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REVIEW OF CANADIAN AND INTERNATIONAL FUTURES RESEARCH

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REVIEW OF CANADIAN AND INTERNATIONAL FUTURES RESEARCH

Secretariat for Futures Studies
Ministry of State for Science and Technology
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The opinions expressed in this document are those of the various contributing federal government departments, government agencies and organizations, and not necessarily those of the Ministry.

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PREFACE

This publication reviews futures research and related activities in Canada up to the fall of 1977. It also assesses futures work being conducted internationally and in other countries where this work is of special significance for Canada. It is the first time such a comprehensive account of futures research has been published by the Canadian government. The government has been an extensive user of this approach in examining departmental goals and objectives within a long-term context and in identifying policy alternatives for the future.

Futures research has taken on a new importance as Canada faces and deals with an increasing number of problems of a long-term nature. During the past year, this new importance has been reflected in the growth of attention being focussed on futures research by all sectors of society.

Studies and organizations concerned with the future have proliferated rapidly. This trend has made it difficult even for specialists active in futures work to keep in touch with new developments and to gauge the evolution of thinking in this area of research. This report was designed to respond to the emerging need for a comprehensive overview of futures research underway in the public and private sectors in Canada. It is important to emphasize that this report does not purport to be an evaluation of futures research. It can be most productively seen as a review which surveys and summarizes major national and international initiatives in the field which have been undertaken in recent years.

This report will be of interest to citizens concerned with Canada's future. It should provide a base of information for planners, researchers, students, and the interested public; and for all an assessment of the state of futures research in Canada.

In preparing this report, the Ministry had the co-operation of all federal government departments and agencies, the Canadian Association for Futures Studies, the World Futures Studies Federation, the United Nations, the Organization for Economic Co-operation and Development, the Institute for Applied Systems Analysis, and a number of individuals whose assistance was essential. The Ministry extends its thanks to all of them.

INTRODUCTION

The Nature of Futures Studies

Why should Canadians or their government study the future? One of the best answers to the question was given more than a decade ago by Daniel Bell, a founding father of futures research, when he defined that then exotic and mysterious science (or art):

> It is an effort to indicate now the future consequences of present public-policy decisions, to anticipate future problems, and to begin the design of alternative solutions so that our society has more options and can make a moral choice, rather than be constrained, as is so often the case when problems descend upon us unnoticed and demand an immediate response.*

The definition describes perfectly the dilemmas of anyone who has to make decisions, whether in the public or private sector. It is as apt now as when it was written in 1967 -- perhaps more apt, because the environment for decision-making has become more turbulent. Can we foresee how much oil it will be possible to extract from the Alberta tar sands 20 years from now? Can we estimate how far the next generation will be able to conserve energy -- or be willing to do so? Can we determine how much money it would be worth spending to develop a new kind of energy source? Can we imagine where energy will stand in the next generation's list of priorities? Can we anticipate the effect of buying increasing amounts of Middle East oil on our future international trade prospects? Can we forecast the reaction of Canadians to a stepped-up construction program of nuclear generating stations?

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* "The Year 2000 -- the trajectory of an idea," Daedalus, Summer 1967.

Thousands of doubts now surround the energy situation, which was once a simple matter of engineering and economics to be taken almost for granted. Millions more such doubts now obscure almost every aspect of modern life, making it impossible to take anything about the future for granted and propelling managers into futures research as the best way to make sure that their decisions are effective.

As the sociologist Michael Marien wrote recently in Futures, "Future studies suffers from peculiar identity problems. Is it a passing fashion, a developed enterprise, or a new discipline still in its early stages?" It confuses people who look for neat definitions. All branches of the social sciences, with the seeming exception of psychology, appear from time to time under the heading "futures studies" but futures studies do not yet appear under the heading "social sciences", not with any regularity or conviction at any rate.

A baffling paradox surrounds studies of the future and divides the contemplative from the active. The future is either predestined, by fate or nature or some other agency, or it is created by some combination of random events and human free will. If it is destined, then there should be ways of perceiving the future with certainty and in advance. But in that case we would have no power to influence it. If on the other hand the future can be more or less what we wish it to be, then it cannot be predicted. Yet one reason for wishing to know the future is to change it. On this analysis, either we cannot know it or we cannot change it.

In practice, unless he is committed to a belief in fate, the researcher of the future makes estimates of the future, turning to one or other of the techniques of futures studies, selecting from an arsenal that is still very much in a state of development. Social momentum, exemplified by the common human desire to continue to behave in a familiar way for as long as possible, is a powerful ally. It is the philosophical justification for extrapolating past trends in many fields, the economy, technology, politics, and so forth. The researcher must also be on the look-out for discontinuities, or breaks in trends, either looking for early warnings of their approach or planning to handle a set of alternative trends or at the least thinking about possible classes of new behaviour and events. It might be said that intuition is here more valuable than the precise use of statistics; it might also be said that whether the object is to discover and project existing trends or to unearth potential discontinuities, the researcher's strongest need is to keep improving his judgment.

