

Program

Second International Meeting on 21st Century Studies

**Washington, D.C.
July 17-21, 1989**

Organized by

**Institute for 21st Century Studies
1611 North Kent Street, Suite 610
Arlington, VA 22209, USA**

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Program

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Prepared by

**Dr. Gerald O. Barney
and
Dr. Martha J. Garrett**

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Institute for 21st Century Studies

The Institute for 21st Century Studies, an independent, nonprofit, charitable, and educational organization, assists both industrialized and developing nations to explore alternative strategies for achieving sustainable economic development and security.

Such strategies are essential for countries facing the complexities of international competition, population growth, resource management, environmental protection, and national security. These interrelated issues present both opportunities and challenges. When managed well, all nations have opportunities to increase their well-being. If mismanaged, however, any nation can find its future clouded by social and political disturbances, economic stagnation, international tension, and armed conflict.

To increase their ability to shape their own future, national leaders around the world are establishing task forces to analyze alternative national futures. The teams, usually headed by a government minister or someone of comparable political stature, include professionals in economics, demographics, resources, environment, and security. The "21st century studies" they carry out provide detailed factual information and projections that help people make choices today that lead to desirable futures.

The 21st century studies differ in three important ways from routine research in planning agencies. First, they examine many sectors in an integrated way--projecting future trends in trade, foreign debt, demography, natural resources, environment, technology, health, education, security, and other areas. Second, they have a long-term perspective, since the significance of many trends is apparent only when examined over a decade or two. A third essential ingredient is a focus on opportunities that do not create troublesome consequences later.

Origin of the Institute

The Institute for 21st Century Studies is one of the consequences of the U.S. government's *Global 2000 Report to the President*. This classic analysis of the economic, demographic, resource, and environmental future of the world was commissioned by President Jimmy Carter and directed by Dr. Gerald O. Barney. After the 1980 publication of the report, Dr. Barney was asked by the Canadian government to prepare a similar study for Canada. Following that study, *Global 2000: Implications for Canada's Future*, teams were soon established in other nations, including the People's Republic of China, South Korea, Taiwan, Mexico, and Iceland. It soon became obvious that there was a need for an organization to assist the teams in carrying out their studies. Recognition of this need led to the establishment of the Institute for 21st Century Studies in 1983.

The Institute's Mission

The primary mission of the Institute is to provide support for the global network of national 21st century study teams. There are now such projects for the following nations and regions: Africa, Australia, Brazil, Britain, Canada, Chile, Colombia, Costa Rica, Ecuador, El Salvador, Europe, Finland, Iberoamerica and

the Caribbean, Iceland, India, Indonesia, Ireland, Japan, South Korea, Mauritius, Mexico, Netherlands, Norway, the Pacific Islands, People's Republic of China, Peru, Poland, Portugal, South Africa, Sub-Saharan Africa, Taiwan, Thailand, Turkey, the United States, and USSR. In addition, there are several global 21st century projects underway, including ones being carried out by religious institutions.

The Institute helps 21st century study teams in the following ways:

- * Identifies individuals who want to start 21st century studies and assists them in launching these studies.
- * Trains teams in the general methodology of preparing studies on alternative futures.
- * Participates in the design and analysis stages of specific studies.
- * Provides the teams information about specific strategies for sustainable development and security.
- * Introduces the teams to organizations and consultants for assistance on specific aspects of the studies.
- * Gathers, analyzes, and passes on to the teams, tools (such as microcomputer models) that will be useful in their work.
- * Assists teams in the publication and international distribution of reports.
- * Helps the study teams identify measures that will assure that their reports receive high-level attention and are used in national policy development.
- * Organizes meetings at which the leaders of the 21st century studies meet and exchange information.

The Institute's Leadership

Members of the Institute's Board include Mr. Lester R. Brown, President, Worldwatch Institute; The Honorable Steingrimur Hermannsson, Prime Minister, Iceland; Dr. Antonio Alonso, Director, Foro México 2010; Ms. Patricia Maimon-Music, Artist; Dr. Alan Rulis, Chief, Regulatory Food Chemistry, Food and Drug Administration; and Ms. Michaela Walsh, President, Women's World Banking.

Dr. Gerald O. Barney, founder and director of the Institute, has published six books and numerous articles on topics related to the national and global futures and is recognized internationally for his work in this field. He has experience in technology assessment, development and security strategies, fusion energy research, and defense analysis and has headed the national program of the Rockefeller Brothers Fund.

Dr. Martha Garrett, formerly co-director of the Institute, now serves as its representative in Europe. While at ITCS, she visited study teams in eight countries, helped design and teach the Institute's workshop, and taught at an IDRC modeling seminar. She is now working on a new version of the *Handbook for 21st Century Studies* and the second edition of *Managing a Nation*.

The Institute's Support

The Institute is supported by service fees and by grants. Support has been received from many of the study teams and from the World Bank, the Rockefeller Brothers Fund, the Hewlett Foundation, the Packard Foundation, the Noyes Foundation, the Gund Foundation, the General Services Foundation, the Town Creek Foundation, the Laurel Foundation, and several individuals, corporations, and religious institutions.

Further Information

Further information is available from the Institute's office: 1611 North Kent Street, Suite 610, Arlington, Virginia, 22209-2111, USA. Telephone: 703/841-0048; Telex: 6491106 WIDC UW; Fax: 703/525-1744.

Acknowledgments

Several organizations and individuals have contributed to the Second International Meeting on 21st Century Studies. Basic funding came from the Rockefeller Brothers Fund. A significant Unesco grant, made through the office of Dr. Frederico Mayor, was also critical in making the meeting possible.

Mr. Ed Cornish and Mr. Ken Hunter of the World Future Society deserve special mention for recognizing the benefits of a "meeting within a meeting" and making the arrangements for the Second International Meeting on 21st Century Studies to be held as a part of the Society's Sixth General Assembly.

The largest contribution by far was made by the individual study teams from around the world. They not only did the research and prepared the papers, but most also provided their own travel funds. Those teams that were unable to do so had their expenses covered by contributions from the following organizations: Conservation Fund, Mitchell Energy and Development Corporation, United Nations Development Programme, Environment Canada, Asia Foundation, Presbyterian Church (USA), and German Marshall Fund.

Authors and Presenters

- Mr. Anil Agarwal, Centre for Science and Environment, New Delhi, India
- Mr. Ramgopal Agarwala, African Region, World Bank, Washington, DC, USA
- Ms. Yvonne Allen, Commission for the Future, Carlton, South Victoria, Australia
- Dr. Antonio Alonso C., Centro de Estudios Prospectivos, Mexico City, Mexico
- Dr. Pedro Amaya, COLCIENCIAS, Bogota, Colombia
- President Oscar Aries S., San José, Costa Rica
- Dr. Gerald O. Barney, Institute for 21st Century Studies, Arlington, Virginia, USA
- Mr. Alvaro de la Barra G., Consultores en Ingenieros de Sistemas, Santiago, Chile
- Prof. Stuart A. Bremer, State University of New York, Binghamton, New York, USA
- Dr. Joao Manuel Gaspar Caraça , Calouste Gulbenkian Foundation, Lisbon, Portugal
- Dr. Chalongphob Sussangkarn, Thailand Development Research Institute, Bangkok, Thailand
- Prof. Changi-Yi David Chang, National Taiwan University, Taipei, Taiwan
- Mr. Ronald Crocombe, Institute for Pacific Studies, Rarotonga, Cook Islands
- Brig. Gen. W. Robert Dobson, National Defense Headquarters, Ottawa, Ontario, Canada
- Mr. Mohammed El-Egaily, Economic Commission for Africa, Addis Ababa, Ethiopia
- Dr. Peter Ellyard, Commission for the Future, Carlton, South Victoria, Australia
- Rev. Dwain C. Epps, National Council of Churches, New York, New York, USA
- Prof. Virginia Gamba-Stonehouse, MacArthur Foundation Fellow, Düsseldorf, Federal Republic of Germany
- Mr. Gonzalo Garland, Grupo de Análisis para el Desarrollo, Lima, Peru
- Dr. Martha J. Garrett, Institute for 21st Century Studies (USA), Mölndal, Sweden
- Dr. Victor Gelovani, Institute for Systems Studies, Moscow, USSR
- Dr. William E. Gibson, Eco-Justice Project, Ithaca, New York, USA

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Dr. Hugues de Jouvenel, Futuribles International, Paris, France

Dr. Esko Kalimo, Social Insurance Institution, Helsinki, Finland

Mr. Bon-ho Koo, Korean Development Institute, Seoul, South Korea

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Dr. Litto Rios B., COLCIENCIAS, Bogotá, Colombia

Dr. John B. Robinson, University of Waterloo, Waterloo, Canada

Mr. Francisco Sagasti, Strategic Planning, World Bank, Washington, DC, USA

Col. William M. Shepherd, Columbia, South Carolina, USA

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Toronto, Ontario, Canada

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Mr. Richard Underwood, Houston, Texas, USA

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Mr. B. B. Vohra, Advisory Board on Energy, New Delhi, India

Dr. Gerald Walker, Bolton Street College of Technology, Dublin, Ireland

Prof. Wang Huijiong, Research Center for Economic, Technological, and Social
Development, Beijing, People's Republic of China

Prof. Andrzej P. Wierzbicki, Polish Academy of Sciences, Warsaw, Poland

Session Schedule

Monday, July 17, 8:30-10:00, Delaware Suite

Opening Plenary, Second International Meeting on 21st Century Studies

President Oscar Aries S. and Mr. Jorge Monge, Ministry of Planning, (paper presented by Mr. Monge), *The Importance of Long-Term Planning in Coping With the Complex Realities Faced by Costa Rica*

Mr. Francisco Sagasti, World Bank, *The Benefits of National Strategic Planning*

Monday, July 17, 10:30-12:00, Wilmington Room

Mr. Tsu-Kan Tsui, Council for Economic Planning and Development, *The Contribution of Long-Term Planning in the Economic Growth of Taiwan (ROC)*

Dr. Phalchitr Uathavikul, Thailand Development Research Institute, (paper presented by **Dr. Chalongphob Sussangkarn**), *Study Plan for, "Thailand Towards the Year 2010: The Dynamics of Thai Development and Strategies for the Future"*

Monday, July 17, 10:30-12:00, Dover Room

Mr. Tsutomu Tanaka, Economic Planning Agency, (paper presented by **Mr. Hajimu Hori**), *Reflections on the Report, "Japan in the Year 2000"*

Dr. Bon-ho Koo, Korean Development Institute, (paper presented by **Dr. Won-Young Lee**), *"The Future Course of Industrial Development in the Republic of Korea" and the Policy Response*

Monday, July 17, 2:00-3:30, Wilmington Room

Mr. Ramgopal Agarwala, World Bank, *The World Bank's Long-Term Perspectives Study for Sub-Saharan Africa*

Prof. Virginia Gamba-Stonehouse, MacArthur Foundation Fellow, *The Future of Latin America, with Special Attention to the Role of the Military and the Influence of Drug Trafficking*

Monday, July 17, 2:00-3:30, Dover Room

Prof. Andrzej P. Wierzbicki, Polish Academy of Sciences, *Toward Poland 2000 and Beyond*

Mr. Alvaro de la Barra G., Instituto Chileno de Estudios Humanisticos, *A Future for All: A Computational Model of the Development of Chile*

Monday, July 17, 4:00-5:30, Wilmington Room

Dr. Peter Ellyard, Commission for the Future, (paper presented by **Ms. Yvonne Allen**) *Scenarios for Australia's Future*

