaceans, copepod evolution, planktivorous fish, food resources of fishes, resource supply rates, African lakes, energy reserve cycle, biomanipulation of zooplankton, lake ecosystem dynamics.

J. Rudi Strickler, Dewey G. Meyers, John T. Lehman, James J. McCarthy, W. John O'Brien, Karel F. Liem, Susan Soltau Kilham, Peter Kilham, Robert E. Hecky, Clyde E. Goulden, W. Charles Kerfoot, W. Gary Sprules.

Problems and Possibilities: The Development of an Effective Shark Repellent from Naturally Occurring Biologically Active Substances (5 Jan., 2:30 p.m., RY): Red Sea Moses Sole; paradaxin; flatfish, fireflies, and sharks; ecology of toxicity; elasmobranch fishes; nature's weapons.

Bernard J. Zahuranec, Eugenie Clark, Naftali Primor, Jose A. Zadunaisky, Joseph Bonaventura, Celia J. Bonaventura, Gerald J. Bakus, Samuel H. Gruber, William O. McClure.

Research on Fish—A Renewable Resource (6 Jan., 9:00 a.m., RY): Global aspects, marine fisheries, farmed fish, fish as food, fish diseases, aquaculture.

David R. Idler, Richard C. Hennemuth, Gary L. Rumsey, E. Graham Bligh, George W. Klontz, T. V. R. Pillay.

Circadian Clocks in Man: Timekeeping in Health and Disease (6 Jan., 2:30 p.m., RY): Biological rhythms in man, normal and abnormal timekeeping, mathematical simulations, human and nonhuman primates, manic-depressive cycles.

Martin C. Moore-Ede, Charles A. Czeisler, Elliot D. Weitzman, Richard E. Kronauer, Thomas A. Wehr.

Ecogenetics—The Importance of Genetically Determined Variation in the Responses of Individuals to Environmental Agents (7 Jan., 9:00 a.m., RY): Metabolic sensitivity, genetic screening, legal and policy implications.

Kenneth K. Kidd, Gilbert S. Omenn, Arthur Falek, Charles R. Scriver, Devra Lee Davis.

Ecological Implications of Evolutionary Genetics (7 Jan., 2:30 p.m., RY): Character displacement, coevolution, *Anolis* lizard populations, plant-insect associations, population structure, natural selection.

Lev R. Ginzburg, Douglas J. Futuyma, Montgomery Slatkin, Jonathan Roughgarden, Michael J. Wade.

Some Mathematical Questions in Biology (8 Jan., 9:00 a.m., 1:30 p.m., RY): Spatial sequences of structures, control of ovulation number, the developing embryo, particle capture by copepods, particle motion through pores, human locomotion.

Stephen Childress, J. K. Percus, Hans Meinhardt, H. Michael Lacker, Mimi Koehl, Sheldon Weinbaum, Simon Mochon.

10. Cell Biology

Theories of Aging, I (4 Jan., 9:00 a.m., RY): Longevity assurance processes, evolutionary theory, mutations and epigenetic changes, genetic clock, programmed theory of aging.

Alain F. Corcos, Lawrence R. Krupka, Ronald W. Hart, George A. Sacher, James E. Trosko, Edward L. Schneider, Leonard Hayflick.

Theories of Aging, II (4 Jan., 2:30 p.m., RY): Hormonal regulatory mechanisms, cellular senescence, hormone action, age-associated processes and diseases.

Richard C. Adelman, Vincent J. Cristofalo, George S. Roth, Arthur Schwartz.

Reproductive Biology and Its Impact on Populations (5 Jan., 9:00 a.m., RY): Gonadotrophin secretion, domesticated animals, reproductive and social factors controlling behaviors.

Neena B. Schwartz, Fernand Labrie, David K. Pomerantz, Janice M. Bahr, Constance S. Campbell, Martha McClintock.

The Genetic Connection Between Molecules and Behavior (5 Jan., 2:30 p.m., RY): Learning and memory, neurotransmitter mutants, cerebellar mutants, variations in neural proteins, human genetic markers, DNA sequence polymorphism.

Xandra O. Breakefield, William G. Quinn, Jeffrey C. Hall, Richard J. Mullen, Raymond L. White.

Biological Implications of Enzyme Polymorphism (6 Jan., 9:00 a.m., RY). Arranged by:

Shiva M. Singh and George Carmody.

The Cancer Cell Surface (6 Jan., 2:30 p.m., RY): Behavior of malignant disease, cancer biology, surface carbohydrates, tumor cell behavior characteristics, human leukemias, membrane compounds and diagnosis.

Michael A. Baker, Phil Gold, George Poste, Robert S. Kerbel, Robert N. Taub.

Role of Receptors in Human Diseases (7 Jan., 9:00 a.m., RY): Autoantibodies, allergic respiratory disease, myasthenia gravis, acetylcholine receptors, lipoprotein receptors and atherosclerosis, androgen receptor, steroid sensitivity.

Jesse Roth, Hadley L. Conn, J. Craig Venter, Daniel B. Drachman, Joseph L. Goldstein, C. Wayne Bardin.

Cellular Messenger Systems—Role of Calmodulin (7 Jan., 2:30 p.m., RY): Cyclic nucleotide metabolism; structure, function and evolution; protein interactions; secretory processes; calcium action.

Thomas C. Vanaman, Jerry H. Wang, Claude B. Klee, Robert J. DeLorenzo, Daniel M. Watterson.

***Drosophila* as a Model Biological System (8 Jan., 9:00 a.m., RY):** Epimorphic pattern regulation, homoeotic mutants, molecular biology, informational complexity, neoplastic mutants.

William P. Hanratty, Jack Girton, Michael Russell, Mary Lou Pardue, David Nash, Frank Janza.