Until now, Canada has not taken the lead in futures studies, perhaps because until recently life in Canada was thought to be fairly easy to predict. In a major bibliography of about a thousand books and articles on futures studies published last year* scarcely a dozen entries were by Canadian authors. Yet there is evidence that interest in studying the future is stirring as never before wherever decisions have to be made and consequences foreseen. It is not an easy time for judging what lies ahead, and

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* Wayne I. Boucher, ed., The study of the future: an agenda for research prepared with the support of the National Science Foundation; U.S. Government Printing Office, Washington, D.C., 1977.

the instrument of futures research is much more in demand. What better reason for presenting this first review of the state of futures studies in Canada now!

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Chapter I

FUTURES STUDIES IN THE FEDERAL GOVERNMENT OF CANADA

The federal government has been involved in futures studies for a decade now, although it has become noticeably more active in the last few years. Some of its activities have had an influence well outside the government itself, such as the hearings of the Senate Science Policy Committee, the energy projections of the Department of Energy, Mines and Resources, and the GAMMA report on the Conserver Society, which was sponsored by several government departments and agencies. Canada has also recently taken part in several international conferences and projects that voice concern for the future of humanity, such as the United Nations' Habitat conference in Vancouver, the U.N. Law of the Sea conference, the INTERFUTURES project of the Organization for Economic Co-operation and Development, and meetings at the International Institute for Applied Systems Analysis.

Steps to create a federal structure for futures studies were initiated at the Privy Council of Canada by the Deputy Secretary to the Cabinet (Plans) and in the Senate of Canada by the chairman of the Science Policy Committee, Senator Maurice Lamontagne. In 1968 the Privy Council commissioned Ronald S. Ritchie of Toronto to study the feasibility of setting up a long-term research institute. His report, submitted after a year's study and published in 1971, together with the recommendations of the Lamontagne committee published in 1972 in the second volume of its report, A science policy for Canada, led to the creation of the Institute for Research on Public Policy, an independent institution with public and private backing charged

with creating a centre for policy analysis, including futures research, that would be useful to the public and private sectors.

As a response to these initiatives, the Technology Assessment Division of the Ministry of State for Science and Technology undertook to concern itself with futures work in the federal government. The Division's terms of reference with respect in this area was outlined in a letter of December 1975 from C.M. Drury, then Minister of State for Science and Technology, to Senator Lamontagne:

1) to be aware of all futures studies in the federal government, and to provide assistance and advice as requested, by summarizing, cataloguing, and identifying the scope of futures programs and activities;

2) to provide secretarial services to the Interdepartmental Committee on Futures Research by scheduling and arranging meetings, by taking and distributing the minutes, and by performing other duties requested by the committee; and

3) to be the central contact point for general information purposes for persons and organizations outside the government.

The Technology Assessment Division divides its responsibilities in futures research into administration and analysis. The Secretariat for Futures Studies is tasked to handle the administration of the second and third functions listed above. The Systems Analysis and Futures Planning Group is responsible for the first function.

As its first substantial activity in this area, the Ministry analysed the results of the Lamontagne committee's survey of futures studies in Canada and circulated the summary report.*

* "The Lamontagne Survey of Futures Studies - An Analysis and Summary" published by the Special Committee of the Senate on Science Policy as Issue No. 13 in June 1977.

One notable finding of the analysis was that in 1975, the period of the survey, federal government futures research was most heavily concentrated in aspects of the human environment. The next three areas of research mentioned most often were resource conservation, the economy, and resource technology. The private sector concentrated its futures research efforts on the economy first, with resource technology, resource conservation, and industrial technology the three areas next most frequently mentioned. The research methods most prevalent at the time were (in order) scenario writing, extrapolation, econometric, and Delphi. The most utilized contacts of the time were (again in order) the Hudson Institute, the Economic Council of Canada, the Institute for Research on Public Policy, the Organization for Economic Co-operation and Development, the World Future Society, and the Conference Board.

In February 1977 the Ministry called the first meeting of the newly named Interdepartmental Committee on Futures Research (formerly the Interdepartmental Committee on Technological Forecasting). The committee has been addressed by: Drs. Manuel Agosin and Antonio Costa of the United Nations; Mr. Carl Beigie, the C.D. Howe Research Institute; Marie-Josée Drouin, the Hudson Institute of Canada; John Kettle of Toronto; and Ian MacDonald, president of York university.

The Ministry played a major role assisting in the organization of the second conference of the Canadian Association for Futures Studies held in June 1977 (described in Chapter 3).