Mr. Ronald G. Crocombe, Institute of Pacific Studies, *The Pacific Islands in the 21st Century*

Monday, July 17, 4:00-5:30, Dover Room

Dr. Pedro Amaya and **Dr. Litto Rios B.**, COLCIENCIAS, (paper presented by Dr. Rios), *"Colombia: Twenty-First Century," an Action Strategy for Managing the Future*

Mr. Ruben F. W. Nelson, Square One Management, Canada, *From the Post Industrial Future to the Post Industrial Perspective: What Was Done and What Was Learned*

Tuesday, July 18, 8:30-10:00, Wilmington Room

Mr. Ma Hong, Research Center for Economic, Technological, and Social Development, (paper presented by **Prof. Wang Huijiong**), *The Research Program on China's Future in the Year 2000 and Beyond*

Dr. Victor Gelovani, Institute for Systems Studies, *The 21st Century Study of the USSR*

Tuesday, July 18, 8:30-10:00, Dover Room

Dr. Carlos A. Quesada-M. and **Ms. Vivienne Solis-Rivera**, National Conservation Strategy Project, (paper presented by Ms. Solis-Rivera), *The National Conservation Strategy for Costa Rica*

Prof. Chang-Yi David Chang, National Taiwan University, *The "Taiwan 2000" Report: Balancing Economic Growth and Environmental Protection*

Tuesday, July 18, 10:30-12:00, Wilmington Room

Dr. P. H. Spies, Institute for Futures Research, *Patterns of Transformation in Southern Africa 1990-2020: Procedures and Prognosis*

Rev. Wesley Granberg-Michaelson, World Council of Churches and **Rev. Dwain C. Epps**, U.S. National Council of Churches (paper presented by Rev. Epps), *Justice, Peace, and the Integrity of the Creation: How Can the World Live in the 21st Century?*

Tuesday, July 18, 10:30-12:00, Dover Room

Dr. John B. Robinson, University of Waterloo, *A Sustainable Canadian Society: The Next Step in the Conserver Society Discussion*

Dr. Hugues de Jouvenel, Futuribles International, *A 21st Century Study of France*

Tuesday, July 18, 2:00-3:30, Wilmington Room

Dr. Agust Valfells, *Back to the Future: "Iceland 2000" Revisited.*

Mr. J. Manrakhan, The University of Mauritius, *"Mauritius 2000" and the Underlying Methodology.*

Tuesday, July 18, 2:00-3:30, Dover Room

Dr. Ricardo A. Navarro, Salvadorean Center of Appropriate Technology, *Long-term Sustainability of El Salvador*

Mr. Anil Agarwal, Centre for Science and Environment, *The Future State of India's Environment*

Tuesday, July 18, 4:00-5:30, Wilmington Room

Mr. B. B. Vohra, Advisory Board on Energy, *India 2000: The Threat of Ecological Disaster*

Dr. William E. Gibson, Eco-Justice Project, *The 21st Century Study by the Presbyterian Church (USA): Keeping and Healing the Creation*

Tuesday, July 18, 4:00-5:30, Dover Room

Mr. Gerald Walker, Bolton Street College of Technology, and **Dr. Ray Mulvihill**, Environmental Research Unit, (paper presented by Dr. Mulvihill), *Reflections on "Ireland in the Year 2000: Towards a National Strategy"*

Dr. Roefie Hueting, Netherlands Central Bureau of Statistics, *Results of an Economic Scenario that Shifts Top Priority from Growth in Production to Protection of the Environment*

Wednesday, July 19, 8:30-10:00, Wilmington Room

Dr. Otto Soemarwoto, Institute for Ecology, *"Indonesia 2020": Charting a Course for Sustainable Development*

Wednesday, July 19, 8:30-10:00, Dover Room

Mr. James Northcott, Policy Studies Institute, *"Britain in 2010": The PSI Project*

Dr. Joao Manuel Gaspar Caraça, Calouste Gulbenkian Foundation, *Reflections on the Project "Portugal 2000"*

Wednesday, July 19, 10:30-12:00, Wilmington Room

Mr. Gonzalo Garland, Grupo de Analisis para el Desarrollo, *Peru in the 21st Century: Challenges and Possibilities*

Dr. Antonio Alonso C., Centro de Estudios Prospectivos, *Results of the "Foro Mexico 2010" Project*

Wednesday, July 19, 10:30-12:00, Dover Room

Dr. Riccardo Petrella, Commission of the European Communities, *European Futures in Science, Technology and Society*

Dr. William M. Stigllani, International Institute for Applied Systems Analysis, *Future Environments for Europe: Some Implications of Alternative Development Paths*

Wednesday, July 19, 2:00-3:30, Wilmington Room

Dr. Sergio Melnick, Minister of Planning, *National and Regional Visions of Chile's Entry into the 21st Century*

Mr. Mohammed El-Egally, Economic Commission for Africa, *ECA and Africa's Development*

Wednesday, July 19, 2:00-3:30, Dover Room

Brig. Gen. W. Robert Dobson, National Defense Headquarters, *Canada's "Project 2010"*

Col. William M. Shepherd, U. S. Army, *The "Army 21" Study*

Wednesday, July 19, 4:00-5:30, Wilmington Room

Ms. Helga Jonsdotter, Prime Minister's Office, *Status Report on the Project, "Iceland in Twenty-five Years"*

Dr. Esko Kalimo, Social Insurance Institution, *Reflections on the Finnish Economy and Society to the Year 2000*

Wednesday, July 19, 4:00-5:30, Dover Room

Dr. Ichtiaque Rasool, National Aeronautic and Space Administration, *The International Geosphere-Biosphere Programme: A Study of Global Change*

Dr. Peter Timmerman, International Federation of Institutes of Advanced Study, *The Project on Human Dimensions of Global Change*

Thursday, July 20, 8:30-10:00, Delaware Suite

Closing Plenary, Second Meeting of Leaders of National 21st Century Studies

Mr. Richard W. Underwood, Contributor to *The Home Planet* and formerly with the National Aeronautics and Space Administration, *The View from Space: Planet Earth at the Threshold of the 21st Century*

**Professional Meeting
Methodologies for 21st Century Studies**

Friday, July 21, 8:30-10:00, Delaware Suite

Dr. Martha J. Garrett, Institute for 21st Century Studies, *Some Advice to National 21st Century Study Teams: Three Questions to Consider*

Mr. Gonzolo Garland, Grupo de Analisis para el Desarrollo, *Integrating Diverse Techniques on a Spreadsheet: Maintaining Inherent Complexity while Achieving Explicit Simplicity.*

Friday, July 21, 10:30-12:00, Delaware Suite

Dr. Paul D. Raskin, Energy Systems Research Group, *Energy and Environment Scenarios: The LEAP Method*

Dr. Stuart A. Bremer, State University of New York, *GLOBUS: The New Multi-Nation Global Model that Includes Trade, Domestic Politics, and International Relations--and Works on a Microcomputer*

Friday, July 21, 2:00-3:30, Delaware Suite

Dr. Andre Piontkowsky, Institute for Systems Studies, Moscow, *Strategic Stability Analysis Through Mathematical Modeling*

Mr. Lin Zixin, Science and Technology Daily, People's Republic of China, *Technological Trends that Will Shape Global Economic Developments Over the Next Quarter Century*

Friday, July 21, 4:00-5:30, Delaware Suite

Dr. Alan D. Hecht, National Climate Program Office, *Climate and the Future of Nations*

Dr. Roger Naill, Applied Energy Services, *FOSSIL2: A Long-Term Energy Policy Model for National Energy Planning*

Directory

Mr. Anil Agarwal
Centre for Science and Environment
807 Vishal Bhawan
95 Nehru Place
New Delhi 110019
India

The Future State of India's Environment
Tuesday, July 18, 2:00-3:30, Dover Room

Mr. Ramgopal Agarwala
Chief, Special Economic Office
Technical Department
Africa Region
World Bank
1818 H Street, NW
Washington, DC 20433
USA



*The World Bank's Long-Term Perspectives
Study for Sub-Saharan Africa*
Monday, July 17, 2:00-3:30, Wilmington Room

The study examines the development experience of sub-Saharan Africa during the last thirty years, notes the megatrends--in the world economy as well as in Africa--that will affect the prospects of Africa during the next generation, that is, the next thirty years. It concludes that on present trends a "nightmare scenario" lies ahead for sub-Saharan Africa. It then goes on to identify the policies and programs that are needed on the part of the Africans and the donor community to create a more promising future for the next generation.

Ramgopal Agarwala heads the team preparing the next Africa Report on the topic of *Long-Term Perspectives for Sub-Saharan Africa*. He was earlier in charge of the team that produced the 1986 Africa Report *Financing Adjustment with Growth in Sub-Saharan Africa, 1986-1990* and was a member of the core team that prepared the 1984 Africa Report *Accelerated Development in Sub-Saharan Africa: An Agenda for Action* and the documents that led to the creation of the Special Facility for Africa. He was responsible for developing the widely-discussed concept of price distortion index, which was first presented in the *World Development Report, 1983*. He has been on World Bank missions to various countries, including Korea, Bangladesh, Kenya, Botswana, Thailand, and Colombia. Before joining the World Bank in 1971, he worked on macroeconomic analysis of the Indian, British, and Canadian economies.

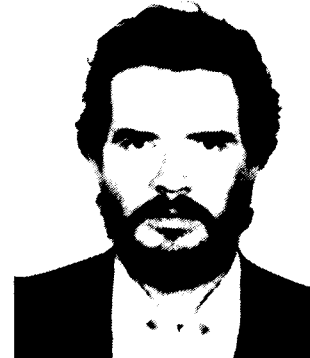
Ms. Yvonne Allen

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Scenarios for Australia's Future
Monday, July 17, 4:00-5:30, Wilmington Room

Dr. Antonio Alonso C.

Director, Foro Mexico 2010
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Carretera Al Ajusco, #203
S/N Tlalpan 14000, 20061
Mexico D.F. 01000
Mexico



Results of the "Foro Mexico 2010" Project
Wednesday, July 19, 10:30-12:00, Wilmington Room

The "Mexico 2010 Forum" project was initiated in 1985 to explore possible long-term futures of Mexico. Nearly two dozen topics are being reviewed, separately and as a whole. Alternative scenarios are being developed on the basis of simple mathematical models plus an extensive consultation process with expert groups. The project is in its final stages and is expected to be finished in 1990. Two final reports, on politics and health, have been finished and are in press, and three more are in preparation. The conference paper covers three topics: 1) the project itself, including its financing, the building of the data base, the selection of topics, and public demand and expectations; 2) descriptions of some of Mexico's possible futures, which are not intended as a complete summary of our views on Mexico's future but illustrate the kind of results obtained; and 3) a brief discussion of the future of the project and its possible spin-offs.

Dr. Alonso received his B.Sc. and M.Sc. degrees from the National Autonomous University of Mexico and his Ph.D. in control engineering from the Imperial College of Science and Technology, London. He held various positions at the Institute of Engineering, National Autonomous University of Mexico, was director of Fundacion Javier Barros Sierra AC, and at present is director of Centro de Estudios Prospectivos AC. He is author or co-author of more than fifty technical papers and co-author of four books on the topics of energy options, 21st century studies, communications, and internal Mexican politics. Dr. Alonso is a technical advisor for the Mexican government, advisor to the planning commission of the National Autonomous University of Mexico, and a member of the board for the Institute for 21st Century Studies (Washington DC), Centro Tepoztlan (Tepoztlan, Mexico), and Macro Asesoria Economica (a private consultant body on economic and financial matters). Dr. Alonso belongs to several technological and scientific societies and is a numerary member of the Mexican Academy of Engineering.

Dr. Pedro Amaya
Director, COLCIENCIAS
Transversal 9A No. 133-28
Bogota
Colombia

*"Colombia: Twenty-First Century," an Action
Strategy for Managing the Future*
Monday, July 17, 4:00-5:30, Dover Room
(Presented by Dr. Litto Rios B.)

This paper summarizes an experience in progress in designing, negotiating, and developing the national, state, and Latin American capability for managing futures. Its primary purpose is that of assuring Colombia its potential role, towards the year 2010, as a strategic integration point between North and South, acting as a society characterized by: an emerging international service economy, a democracy with local-regional autonomy, ecological based development, a participative social organization, permanent education for social change, a national scientific and technological capability closely intertwined with global and regional science and technology development, and multicultural communities interacting with diverse regional, national, and global cultures. The project has been carried out under the auspices of COLCIENCIAS, the Colombian National Science Foundation, and with the vital support of organizations in the Antioquian region. The paper includes the theoretical framework of the study and the position of COLCIENCIAS, a global vision of Colombia, the futures vacuum, the action strategy for the future, futures management, plus commentaries, criticism, and conclusions.

President Oscar Aries S.
Casa Presidencial
San José
Costa Rica

The Importance of Long-Term Planning in the Development of Costa Rica
Monday, July 17, 8:30-10:00, Delaware Suite (Presented by Mr. Jorge Monge)

Dr. Gerald O. Barney
Director
Institute for 21st Century Studies
1611 North Kent Street
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Arlington, Virginia 22209-2111
USA

Meeting Organizer and Chair



Dr. Barney is the founder and director of the Institute for 21st Century Studies, an independent, non-profit organization that assists nations in evaluating future alternatives in national security, socioeconomics, demographics, and environment. Earlier he directed *The Global 2000 Report to The President* for

President Jimmy Carter, chaired the Rockefeller Brothers Fund national program, worked with former governors Nelson Rockefeller and Russell Peterson on The Commission for Critical Choices for Americans, directed long-range forecasting and technology assessment at the Council on Environmental Quality, and worked in defense analysis at the Center for Naval Analysis. His publications include the three-volume *Global 2000 Report to The President*; *The Unfinished Agenda: The Citizens Policy Guide to Environment Issues*; *Managing a Nation: The Software Sourcebook*; *Global 2000: Implications for Canada*, and "The Future of The Creation: The Central Challenge for Theologians," in the journal *Word and World*. Dr. Barney earned his Ph.D. in physics from the University of Wisconsin and held a postdoctoral fellowship in policy analysis at Harvard and MIT. He is married to Carol A. Barney and has three children.

Mr. Alvaro de la Barra G.

Consultores en Ingenieros de Sistemas
Marchant Pereira 1055
Santiago
Chile

A Future for All: A Computational Model of the Development of Chile
Monday, July 17, 2:00-3:30, Dover Room

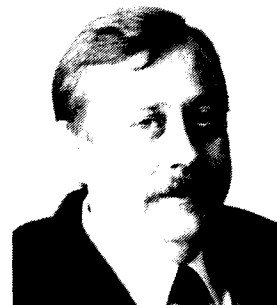
This paper presents an overview of the book-length report, *A Future for All: A Computational Model of the Development of Chile*. The model structure, basic rationale, and hypotheses are reviewed. The model is based on maximizing quality of life as measured by life expectancy. Major variables influencing quality of life include food, education, and investment.

Mr. de la Barra is a civil engineer. He holds an undergraduate degree from Universidad Católica de Chile and a master's in industrial engineering from Stanford University. He has been a professor in the Faculty of Physical Science and Mathematics at Universidad de Chile and is former dean of the Faculty of Engineering of Universidad Católica de Chile. He is now doing consulting work in the private sector.

Prof. Stuart A. Bremer

Department of Political Science
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Binghamton, New York 13901
USA

GLOBUS: The New Multi-Nation Global Model That Includes Trade, Domestic Politics, and International Relations--and Works on a Microcomputer
Friday, July 21, 10:30-12:00 Delaware Suite



GLOBUS is the latest in the series of global models developed since the early 1970s. None of the earlier models included didactic trade flows, international relations, or domestic politics. GLOBUS does. Also, since GLOBUS operates on a microcomputer and will be made available at a nominal cost, this model

promises to be the source of a new generation of global development/security scenarios. Stuart Bremer devoted the last decade to developing the GLOBUS model.

Stuart A. Bremer is a professor of political science at the State University of New York at Binghamton. From 1979 to 1988 he was head of the GLOBUS research group at the Wissenschaftszentrum Berlin for Social Research in West Berlin. Prior to that he was a member of the Department of Political Science at the University of Michigan. He is the author of *Simulated Worlds* and editor/author of *The GLOBUS Model* and has published a variety of articles on computer simulation and international conflict.

Dr. Joao Manuel Gaspar Caraça
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"Portugal 2000" Project
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Reflections on the Project, "Portugal 2000"
Wednesday, July 19, 8:30-10:00, Dover Room

The futures activity in Portugal is reviewed, from early precursors to recent studies. The motivation and general framework of the "Portugal 2000" project, its methodology and the tasks conducted are described, and some preliminary results and issues are discussed.

Dr. Joao Manuel Gaspar Caraça was educated at Lisbon and Oxford. From 1975-1979 he served as chairman of the managing committee of the Portuguese Nuclear Energy Board. In 1978 he became director of the Planning Department of the National Scientific and Technological Research Board and continued in this capacity until 1982. In 1983 he joined the Gulbenkian Foundation where he is now director of the Science Department and coordinator of the Portugal 2000 project.

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The Study Plan for "Thailand Towards the Year 2010": The Dynamics of Thai Development and Strategies for the Future
Monday, July 17, 10:30-12:00, Wilmington Room

Abstract given under Dr. Phalchitr Uathavikul

Professor Chang-Yi David Chang

National Taiwan University
Department of Geography
Taipei 107
Taiwan (ROC)



The "Taiwan 2000" Report: Balancing Economic Growth and Environmental Protection
Tuesday, July 18, 8:30-10:00, Dover Room

Taiwan is now in a time of transition with respect to environmental protection. In the 1950s, 1960s, and 1970s, economic growth was given priority over environmental issues almost without question. As the costs of unregulated industry have become greater and more obvious, a variety of measures have been implemented to prevent problems as they arise and to attempt prevention of further problems. However, the situation has continued to worsen, and pressure is building for a more complete, integrated, and deliberate set of measures to restore and protect our environment. The Taiwan 2000 study can provide the help to bring Taiwan into the next stage, where the government takes a clear and conscious stand on the environment and actively and effectively acknowledges in its planning processes the need for maintaining a healthy environment .

Chang-Yi David Chang is currently a professor at the University of Texas at Austin. He has received numerous honors and awards, among which are several fellowships and research scholarships. He has traveled extensively throughout the world.

Mr. Ronald G. Crocombe

Institute of Pacific Studies
University of the South Pacific
Box 309
Rarotonga
Cook Islands

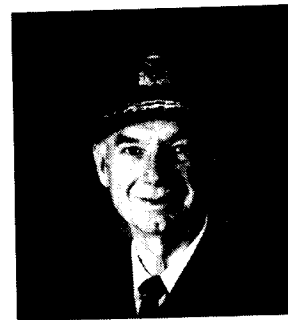
The Pacific Islands in the 21st Century
Monday, July 17, 4:00-5:30, Wilmington Room

This is a personal, tentative consideration of possible trends and options for the Pacific Islands in the next century. The region studied embraces the twenty-four nations and territories of the areas commonly known as Melanesia, Micronesia and Polynesia. Because of the small population and limited resources, external forces are an important determinant in the islands, and much of what has happened here in the past generation has been a distant derivative of relations between major powers. Among other factors that will be important in the future of the islands are environmental deterioration and environmental enhancement. Advances in communications technology may have even greater impact on these exceedingly scattered communities than elsewhere in the world. Population will be a much bigger issue for Melanesia than for most of Polynesia or Micronesia, even though Melanesia has much more land. Within fairly inflexible outer parameters, the islands have considerable potential leverage and scope for protective and creative reaction. Perhaps the greatest determinant in the future

of the area will be the quality of leadership, as the opportunities and dangers lie not so much in material resources as in the management of relationships.

Ron Crocombe is a professor emeritus of Pacific studies of the University of the South Pacific, where he was on the faculty from 1969 to 1988. He was the founding director of the Institute of Pacific Studies, which conducts and coordinates interdisciplinary studies in the social sciences and humanities throughout the Pacific Islands. In the 1960s he directed a social science research institute (now the Institute of Applied Social and Economic Research) in Papua, New Guinea. He is author and/or editor of 20 books and over 100 articles in professional journals and has undertaken extensive consultancy for governments, international agencies and other institutions. He has served as a judge for the Commonwealth Writers Prize, co-founded the South Pacific Social Sciences Association, and edited several journals.

Brig. Gen. W. Robert Dobson
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Canada's "Project 2010"
Wednesday, July 19, 2:00-3:30, Dover Room

"Project 2010" is an investigation into whether the Canadian Armed Forces--especially the Royal Canadian Air Force--have the capabilities to meet the uncertain conditions that could prevail in the early part of the twenty-first century. The project is being conducted in three phases: 1) an identification of the global and national environment for defense planning in the year 2010 and beyond based on trends in demography, climatology, resources and environment, society and politics, economics, technology in the aviation industry, space, and international and military affairs; 2) an identification of future roles and missions and a design of a model aerospace/airforce; and 3) an outline of the most favorable methods of making an orderly transition to the proposed model. The report describes a class of national and international problems not previously experienced by conventional political entities. The forms of economic, political, and military power traditionally exercised by Western industrialized nations were not designed to contend with the rate or the magnitude of behavioral change that seems to be occurring as the world moves from the industrial age to the information age.

Brigadier-General Dobson joined the RCAF in 1956 and earned his wings in 1957. After six years as a flight instructor, he flew with the Golden Hawk Aerobatic Team and with the Goldyllocks Harvard Demonstration Team. Later he served as Project Officer for the Tutor jet training aircraft, as Staff Officer at Air Defence Command Headquarters in North Bay, Ontario, as Base Operations Officer at Cold Lake, Alberta, Commander of the 427 Tactical Helicopter Squadron at CFB Petawawa, Chief of Staff at CFB Borden, Deputy Commander of 10 Tactical Air Group, Quebec, Commander of CFB Comox, D.C., and Project Director, Future Aerospace Studies. He was promoted to his present rank on 1 April 1987 and named Director General Force Development.