In 1977 the Ministry followed up the Lamontagne Survey of 1975 with a new review and evaluation of futures studies in the federal government. The original survey was a quantitative analysis of futures work in government and yielded some basic information about budgets, personnel, projects, and publications. The follow-up, Survey of Futures Studies in the Federal Government of Canada: Phase II, was a qualitative assessment of government futures work, combining new information with data from the original survey.

The prime objectives of the Phase II Survey were to identify the federal government's specific needs for futures studies, determine how well those needs are being met, and devise a strategy for improving futures work in the government and meeting its needs more satisfactorily. The 12 departments judged to conduct the most promising work were selected for review. The survey covered the period from January 1976 to March 1977.

Canadian International Development Agency

The Prospective Unit's mandate is basically to enlighten and prepare long-term decisions concerning Canada's international co-operation in the development field.

Its main activities include a series of interdepartmental workshops (organized jointly with the Advanced Concepts Centre of Environment Canada) on the theme of "Environment and Development", as well as internal seminars on subjects such as "The International

Development Problématique" and "Self-Reliance and Basic Needs in Rural and Urban Environments". This interdepartmental character of the Environment and Development study process stems from the conviction that domestic policy development and international cooperation policies are two fields intimately interlinked from a prospective point of view.

The Unit also publishes reports and background documents related to those seminars. Furthermore, the Unit maintains a network of prospective information through its relations with many futures research institutions involved in development thinking and experiences, throughout Asia, Africa, Europe and America.

Finally, the Prospective Unit participates in the internal planning process at CIDA, by the yearly production of an "Environmental Assessment Paper" (which is an outlook of future trends on the international scene), as well as other appropriate contributions to CIDA's Policy and Planning activities.

Department of Communications

The department's futures effort is directed at the overall policy structure of communications in Canada and at specific resource and hardware issues. Two overall policy discussion papers have been produced, Perspective 1985 and Threats and Opportunities in the development of Canadian public telecommunications in the next decade. Together they look at the department's dynamic, its long-term direction, and the R&D priorities of telecommunications in Canada.

The major issues likely to concern the department next are investigated in the Threats and Opportunities . . . paper. They are:

the impact of the demand for new domestic and business services on the national telecommunications complex of telephony, broadcasting and cable distribution; the economic and technical imperatives of delivery system rationalization; the potential need to separate responsibilities for content/programming and carriage; and the consequences of increasing reliance on imported subscriber equipment hardware.

Energy, Mines and Resources

The futures effort at EMR is structured toward developing medium-term and long-term comprehensive energy planning. Futures research is concentrated principally in the Energy Review Group, which is extending the energy assessments beyond those presented to 1990 in the report, "An Energy Strategy for Canada" (1976). These assessments will result in a published report, "Energy Futures for Canadians". The Group hopes to have the report assessed by technical experts, parliamentary groups, and interested members of the public, and recommends continual, systematic up-dates both of the assessments and of programs of action to deal with Canada's long-term energy future.

Department of External Affairs

The Policy Planning Secretariat performs futures-related activities among other tasks at the Department of External Affairs. The Secretariat evaluates the effectiveness of current Canadian foreign policy in the light of changing international and domestic circumstances, stimulates the consideration of options and plans new directions in policy to deal with opportunities and constraints

in Canada's international relations. Medium-term forecasts are carried out on functional and geographic issues relevant to policy development. Future studies are occasionally commissioned by the Department from the academic world.

Department of Finance

The futures effort at the department is located in the Long-Range and Structural Analysis Division, which is responsible for co-ordinating futures research activities in the department. It is preparing a new set of medium-range and long-range macro-economic projections and making a particular effort to ensure that they are accessible to other departments.

The division is now developing and implementing a long range work program. A set of medium and long range macro economic projections is being prepared with particular attention to examining the sensitivity of projections to alternative assumptions. The division is also examining future structural problems.

Department of Industry, Trade & Commerce

Futures-related work as a long-term industrial sector strategy, and an analysis of industrial incentives with their medium and long-term impacts, are being formulated. It is also here that the Canadian Explor Model has been developed as a long run structural and trade simulation model. This is a major futures effort involving approximately four man-years. On the industry side of ITC, emphasis is being given to planning large "turn key" projects with a long planning period, such as railroads, subways, airports, irrigation and power projects, in international markets.

Explor is an input/output model with coefficient projections for 68 sectors which are analysed by ITC line branches for their reasonableness. The main thrust of the model has been towards international trade and project analysis such as the analysis of tariff cuts in the current Multilateral Trade Negotiations and energy project proposals. Other ongoing projects include an examination of the future Canadian industrial structure for the OECD working group on future industrial structures and the sectoral specification of long range scenarios from other sources, most notably the Department of Finance.