Mr. Mohammed El-Egaily
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Ethiopia

ECA and Africa's Development
Wednesday, July 19, 2:00-3:30, Wilmington Room

Dr. Peter Ellyard
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Australia

Scenarios for Australia's Future
Monday, July 17, 4:00-5:30, Wilmington Room (Presented by Ms. Yvonne Allen)

The Rev. Dwain C. Epps
Executive Director
The International Affairs Commission
National Council of Churches
475 Riverside Drive, Room 852
New York, New York 10115
USA

Justice, Peace, and the Integrity of the Creation: How Can the World Live in the 21st Century?
Tuesday, July 18, 10:30-12:00, Wilmington Room

Prof. Virginia Gamba-Stonehouse
c/o Bruce D. Stonehouse
Minemet
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The Future of Latin America, with Special Attention to the Role of the Military and the Influence of Drug Trafficking
Monday, July 17, 2:00-3:30, Wilmington Room

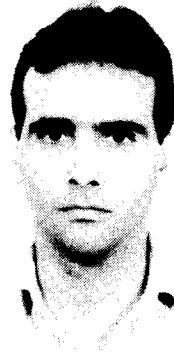
Both the United States and Latin America want to sustain a workable relationship, including in the area of security. But it is not clear how this objective can be achieved, and the current trend is towards de-coupling and isolation. An

examination of the underlying causes shows that common interests between the U.S. and Latin America are more negative than positive, being based on uncertainty about future options, economic problems, and fear of isolation. On the other hand, the U.S. and Latin America have divergent, even contradictory, views regarding common security threats; one of the very few threats perceived by both is drug trafficking. If the U.S. and Latin America decide that it is in their interest to reformulate their relationship, one of the areas of possible cooperation will be security. The Inter-American Defense System could be re-composed and made operational. In such an arrangement, the relationship must be erected by the civilian decision makers within the governments, and the military components must be instruments directed by those civilian governments. Whatever action is taken, both Inter-American relations and Inter-American Defense System interactions require a new dimension in U.S. and Latin American perceptions.

Professor Gamba-Stonehouse is Argentine. She received a bachelor's degree from the University of Newcastle Upon Tyne in England and a master's degree in strategic studies from the University of Wales (Aberystwyth). In Argentina she has taught military strategy and civil-military relations to the Joint Chiefs of Staff and to the National Defense College. She has also been a researcher at the Department of War Studies, King's College London, and a visiting professor in the United States at the Center of International Security Studies at the University of Maryland, the School of International Service at American University, and the Institute for National Strategic Studies at the National Defense University. Professor Gamba has published ten books and numerous articles on topics related to national security and defense strategies. She recently was awarded a grant from the MacArthur Foundation to do research on the future of the Inter-American Defense System. She serves on numerous boards, including the Pugwash Conferences Council. Currently Professor Gamba is a member of the core group for the U.N.-sponsored War Risk Reduction Project at Yale University and a visiting professor at the Department of War Studies, King's College, London.

Mr. Gonzolo Garland

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(First of two papers)

Peru in the 21st Century: Challenges and Possibilities
Wednesday, July 19, 10:30-12:00, Wilmington Room

This paper presents the main results of the Peruvian 21st century program of studies. In the first place it includes a brief explanation of the methodology used for the design of sectoral and aggregate models. It also discusses the major findings of the work with different scenarios of desired and possible futures. Finally, the paper identifies crucial issues to be taken into consideration in the design of any long-term development strategy for Peru, and advances some policy recommendations.

(Second of two papers)

Integrating Diverse Techniques on a Spreadsheet: Maintaining Inherent Complexity while Achieving Explicit Simplicity

Friday, July 21, 8:30-10:00, Delaware Suite

This paper discusses the use of techniques of different complexity in modeling aspects of reality. The choice of technique must be determined primarily by the problems being analyzed. If the problems require a complex technique, the modeler should not sacrifice quality for an ability to present the results in an accessible way. However, simplicity, clarity, and accessibility are important considerations if policy-makers are expected to use the models in the process of policy formulation. This conflict can often be solved by the use of spreadsheets, which are relatively easily learned and handled. Both governmental and private policy-makers are using spreadsheets increasingly in applications that previously required more complex, less intelligible techniques. Spreadsheet versions of complex models allows the intelligibility needed by policy-makers without sacrificing the level of complexity required by the problem at hand. In this way the impact of prospective studies on policy planning can be increased.

Mr. Gonzalo H. Garland is a member of the board of directors and a senior researcher at Group of Analysis for Development (GRADE), a private non-profit research center in Lima. He has participated in long-term studies relating to the role of science and technology in development. He also teaches both microeconomics and macroeconomics at the Universidad del Pacifico. Mr. Garland has been a member of the board of directors of the Banco Industrial del Peru, one of the largest state-owned banks. He has also been a consultant to Unesco and to several Peruvian institutions. He holds a M.A. in economics from Stanford University and a B.A. from the Universidad del Pacifico and has published several papers on development planning and on the impact of new technologies on development.

Dr. Martha J. Garrett
European Representative
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*Some Advice to National 21st Century
Study Teams: Three Questions to Consider*
Friday, July 21, 8:30-10:00, Delaware Suite

The Institute for 21st Century Studies staff have worked with a large number of the 21st century studies and have seen firsthand the difficulties that teams commonly encounter. Paradigm blindness and fear often lead to studies that are overly narrow in scope or that omit some important issues. Technique may be emphasized more than thinking, excessive time may be spent on databases, and teams may become mesmerized by models. Studies have also suffered because of management problems, including ones related to internal team dynamics or to the role of various boards. New study teams can avoid these problems if they anticipate them and take active steps toward their solution. Much of the

information about how to do so is available in the Institute's *Handbook for 21st Century Studies*.

Martha Garrett is former co-director of the Institute for 21st Century Studies and now serves as the Institute's representative in Europe. She received her Ph.D. in zoology from the University of North Carolina and has been trained in both computer modeling and management techniques. Before she joined ITCS, she did research in environmental physiology, taught zoology at the University of North Carolina, and was administrator of several science education programs. She was a judge for the Mitchell Competition on designing sustainable societies and served on the national Lutheran task force on the future. As a member of the ITCS staff, Dr. Garrett visited 21st century study teams in eight countries, was involved in designing and teaching the Institute's training workshop, was a faculty member at an IDRC modeling seminar organized by the System Research Institute, and compiled a directory of alternative futures groups in Latin American. She currently is working on new versions of the *Handbook for 21st Century Studies* and *Managing a Nation*.

Dr. Victor Gelovani
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Soviet Global Modeling Project
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The 21st Century Study of the USSR
Tuesday, July 18, 8:30-10:00, Wilmington Room

The long-term demographic, socioeconomic, technologic, and ecological development of the world and of the Soviet Union particularly has been analyzed and projected to the year 2010 by an Institute for Systems Studies research team. The analysis, based on a nine-region model, shows that the Soviet Union is in a critical development stage. If present inertial tendencies continue, economic growth in the USSR would fall below 1% per year till the year 2000, and the population would decline after 2009. The economic and technologic gap between the USSR and the developed countries would increase. The way out of this critical situation is opened by the perestroika, which should boost development by sharply increasing the economy's responsiveness to social aims, population interests, technical innovations, resource conservation, and ecological stability. According to the accelerated development scenario, which assumes that the political and economic reform program put forward by the leaders of the perestroika will be fully implemented, the economic potential of the USSR will double between 1988 to 2000. Only the success of this program will ensure the stable development of the Soviet society during its transition to the 21st century.

Dr. Victor Gelovani is director of the Soviet Branch of the World Laboratory and project leader for the Soviet Global Modeling Project. Born in 1940, he received his doctorate from the Moscow Physical-Technical Institute. He is a corresponding member of the Soviet Academy of Sciences.

Dr. William E. Gibson
Eco-Justice Project
Anabel Taylor Hall
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USA



The 21st Century Study by the Presbyterian Church (USA): Keeping and Healing the Creation
Tuesday, July 18, 4:00-5:30, Wilmington Room

The Eco-Justice Task Force by the Presbyterian Church (U.S.A.) was formed to describe both the deteriorating condition of the environment and to assess the implications for the church's mission. The task force's report, *Keeping and Healing the Creation*, finds that the earth and all creatures are properly understood as the loved creation of One who acts and calls for the liberation of the vulnerable and the oppressed. The challenge to the church, as it moves into the 21st century, is to look at the "eco-justice crisis" in the context of the church's self-understanding. The challenge to faithful people is to hear an urgent call to participate in "setting creation free." The book establishes a basis for critical and constructive involvement of people who are contributing to attitudinal, lifestyle, and policy changes to protect and restore earth and people. The book also elaborates norms of sustainability, participation, sufficiency, and solidarity.

William E. Gibson is an ordained minister in the Presbyterian Church (U.S.A.). He is a graduate of the University of Wisconsin, Princeton Theological Seminary, and Union Theological Seminary (New York). From the last-named institution he received a Ph.D. in Christian Ethics. He has held positions as a minister in higher education at the University of Arkansas, the University of Pennsylvania, Rochester Institute of Technology, and Cornell University. From 1974 to 1986 he was the founding coordinator of the Eco-Justice Project and Network, of the Center for Religion, Ethics and Social Policy at Cornell. He currently edits *The Egg: A Journal of Eco-Justice*, and as a Staff Associate of the Eco-Justice Project takes numerous assignments for speaking, writing, and consulting. He is a consultant to the Eco-Justice Task Force of the Committee on Social Witness Policy, Presbyterian Church (U.S.A.). His writings have appeared in numerous publications, including: *A Covenant Group for Lifestyle Assessment*, *Social Themes of the Christian Year*, *For Creation's Sake*, *Shalom Connections in Personal and Congregational Life*, and *Economics and the Reformed Faith*.

Rev. Wesley Granberg-Michaelson
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Justice, Peace, and the Integrity of the Creation: How Can the World Live in the 21st Century?
Tuesday, July 18, 10:30-12:00, Wilmington Room (Presented by Rev. Dwain C. Epps)

Dr. Alan D. Hecht
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USA

Climate and the Future of Nations
Friday, July 21, 4:00-5:30, Delaware Suite

This paper describes the international impacts study on climate change, population, and economics. Included are possible scenarios for climate change and the social, economic, and environmental implications of these changes.

Mr. Hajimu Hori
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Japan

Reflections on the Report, "Japan in the Year 2000"
Monday, July 17, 10:30-12:00, Dover Room

Abstract given under Mr. Tsutomu Tanaka.

Dr. Roefie Hueting
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*Results of an Economic Scenario that Shifts
Top Priority from Growth in Production to
Protection of the Environment*
Tuesday, July 18, 4:00-5:30, Dover Room



Welfare, or satisfaction of wants, is not only dependent on produced goods but also on the quality of the environment, leisure time, income distribution, working conditions, employment, and the safety of the future. The same amount of production and consumption requires more labor with environmental conservation than without. Nevertheless, under current conditions, environmental measures often lead to a loss of jobs. The paper enunciates under which conditions environmental measures lead to more employment. In the scenario study the necessary environmental measures have been formulated, their effects on the environment have been estimated in physical terms and their costs in money terms. The (negative) consequences for production and the (positive) consequences for employment have been scanned with the aid of an econometric model.

R. Hueting, born in 1929, is head of the Department for Environment Statistics of the Netherlands Central Bureau of Statistics. In 1970 he published *Wat is de natuur ons waard? (What is Nature's Value to Us?)*, a collection of articles from the years 1967-1970 on the deterioration of the environment and economic growth. In 1974 he took, cum laude, a doctor's degree on the thesis *Nieuwe schaarste en economische groei*. An updated version in the English language has been published in 1980 under the title *New Scarcity and Economic Growth*. Dr. Hueting has published numerous papers and articles on the environmental problem, both in Dutch and in English, for seminars, periodicals, and collections.

Ms. Helga Jonsdotter

Assistant to the Prime Minister
Althingi
Reykjavik
Iceland

Status Report on the Project, "Iceland in Twenty-five Years"
Wednesday, July 19, 4:00-5:30, Wilmington Room

Dr. Hugues de Jouvenel

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A 21st Century Study of France
Tuesday, July 18, 10:30-12:00, Dover Room

Dr. Esko Kalimo

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Reflections on the Finnish Economy and Society to the Year 2000
Wednesday, July 19, 4:00-5:30, Wilmington Room

Mr. Bon-ho Koo

President, Korean Development Institute
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South Korea

"The Future Course of Industrial Development in the Republic of Korea" and the Policy Response

Monday, July 17, 10:30-12:00, Dover Room (Presented by Dr. Lee)

Korea is at a historic turning point as it stands at the threshold of advanced nationhood. For this transition to be achieved, the current industrial structure has to be changed. This paper explores the possible and desirable course of the restructuring of industries faced with changing international and domestic economic environments. Due attention is given to the impact of high-technology development on the competitiveness of Korean industries. In addition, the government policy measures needed in the restructuring process are identified.

Dr. Won-Young Lee

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"The Future Course of Industrial Development in the Republic of Korea" and the Policy Response

Monday, July 17, 10:30-12:00, Dover Room

Abstract given under Mr. Bon-ho Koo

Dr. Lee is 39 years old. He graduated from Seoul National University in 1969, obtained his M.A from Kent State University in 1978, and his Ph.D. in economics from the University of Michigan in 1983. He was a member of Future Industry Task Force during 1985-1987 and served as a specialist for the Presidential Commission on Economic Restructuring in 1988. Dr. Lee has numerous publications in the fields of international trade and industrial policy.

Mr. Lin Zixin

Editor in Chief
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Technological Trends That Will Shape Global Economic Developments Over the Next Quarter Century

Friday, July 21, 2:00-3:30, Delaware Suite

Every 21st century study faces a major task in deciding what to assume about global technological developments and the impact of these developments on the national future. Unfortunately, few people have considered thoughtfully the trends in global technology and their implications for the future development and security of nations. This paper will discuss the future trends in technology that seem most relevant to the future of developing countries.

Mr. Lin directed the first phase of China's enormously influential 21st century study, *China in the Year 2000*. He then became editor in chief of the *Xeji Ribao* (*Science and Technology Daily*), one of three newspapers published by the Chinese government. He is also a principal participant in all decisions on technological policy in Beijing.

Mr. Ma Hong

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The State Council of the PRC
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People's Republic of China

The Research Program on China's Future in the Year 2000 and Beyond
Tuesday, July 18, 8:30-10:00, Wilmington Room (Presented by Prof. Wang Huijiong)

Mr. J. Manrakhan

Vice Chancellor
The University of Mauritius
Réduit
Mauritius

"Mauritius 2000" and The Underlying Methodology
Tuesday, July 18, 2:00-3:30, Wilmington Room

The "Mauritius 2000" project has developed a set of scenarios for the first quarter of the 21st century, based on the Enhancement of Carrying Capacity Options (ECCO) model initially developed under the aegis of Unesco. Both energy and money are used as numeracies. In addition to a surprise-free reference scenario, several variants have been produced with single or multiple changes of policies or assumptions. In the reference scenario (1985-2025), population grows to 1.57 million; the standard of living falls by 50%; unemployment rises to 46%; and the national debt increases three-fold. However, in one of the variants with multiple policy changes, population reaches only 1.2 million; the material standard of living increases by 75%; food self sufficiency increases five-fold; unemployment drops to 1.7%; and the national debt decreases.

Professor J. Manrakhan is currently vice chancellor of the University of Mauritius. He received his B.Sc. in agriculture from the University of Mauritius and his M.Sc. from the University of Reading in the United Kingdom. He has authored and co-authored several publications relating to Mauritius. Professor Manrakhan is married and has three children.

Dr. Sergio Melnick
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Santiago
Chile

National and Regional Visions of Chile's Entry into the 21st Century
Wednesday, July 19, 2:00-3:30, Wilmington Room

Mr. Jorge Monge
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Costa Rica

The Importance of Long-Term Planning in the Development of Costa Rica
Monday, July 17, 8:30-10:00, Delaware Suite

Jorge Monge received his B.S. degree in industrial engineering from Universidad de Costa Rica and his master's of public administration from Harvard University. His professional experience includes work within industry and numerous government positions. He has been president of the national agroindustrial commission, coordinator of the board of industries, national coordinator for OLADE (Latin American Energy Organization), and vice minister of two government departments responsible for industry, energy, mines, and natural resources. In these positions he has headed several official international missions for the Cost Rican government. Mr. Monge has also been on the board of CODESA (the Costa Rican development corporation), Banco Popular y Desarrollo Comunal, and Banco Central de Costa Rica, has served as president of the national forestry council, and been a Mason Fellow at the Harvard Institute for International Development. He is now minister of national planning and political economy for Costa Rica and advisor to the president of the republic.

Mr. Ray Mulvihill
Environmental Research Unit
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Waterloo Road
Dublin 4
Ireland

Reflections on "Ireland in the Year 2000: Toward a National Strategy"

Tuesday, July 18, 4:00-5:30, Dover Room

Abstract given under Mr. Gerald Walker

Dr. Roger F. Naill
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*FOSSIL2: A Long-Term Energy Policy Model
for National Energy Planning*
Friday, July 21, 4:00-5:30, Delaware Suite

Many nations either have or are trying to develop energy economies that are petroleum based. Yet geological analysis suggest that petroleum and natural gas production, globally, will peak and begin to decline in the next few decades. As a result, the global energy economy is expected to undergo a massive transition from dependence on oil and gas to alternative energy sources--perhaps coal or renewables.

Roger F. Naill is vice president for energy planning services at Applied Energy Services, Inc., a cogeneration and consulting company located in Arlington, Virginia. AES provides utility and government customers with consulting services related to least-cost energy planning. Prior to joining AES in 1981, Dr. Naill was director of the Office of Analytical Services at the U.S. Department of Energy. From 1976 to 1977 he was a research assistant professor of engineering at Dartmouth College's Thayer School of Engineering, and director of the Dartmouth Energy Policy Project. Dr. Naill received his undergraduate degree in physics from Princeton University, his M.S. from the Sloan School of Management at MIT, and his Ph.D. in engineering/operations research from Dartmouth College.

Dr. Ricardo A. Navarro
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El Salvador



Long-Term Sustainability of El Salvador
Tuesday, July 18, 2:00-3:30, Dover Room

An assessment of the long-term sustainability of El Salvador has been carried out, with the aid of a system dynamics computer model. The assessment evaluates the resource needs of the country in light of present and feasible patterns of population growth, following a process of sustainable development. Sustainability in this assessment is understood in terms of the capacity of the country to satisfy the food and housing needs of the population and maintain a certain degree of transportation and industry, while at the same time adopting and developing technologies that can have a feasible interaction with the environment, generating jobs with low capital investments and decentralized infrastructure, and reducing technical, economic and political dependency. The

results of the analysis seem to indicate that a development process can be sustained if proper technological changes are made with a social and ecologic orientation and if the political climate allows it.

Dr. Ricardo A. Navarro is the president of the Salvadorean Center of Appropriate Technology and the vice president of the Salvadorean Ecological Unity, a federation of twenty-two institutions involved in ecological work in El Salvador. He is also a member of the executive committee of SATIS, an international organization of 100 appropriate technology institutions around the world. He is a member of several technical and academic organizations in El Salvador. While serving as a professor in the Mechanical Engineering Department at Universidad Centroamericana in El Salvador, he studied political science in El Salvador and geothermal energy in Japan. Dr. Navarro was born in 1951. He holds a bachelor's degree and a master of science degree in mechanical engineering from Purdue University, a mechanical engineering degree from Universidad Jose Simeon Cafias in El Salvador and a masters of science degree and doctor of science degree in engineering from Washington University.

Mr. Ruben F. W. Nelson
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Canada



From Post-Industrial Future to Post-Industrial Perspective: What We Did and What We Learned
Monday, July 17, 4:00-5:30, Dover Room

The Post-Industrial Future Project is an attempt to explore seriously the view that long-term cultural change (to a post-industrial future) is real and must become the assumed context for both reading the present signs of change and thinking about our future. In the last analysis, we developed a post-industrial perspective on our world and our future. This paper will set out why and how we did the project and our main conclusions.

Mr. Nelson has devoted twenty-five years to exploring and thinking strategically about the forces and dynamics that both shape and inhibit personal, organizational, and societal growth. He is best known for his descriptions of the changes taking place in our societal context--the long transition of industrial societies and organizations to a post-industrial future. He has been an advisor to cabinet ministers and to senior managers in virtually every sector of Canadian society. He also directs major research projects and task forces, the most recent being the Post-Industrial Future Project: A Canadian Exploration of the Implications of Profound Societal Change. Mr. Nelson is a founding member and past president of the Canadian Association of Futures Studies. In the mid-70s he undertook the first formal research in Canada into "societal paradigm change." He is the author of *The Illusions of Urban Man* and a variety of articles. He is editor of the Canadian Directory of Futures Services and Resources.

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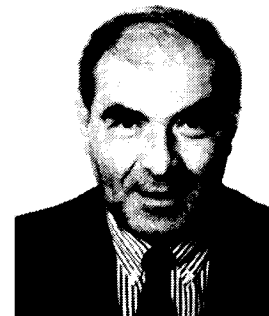


"Britain in 2010": The PSI Project
Wednesday, July 19, 8:30-10:00, Dover Room

The Policy Studies Institute, an independent research organization based in London, has a multidisciplinary team of researchers engaged in policy-oriented research in a wide range of subject areas. The paper gives an account of the 21st century project the institute is undertaking--the aims and objectives, the coverage and methods adopted, and the reasons for each. It also describes the unusual range of supporting organizations, which include a foundation, five departments of government, and four private sector companies, and explains how, in addition to providing funding, these institutions have participated in the project.

Jim Northcott is leading the team of researchers working on the "Britain in 2010" project. He is a senior fellow at the Policy Research Institute and research coordinator of its industrial development program. He has been the author of seventeen published PSI reports, mostly on industrial development and applications of new technology. Previously he has worked for Economic Consultants Limited and for the Economist Intelligence Unit. He has worked on development studies in Malaysia, Egypt, and Mexico and made documentary films for television in Ghana and Uganda.

Dr. Riccardo Petrella
Head
FAST Programme
DG XII/H/2
Commission of the European Communities
200 rue de la Loi
1049 Brussels
Belgium



European Futures in Science, Technology, and Society
Wednesday, July 19, 10:30-12:00, Dover Room

The paper will summarize the results of Forecasting and Assessment in Science and Technology (FAST II), which has been carried out during the years 1984-87 by more than 212 research centers. The program has focused mainly on five areas: 1) changes in the relationship between technology, work, and employment (TWE); 2) the transformation of services and new technologies (SERV); 3) the communication function--a strategic issue for Europe (COM); 4) the future of the food system (ALIM); and 5) the integrated development of renewable natural resources (RES).

Dr. Riccardo Petrella is head of the Forecasting and Assessment in Science and Technology (FAST) program at the Commission of the European Communities in

Brussels, and "Charge de cours" at the Catholic University of Louvain. He is a member of the board of the European Foundation for the Improvement of Working Conditions in Dublin, of the consultative board of the Observatoire de Prospective de La Normandie (France), of the European Business Priorities Group (Belgium), of the board of L'Association Internationale FUTURIBLES (France), of the scientific committee of the national research program on New Technology and Employment in the Federal Republic of Germany, and of the group Plan Strategie in 1991-1995 at the Catholic University of Louvain (Belgium). His doctorate is from Florence University in political economy.

Dr. Phalchitr Uathavikul

President
Thailand Development Research Institute
(TDRI)
15th Floor, Rajapark Building
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Bangkok 10110
Thailand



*The Study Plan for "Thailand Towards the Year 2010":
The Dynamics of Thai Development and Strategies
for the Future*

Monday, July 17, 10:30-12:00, Wilmington Room (Presented by Dr. Chalongsob Sussangkarn)

"Thailand Towards the Year 2010" is a large-scale three-year study aimed, not at the definition of a future ideal state, but the exploration of pragmatic alternative development strategies and policy options. The objective will be achieved through in-depth historical analysis of the process of transformation of the Thai society over the past twenty-five years, as a basis for projection into the future. The study will analyze underlying (as against proximate) factors and will consist of three components: 1) dynamics of internal growth (demography, economic structure, science and technology, resource base, sociocultural change, and political development), leading to a conclusion on the central issue of sustainability; 2) the external environment (alternative future global scenarios, current Thai patterns and trends, and dynamic comparative advantage); and 3) development strategies and policy options (strategies for alternative futures, associated policy options, and policy instruments). The study is a joint project between the National Economic and Social Development Board and the Thailand Development Research Institute (TDRI).

Dr. Phalchitr is the president of Thailand Development Research Institute Foundation (TDRI) in Bangkok and is also a member of the National Economic and Social Development Board. He has served for twenty-five years in the service of the Thai government. His previous positions include: executive director of the World Bank, deputy minister of finance, professor and rector of the National Institute of Development Administration (NIDA), and advisor to the prime minister for economic affairs. He has also served on various national boards and committees, including the Court of Directors, the Bank of Thailand, and the Civil Service Commission, and has been a member of the National Legislative Assembly.

Dr. Andre Piontkowsky
Institute for Systems Studies
USSR Academy of Sciences
9, Prospect 60-Letija Oktiabria
117312 Moscow B-312
USSR



*Strategic Stability Analysis Through
Mathematical Modeling*
Friday, July 21, 2:00-3:30, Delaware Suite

The future of all nations is dependent of progress being made on nuclear disarmament. If the practical implementation of nuclear disarmament is actually to proceed, it will be necessary to assure that "strategic security" is maintained at all of the intermediate stages of the process. The concept of strategic stability is analyzed by the methods of mathematical modeling. A two-level interactive modeling system is represented. It includes a relatively simple two-dimensional visual model and a sophisticated, multi-dimensional model that takes into account actual characteristics and parameters of real strategic weapon systems.

Dr. Andre Piontkowsky is a senior researcher at the Institute for Systems Studies. Born in 1940, he received his doctorate in applied mathematics from the Mathematics Faculty of Moscow State University. He is a member of the American Mathematical Society.

Dr. Carlos A. Quesada-M.
Director
National Conservation Strategy for Costa Rica
(ECODES)
Escuela de Ingeniería Civil
Universidad de Costa Rica
San José
Costa Rica



The National Conservation Strategy for Costa Rica
Tuesday, July 18, 8:30-10:00, Dover Room
(Presented by Ms. Vivienne Solis-Rivera)

The Conservation Strategy for Sustainable Development of Costa Rica (ECODES) is an effort to incorporate the environmental variable in the planning process. It provides an integrated reference framework that facilitates taking due consideration of environmental options and restrictions. The integrated reference framework can be used in planning efforts at local, sectoral, regional, and national levels and is very useful in accommodating goals in relation to both long-term conservation and long-term development. ECODES is the result of a two-year systematic effort, beginning in April 1987, by the Ministry of Natural Resources, Energy, and Mines.

Dr. Carlos Quesada is a civil engineer with a Ph.D. in water resources systems and master's degrees in both hydrology and natural resources planning from Colorado State University. He has occupied important professional, executive, and administrative positions such as director of the Civil Engineering School at

the University of Costa Rica and head of the watershed management program at the International Center for Graduate Training and Research (CATIE), Costa Rica. At present he serves as director of the Costa Rican Conservation Strategy for Sustainable Development, and as head of the Water Resources and Environmental Engineering Department of the University of Costa Rica. He is also environmental advisor to the minister of natural resources, energy, and mines. He has served as international short-term consultant in countries on three continents, is an active member of several international organizations and scientific societies (including the Balaton Group), and has recently been appointed as a member of the program planning advisory group for IUCN.

Dr. Paul D. Raskin

President
Energy Systems Research Group, Inc., and
Director
Stockholm Environmental Institute-Boston
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14th Floor
Boston, Massachusetts 02110
USA



Energy and Environment Scenarios: The LEAP Method
Friday, July 21, 10:30-12:00, Delaware Suite

The paper describes the origin, structure, and use of the LEAP system and its role in underscoring the policy implications of alternative futures. The LEAP system is a set of computerized programs for analyzing current usage of energy and other resources and for creating long-range scenarios for assessing the resource and environmental repercussions of alternative long-term future scenarios. A flexible and user-friendly system, LEAP has been used in numerous applications at the regional, national, and multinational levels. It currently is being enhanced for assessments of the environmental and resource feasibility and desirability of alternative global economic, demographic, and techno-cultural development trajectories.

Dr. Raskin is a senior research scientist and the president of Energy Systems Research Group. Subsequent to receiving his Ph.D. in physics from Columbia University in 1969, he served on the faculties of City College of New York and the State University of New York at Albany. At the latter, in addition to carrying out research in physics, he chaired the faculty at an interdisciplinary college on contemporary social institutions and expanded his research activities to include energy and environmental issues. Since 1976 Dr. Raskin has been with ESRG, where he has authored or co-authored over sixty energy studies, articles, and books and has advised numerous state and federal governmental agencies, private organizations, and international bodies and governments. These studies cover a variety of energy-related issues, including utility system planning, demand forecasting, conservation policy, and cost-benefit analysis.

Dr. Ichtiaque Rasool
Chief Scientist for Global Change
NASA Headquarters, Code E
600 Independence Avenue. SW
Washington, DC 20546
USA



*The International Geosphere-Biosphere Programme:
A Study of Global Change*
Wednesday, July 19, 4:00-5:30, Dover Room

The first decade of the 21st century will be markedly different from the last decade of the 20th. Economic and technological activity coupled to the exponentially growing population will considerably alter the atmosphere, the oceans, and the face of the land surface. This paper will discuss the observed trends of the change taking place now, the scientific issues involved in making any projections towards the future, and a proposal on how to proceed in order to absolve some of these uncertainties in the next five to ten years.

Dr. S. Ichtiaque Rasool is currently chief scientist for global change programs in the Office of Space Science and Applications at NASA Headquarters. His previous positions within NASA have included chief scientist in the Office of Space and Terrestrial Applications, deputy associate administrator for Space Science, and deputy director of the Planetary Program Office. He has been a senior research scientist at the Goddard Institute for Space Studies in New York, has held special appointments at the Ecole Normale Supérieure in Paris and the Jet Propulsion Lab in Caltech, Pasadena, California, and has held adjunct and visiting positions at New York University, Columbia University, the University of Paris, and the California Institute of Technology. Dr. Rasool has received several awards from NASA, including the agency's highest scientific award, and he is an elected member of the International Academy of Astronautics. He is co-chairman of the International Satellite Land Surface Climatology Project, a member of the ICSU Special Committee on Geosphere-Biosphere Program, and a member of the National Academy of Science's Committee on Global Change.

Dr. Litto Rios B.
General Administrative Advisor
COLCIENCIAS
Transversal 9A No. 133-28
Bogota
Colombia



*"Colombia: Twenty-First Century,"
an Action Strategy for Managing the Future*
Monday, July 17, 4:00-5:30, Dover Room

Abstract given under Dr. Pedro Amaya

Dr. Litto Rios holds a bachelor's degree from Universidad de Antioquia and a medical degree from Universidad Nacional de Colombia Bogotá. He has held numerous academic posts, including director of the Postgraduate Institute of Political Science at Universidad de Antioquia and director of the Center for

Development Studies at the Universidad Nacional. He has also held several positions in Venezuela, including advisor to the Ministry of Education and director of a seminar on Latin-American Rural Development at Universidad de los Llanos. He is currently general administrative advisor to COLCIENCIAS. Dr. Rios has published in the areas of future studies, development, and strategies.

Dr. John B. Robinson
Department of Environment
and Resource Studies
University of Waterloo
Waterloo, Ontario N2L 3G1
Canada



*A Sustainable Canadian Society:
The Next Step in the Conserver Society Discussion*
Tuesday, July 18, 10:30-12:00, Dover Room

This paper reports on a two-year study, started in September 1988, to assess the economic and technological feasibility and impacts of a sustainable development path for Canada to the year 2041. An exercise in normative scenario analysis, or backcasting, the study will use an innovative national-level simulation modeling system, SERF, which describes the physical flows of energy, materials, and labour throughout the Canadian socioeconomic system and permits the development and testing of detailed physical scenarios of human activities. The SERF analysis will be combined with an examination of the environmental and sociopolitical implications of moving Canada onto a sustainable development path.

John Robinson is an associate professor in the Department of Environment and Resource Studies, and director of the Waterloo Simulation Research Facility (WATSRF), at the University of Waterloo. He teaches courses in energy policy analysis, sustainable development issues, and environmental philosophy. He has published extensively in the areas of energy efficiency and renewable energy development, energy policy analysis and energy and socioeconomic modeling and forecasting. He is currently working on several projects related to long-term socioeconomic and resource policy modeling and forecasting, including model development work at WATSRF, long-term scenario analysis on sustainable development issues in Canada, and a collaborative book on the philosophical, political, and methodological dimensions of modeling and forecasting.

Mr. Francisco Sagasti
Chief, Strategic Planning
World Bank
Room J 3145
1818 H Street, NW
Washington, DC 20433
USA

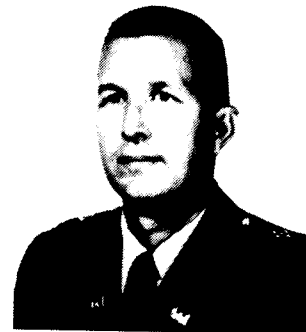


The Benefits of National Strategic Planning
Monday, July 17, 8:30-10:00, Delaware Suite

This paper examines the main features of the changing international context for national development, arguing that a fractured global order is emerging as the 21st century approaches. The challenges faced by societal governance in such a setting are identified and several advances--in management sciences, development planning and information technology--are described that can help to meet these challenges. The paper concludes with some remarks on conceptual adjustments needed to confront the 1990s and on the importance of national strategic planning.

Francisco Sagasti is Chief of the Strategic Planning Division of the World Bank, Adjunct Professor of Decision Sciences at the Wharton School, University of Pennsylvania, and Chairman of the United Nations Advisory Committee on Science and Technology for Development. Between 1980 and 1987 he was director of the Grupo de Análisis para el Desarrollo (GRADE) in Peru. He has been an advisor to the Peruvian ministers of foreign affairs and planning and since 1985 has been a member of the Rector's advisory committee of the United Nations University. Between 1973 and 1978 he coordinated an international research project on science and technology policies in ten developing countries, and between 1980 and 1983 he was a member of the board of the Peruvian National Council for Science and Technology. Mr. Sagasti has also worked for the Department of Scientific Affairs of the Organization of American States and the Secretariat of the Andean Common Market. He has published many papers and books in the fields of science and technology policy, management science, and development planning. He has received the United Nations Peace Medal and the Society for International Development's Paul Hoffman Award and has been a Fulbright Distinguished Visiting Lecturer.

Col. William M. Shepherd
Commander
US. Army Readiness Group
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3709 Custer Loop
Columbia, South Carolina 29206
USA



The "Army 21" Study
Wednesday, July 19, 2:00-3:30, Dover Room

This paper reports on a conceptual vision of how the Army might operate thirty years into the future. The concept will reflect strategy guidance from senior leadership and consider extrapolations of trends in geopolitics, demographics, threat, strategies, and technology. The concept represents the disciplined evolution of current Army strategy and posits a concept that is feasible, supportable, and acceptable. The paper examines the future roles and missions of the Army within the context of operations with other armed services and allied nations.

Colonel Shepherd is currently the commander of the U.S. Army Readiness Group at Fort Jackson, South Carolina. Prior to this assignment, he headed the Concepts and Strategic Planning Directorate for the Army's Training and Doctrine Command at Fort Monroe, Virginia. Col. Shepherd joined the Army following graduation from the Virginia Polytechnic Institute with a B.S. in geology. He also

holds an M.S. degree in civil engineering from Clemson University and has done advanced studies at the Aspen Institute. His responsibilities at Fort Monroe include a management of the Army's futures planning program, formulating concepts for Army operations in the 21st century, and implementing transition strategies. He is a member of the Society of American Military Engineers, the World Future Society, and the American Society of Civil Engineers.

Dr. Otto Soemarwoto
Director
Institute of Ecology, and
Professor of Biomangement
Padjadgaran University
Bandung
Indonesia



*"Indonesia 2020":
Charting a Course for Sustainable Development*
Wednesday, July 19, 8:30-10:00, Wilmington Room

Since independence in 1945, Indonesia has faced many difficulties including guerilla warfare against the Dutch, secessionist movements, two communist coups, and near economic collapse. But it has succeeded in amalgamating many ethnic groups into one nation and building up its economy. It has transformed itself from a poor nation into a middle-income one and from a large rice importer to a rice self-sufficient nation. However, these successes have involved costs, including too much dependence on rice, pest outbreaks, depletion of forest resources, erosion and hydrological damages, and pollution, all of which threaten the sustainability of development. This project aims at exploring alternative policies that can increase the probability of attaining sustainability.

Dr. Soemarwoto received his Ph.D. from the University of California at Berkeley in 1960. After graduating, he taught at the Gadjah Mada University in Indonesia, and from the years 1964-72 he served as director of the National Biological Institute in Bogor, Indonesia. Dr. Soemarwoto is currently professor at Padjadjaran University and serves as the director of the Institute of Ecology in Bandung. He has received numerous awards in recognition of his work.

Ms. Vivienne Solis-Rivera
National Conservation Strategy for Costa Rica
(ECODES)
Escuela de Ingeniería Cival
Universidad de Costa Rica
San José
Costa Rica



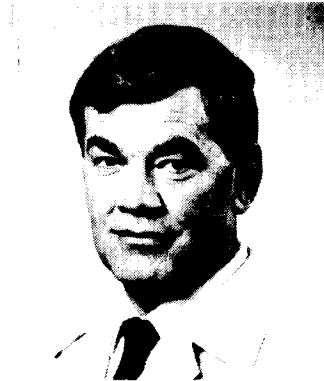
The National Conservation Strategy for Costa Rica
Tuesday, July 18, 8:30-10:00, Dover Room

Abstract given under Dr. Carlos A. Quesada-M.

Ms. Vivienne Solis-Rivera is executive assistant for the National Conservation Strategy for Costa Rica. In this capacity she is a part of the Regional Office of the International Union for the Conservation of Nature and Natural Resources (IUCN). She holds master's degrees in biology from the University of Costa Rica and in systematics and ecology from the University of Lawrence, Kansas. Previously she has been a professor at the International Center for Graduate Training and Research (CATIE), Costa Rica; coordinator of the masters in wildlife management program, National University of Costa Rica; and a part of the Environmental Education program, Open State University (UNED). She has conducted research projects in tropical ecology in Costa Rica.

Dr. P. H. Spies

Institute for Futures Research
Business School
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South Africa



Patterns of Transformation in Southern Africa 1990-2020: Procedures and Prognosis
Tuesday, July 18, 10:30-12:00, Wilmington Room

Southern Africa is defined as the southern part of the African subcontinent consisting of Angola, Zaire, Zambia, Malawi, Zimbabwe, Mozambique, Namibia, Botswana, Swaziland, Lesotho, and South Africa. The current political and socioeconomic scene in this area is dominated by ideological conflict, racial conflict, high population growth, underutilization of natural resources, relatively low levels of human development and growing poverty. These patterns are reviewed, and a prognosis for the year 2020 is presented, based on the assumption that current trends will dominate over the next thirty years. This prognosis is a scenario of the "current future." An alternative future is then investigated, based on the potential for the region to develop and create welfare for all its peoples. Economic, sociopolitical, and technological strategies that can create the best conditions for human development are reviewed. The analysis is nonideological. It does not, for example, refer to socialism versus capitalism, racism versus nonracism, or nationalism versus internationalism. Guidelines from systems thinking are used to define orientations, strategies, and policies that can promote long-term welfare in the subcontinent.

Dr. Philip Spies is a professor at the Business School, University of Stellenbosch, where he teaches strategic management, environmental scanning, and scenario development, and director of the University's Institute for Futures Research (IFR). He is consultant in strategic management to the forty-five institutions associated with the IFR and has been consultant to the Bureau for Economic Research. He has led twenty major research projects, including one on the long-term future of the Natal/KwaZulu region. Dr. Spies is responsible for *Business Futures*, an annual overview of the South African business environment. He has authored or co-authored a large number of research reports and other publications and has received numerous awards and grants. Dr. Spies has traveled and lived in both Europe and the United States.

Dr. William M. Stigliani
International Institute for
Applied Systems Analysis Environment Program
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Austria



*Future Environments for Europe:
Some Implications of Alternative Development Paths*
Wednesday, July 19, 10:30-12:00, Dover Room

The paper discusses some of the major environmental problems that may beset Europe up to the year 2030 and evaluates the relative seriousness of the problems for each of four alternative socioeconomic development pathways. The analysis demonstrates that the European environment is tightly linked to the global environment. Thus, achievement of a sustainable European environment in the coming decades is not only dependent on environmentally "friendly" development in Europe, but also on similar development occurring in the rest of the world.

Dr. W. M. Stigliani received his Ph.D. in physical chemistry from Princeton University. He is currently a senior research scholar at the International Institute for Applied Systems Analysis (Laxenburg, Austria), where he led the recently completed study *Future Environments for Europe: Some Implications of Alternative Development Paths*. Prior to this position he was a staff person on the Environmental Studies Board at the U.S. National Academy of Sciences, where he was study director for three studies on acid deposition in North America. He has published several books and papers on environmental chemistry and has worked on a wide array of environmental problems. In recent years he has focused on issues related to ecologically sustainable development.

Mr. Tsutomu Tanaka
Deputy Director-General
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Japan



*Reflections on the Report,
"Japan in the Year 2000"*
Monday, July 17, 10:30-12:00, Dover Room
(Presented by Mr. Hajimu Hori)

In 1981 Mr. Toshio Komoto, minister of state for economic planning, noted that Japan was about to experience major changes in entering an age of internationalization and in experiencing the aging and maturity of Japanese society. To prepare the nation for these changes, Mr. Komoto established a long-term outlook committee under the chairmanship of Mr. Saburo Okita. The report of the committee, *Japan in the Year 2000*, has been widely read in Japan and in other nations. This paper, presented by the staff director of the original report, will update the study in the light of more recent developments in and outside of the country.

Mr. Tsutomu Tanaka is now deputy director-general of the Coordination Bureau of the Economic Planning Agency. Previously he has held the position of deputy director-general of the Economic Research Institute at the Economic Planning Agency and director of the International Division at the Environment Agency.

Dr. Peter Timmerman

International Federation of Institutes
for Advanced Study
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Canada

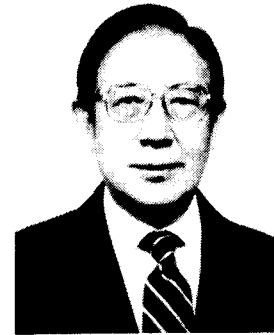


The Project on Human Dimensions of Global Change
Wednesday, July 19, 4:00-5:30, Dover Room

The Human Dimensions of Global Change Programme (HDGCP), is a decade-long international research project in the social sciences to examine the dynamics of human interactions with the environment and to improve the societal responses to environmental change. HDGCP is designed in part to act as a complementary program to the forthcoming global initiative in the physical science, the International Geosphere-Biosphere Programme (IGBP). The paper will discuss the creation and development of HDGCP; the current plans of the program, some of the difficulties associated with creating a working international social science network, and prospects for involvement in HDGCP activities by other interested parties.

Dr. Timmerman is a research associate of the International Federation of Institutes for Advanced Study and of the Institute for Environmental Studies, University of Toronto, Toronto, Ontario, Canada. He has been working in the area of environmental theory and practice for the last ten years. He was educated at the University of Toronto and at University College, University of London. His original specialization was in technical hazards and emergency planning, and as part of his work in this field, he was one of the authors of the official report on the Mississauga Train Derailment of 1979. More recently, he has been engaged in examining global environmental hazards, including global climate warming and sustainable development. His publications include *Vulnerability, Resilience, and the Collapse of Society* (1981), "Mythology and Surprise in the Sustainable Development of the Biosphere" in *The Sustainable Development of the Biosphere* ed. Clark and Munn (1986), and, most recently, planning documents for the Human Dimensions of Global Change Programme.

Mr. Tsu-Kan Tsui
Vice-Chairman
Council for Economic Planning and Development
(CEPD)
9th Floor,
87, Nanking East Road, Sec. 2
Taipei 100
Taiwan (ROC)



*The Contribution of Long-Term Planning
to the Economic Growth of Taiwan (ROC)*
Monday, July 17, 10:30-12:00, Wilmington Room

Taiwan has experienced several decades of sustained economic growth that are the envy of developing countries throughout the world. Taiwan's growth could not have been sustained without skillful long-term planning. This paper reviews the contribution that long-term planning has made to Taiwan's economic and social development.

Mr Tsui has been vice chairman of the Council for Economic Planning and Development (CEPD) since 1984. Previously he has been secretary general of the CEPD and secretary general of the Economic Planning Council. He received his education from Purdue University, Polytechnic Institute of New York, and the Economic Development Institute of the International Bank for Reconstruction and Development. He is married and has two children.

Mr. Richard W. Underwood
18323 Blanchmont Lane
Houston TX 77058
USA

The Earth as Seen from Space
Thursday, July 20, 8:30-10:00, Delaware Suite

Astronauts, the ultimate travelers, travel nearly a half million miles, see the sun rise and set sixteen times each day, and take thousands of photographs of the Earth. These photographs provide information that is useful to every geoscientific field, including agriculture, geology, oceanography, meteorology, land use and urban studies, cartography, and ecology. This talk will present eighty slides selected from the millions taken by U.S. and Soviet astronauts since the beginning of the space age. The slides have been chosen not only to show the beauty of the Earth but also to illustrate how seriously the planet is in trouble today. The planetary advances of desertification, deforestation, acid rain, weather modification, climate change, land-use changes, siltation, erosion, and oceanic pollution are illustrated in the only way they can be fully appreciated-- from space. Mr. Underwood's synoptic views of the planet provide information neither obtainable or comprehensible by any other means.

Mr. Richard W. Underwood was technical assistant to the director, Photography and Television Technology, National Aeronautics and Space Administration (NASA) until his retirement in 1986. He was technical monitor for the photographic aspects of the Gemini, Apollo, Skylab, and Apollo-Soyuz programs.

He has provided technical training to every single person ever to go into space aboard an American spacecraft. His honors include: NASA Exceptional Service Medal, Presidential Medal of Freedom, and the Frederick W. Brehm Memorial Medal from the University of Rochester. Mr. Underwood now speaks to audiences around the world, emphasizing wise utilization of the planet and planetary environmental problems as seen from space.

Dr. Agúst Valfells
Box 5073
Reykjavik
Iceland

Back to the Future:
"Iceland 2000" Revisited
Tuesday, July 18, 2:00-3:30, Wilmington Room



The study "Iceland 2000" was undertaken in 1978-79. The present study compares actual developments since then with projected ones and modifies the projections of the old study that go beyond 1988 in accordance with actual trends during the period 1978 to 1989. This provides a test of the methodology used in the original study, as well as a more accurate future prediction.

Dr. Valfells received his bachelor's degree in engineering from McGill University, his master's degree in chemical engineering from MIT, and his Ph.D. in nuclear engineering from Iowa State University. He has been a member of the faculty at Iowa State University and a research associate at the University of Iceland Science Institute. He has worked in industry as a construction engineer and as an executive in various corporations. Dr. Valfells has been director of Icelandic civil defense, consultant to the Icelandic Ministry of Industry, the Icelandic Power Company, and the Icelandic National Research Council, and president of the Icelandic Engineering Society.

Mr. B. B. Vohra
Chairman
Advisory Board on Energy
Sardar Patel Bhawan
New Delhi 110001
India

India 2000: The Threat of Ecological Disaster
Tuesday, July 18, 4:00-5:30, Wilmington Room



India is experiencing an ecological crisis. The rate at which the country's natural resources are being degraded and depleted is alarming. The task of saving India from disaster and restoring ecological health is a challenge before which all other national problems are insignificant. This grim scenario is not unique to India but

exists to some extent in most developing countries, which together account for nearly two-thirds of humanity. There is little hope of saving the world from ecological disaster if deforestation and land degradation continue over the vast areas included in these developing nations. The current situation is thus a challenge that cuts across national boundaries and makes traditional concepts of nationalism increasingly irrelevant. If the future is to be safeguarded, there must be a dramatic reduction in international animosities so that resources can be diverted from defense to ecological rehabilitation. A change in international climate is needed to enable developing countries to use more of their own resources in ecological programs and to make possible more aid for these programs from the developed countries. This is the only way in which today's world of despair can be transformed into a world of hope.

Shri B. B. Vohra obtained his education at the Punjab University and was awarded a U.N. fellowship in economic development in 1954. After several positions in the government of the Punjab State, he joined the government of India, in which he has served in many senior capacities. He was appointed founder chairman of the Central Ground Water Board in 1970 and served as secretary to the government in the Ministry of Petroleum from 1976 to 1981. He was chairman of the National Committee on Environmental Planning between 1981 and 1983. He led the first Indian environmental delegation to China in 1981 and also headed the country's delegation to the UNEP in 1981 and 1982. He is currently chairman of the government's Advisory Board of Energy. Mr. Vohra delivered the Sardar Patel Memorial Lectures in 1980 and the Jawahar Lal Nehru Memorial Lecture in 1988. He has written and lectured extensively on various aspects of environmental and natural resource management. A collection of some of his papers has been published by the government of India under the title, *Land and Water Management Problems in India (1982)*. Mr. Vohra has been an invited participant at several international conferences dealing with global threats to the environment.

Mr. Gerald Walker

Bolton Street College of Technology
Bolton Street
Dublin
Ireland

Reflections on "Ireland in the Year 2000: Toward a National Strategy"
Tuesday, July 18, 4:00-5:30, Dover Room (Presented by Dr. Mulvihill)

Between 1980 and 1985, the National Institute for Physical Planning and Construction Research in Dublin carried out a study that resulted in seven *Ireland in the Year 2000* publications. Among the topics covered in the study were technology, infrastructure, national strategy, employment, and urbanization. This paper draws on these reports, particularly the 1983 publication *Towards a National Strategy--Issues & Perspectives*. In addition to examining some of the results of the study and their present validity, this paper describes the process through which the study was carried out and analyzes the strengths and weaknesses of that process. The authors feel that the study process was particularly interesting and appropriate to the circumstances prevailing in Ireland in the early 1980s. Nevertheless, they recognize that they made mistakes and

are presenting this paper in the hope that others in similar situations may learn from their experience.

Prof. Wang Huijiong

Research Center for Economic, Technological, and Social Development
The State Council of the PRC
22 Xianmen Street
Beijing
People's Republic of China

The Research Program on China's Future in the Year 2000 and Beyond
Tuesday, July 18, 8:30-10:00, Wilmington Room

Prof. dr. hab. Andrzej P. Wierzbicki

Committee for Future Studies
of National Development
"Poland 2000"
Presidium of the Polish Academy of Sciences
Palac Kultury I Nauki
Warsaw
Poland



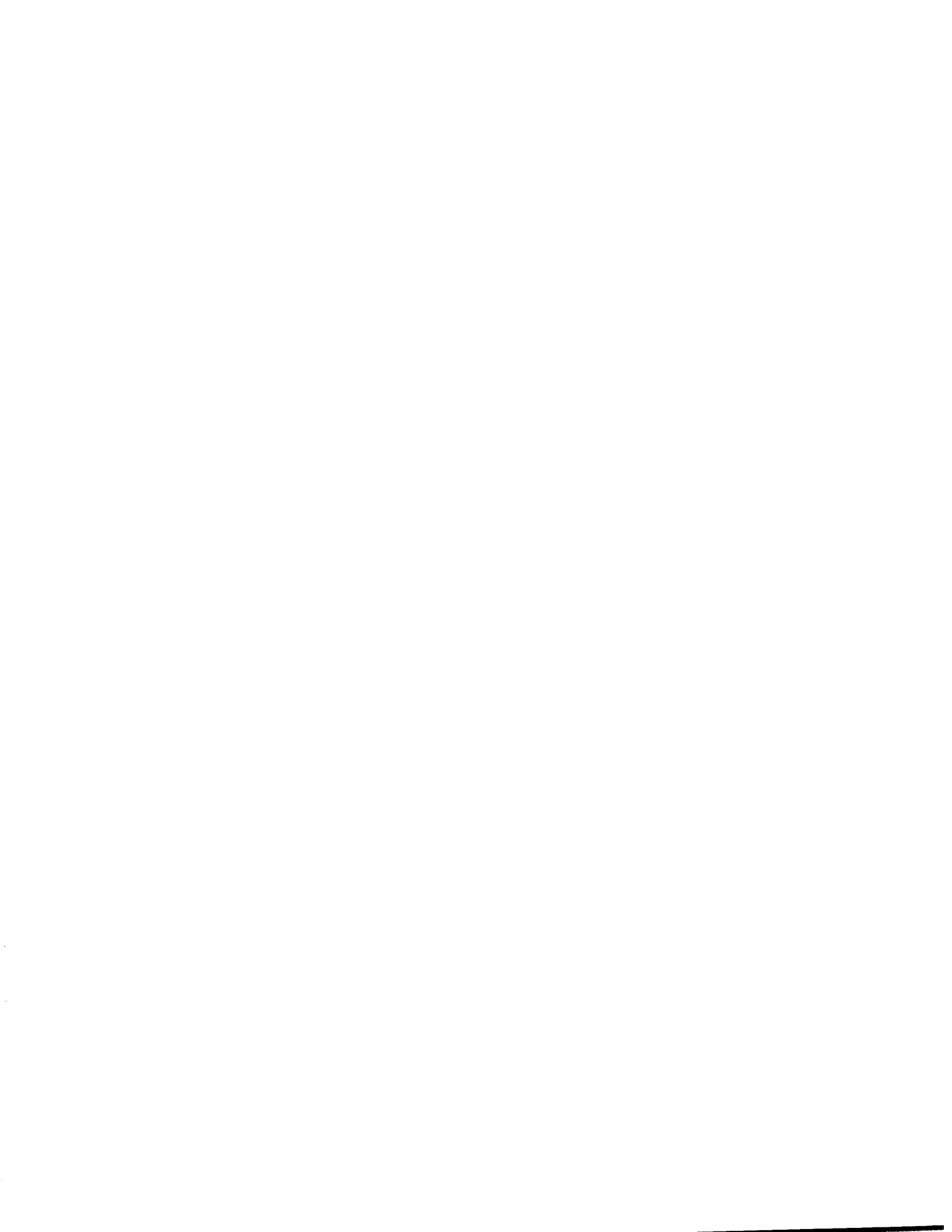
Toward Poland 2000 and Beyond
Monday, July 17, 2:00-3:30, Dover Room

The paper summarizes briefly the finding of a major study (about seven hundred pages in Polish) on scenarios of future national development of Poland to the year 2000 and beyond. The study was prepared in the years 1985-88 and covered aspects of demography, sociology, political sciences, economics (current conditions, reform of economic mechanisms, economic structural change), food and agriculture, energy policy, housing, spatial planning, ecology, environment, health, education and cultural development, and other issues. The study was organized along three scenarios of national development.

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Schedule Summary

Monday	8:30	Delaware	Costa Rica, Aries & Monge World, Sagasti
	10:30	Wilmington	Taiwan, Tsui, Thailand, Phalchitr & Chalongphob
	10:30	Dover	Japan, Tanaka & Hori Korea, Koo & Lee
	2:00	Wilmington	Africa, Agarwala Latin America, Gamba-Stonehouse
	2:00	Dover	Poland, Wierzbicki Chile, de la Barra
	4:00	Wilmington	Australia, Ellyard & Allen Pacific Islands, Crocombe
	4:00	Dover	Colombia, Amaya and Rios Canada, Nelson
	Tuesday	8:30	Wilmington
8:30		Dover	Costa Rica, Quesada-M. & Solis-Rivera Taiwan, Chang
10:30		Wilmington	Southern Africa, Spies World, Granberg-Michaelson & Epps
10:30		Dover	Canada, Robinson France, Jouvenel
2:00		Wilmington	Iceland, Valfells Mauritius, Manrakhan
2:00		Dover	El Salvador, Navarro India, Agarwal
4:00		Wilmington	India, Vohra World, Gibson
4:00		Dover	Ireland, Walker & Mulvihill Netherlands, Hueting
Wednesday	8:30	Wilmington	Indonesia, Soemarwoto
	8:30	Dover	Britain, Northcott Portugal, Caraça
	10:30	Wilmington	Peru, Garland Mexico, Alonso
	10:30	Dover	Europe, Petrella Europe, Stigliani
	2:00	Wilmington	Chile, Melnick Africa, El-Egaily
	2:00	Dover	Canada, Dobson USA, Shepherd
	4:00	Wilmington	Iceland, Jonsdotter Finland, Kalimo
	4:00	Dover	World, Rasool World, Timmerman
Thursday	8:30	Delaware	World, Underwood
Friday	8:30	Delaware	Methods, Garrett Methods, Garland
	10:30	Delaware	Methods, Raskin Methods, Bremer
	2:00	Delaware	Methods, Piontkowsky Methods, Lin
	4:00	Delaware	Methods, Hecht Methods, Nail



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