International Development Research Centre

The centre does not conduct any futures research in-house but has funded futures studies in several countries. The most significant of these was the world economic model developed by the Bariloche Foundation of Argentina, which starts from the assumption that the less developed countries will not retrace the steps of the developed countries and that the future international economic order will have a different basis. The centre also helped create the International Food Policy Research Institute, which focuses on food grains. It makes projections of the needs of food-deficient countries.

National Defence

Four branches of the department conduct futures research: The Policy Planning Branch of the Policy Group, the Operational Research and Analysis Establishment, the Plans Branch of the Defence Research Board, and the Intelligence and Security Division. The

department has prepared a strategic assessment for the next 10-15 years assessing international and domestic developments likely to affect Canadian security. This forms the basis for long-range policy planning of departmental capabilities. The department is also taking part in long-range NATO studies, including participation in the Advisory Group for Aerospace Research and Development, which is attempting to project and direct aerospace technology development for the rest of the 20th century.

National Research Council

Research planning is undertaken in most areas of interest to the Council. Among its main activities have been a report on Canadian opportunities in space, continuing work in the fields of non-renewable energy and fushion research, and a study called Food Research 2000 carried out with the Department of Agriculture. W.H.C. Simmonds of NRC's Industrial Programs Office took part in the National Science Foundation's Project: Knowledge 2000 and in the Quebec 1995 study of the Quebec Office of Planning and Development, was a consultant for the Club of Rome report Goals for Mankind, and with Harold A. Linstone, editor of the journal Technological Forecasting & Social Change, edited the book Futures research: New directions published in the fall of 1977.

Department of Regional Economic Expansion

The department's Economic Analysis Division has built a simple, flexible model that produces long-term regional projections of the main demographic and economic aggregates up to the year 2001, incorporating regional projections obtained from the Conference

Board in Canada. Since only a few variables interact, the model can be worked directly by decision makers, and the regional offices have been making use of it.

The Program Evaluation Division evaluates long-term development projects which DREE might support: examples are studies of the long-term prospects for a steel mill in Eastern Canada and for the pulp and paper industry.

Transport Canada

Futures research is concentrated in the Strategic Planning Group. Its principal effort is the special study on the automobile. This study is concerned with the automobile's present and future roles in Canada, problems and strategies. The task force has three full time professionals, two full time research assistants, 26 consultants, and contributing representatives from five other departments of the government, the Ontario government, municipal governments, the auto industry, and Bell Canada. The main tool used is the scenario technique: five scenarios ranging from "Paralysis" (economic stagnation, high energy costs, etc.) to "California" (high urban growth, high automobile sales, etc.) have been developed. The study will be completed in the spring of 1978.

Treasury Board

In the Treasury Board Secretariat, the Planning Branch, though not involved directly at the moment in futures research, maintains an interest in medium and long-term aspects of the problems it considers.

Moreover, the Deputy Secretary of the Branch is co-chairman of the Co-ordinating Committee on Evaluation and Planning (CCEP) which shares the responsibility for futures research co-ordination with the Interdepartmental Committee on Futures Research, chaired by MOSST. The Deputy Secretary of Planning Branch, as co-chairman of the CCEP, is also the Canadian representative on the Steering Committee of the Interfutures Project of OECD.

Government Research Institutes

The Economic Council of Canada

The council undertakes economic research for the government, but its work is published and has wide public influence. The CANDIDE economic model is one of its major pieces of futures research (see Chapter 5, "Four major futures studies"). It has also been active in the field of social indicators and in looking at the long-term options in international development. Its annual reviews have made significant contributions to the public perception of future economic alternatives.

The Science Council of Canada

The council's mandate is to make the government and the public aware of science and technology issues, but it does carry out occasional futures research. Its contribution comprises four interrelated themes. These are "technological sovereignty",

"implications of a Conserver Society", "the health of the Canadian scientific community", and "Science and the system of governance".

These themes are useful in identifying emerging science policy-issues and structuring the "look-out" or "early-warning" role which has become an integral part of the Science Council's program.

The Senate Special Committee on Science Policy

Before the Senate Special Committee on Science Policy ended its hearings, it spent two days inquiring into recent futures research activities in government or related to government interests.

On February 23, 1977, the Institute for Research on Public Policy appeared before the committee. The witnesses were Dr. A.W.R. Carrothers, then president of the institute, Dr. George R. Lindsey, Chief of Operational Research and Analysis, Department of National Defence (then on contract to IRPP), and Dr. J. David Hoffman, Director of the Futures Studies Program at the institute.

Dr. Carrothers said the institute intended to identify which aspects of Canadian society were changing most rapidly, provide commentaries and projections on data collected and published by other agencies, and examine the effects of economic and technological change on Canadian society. The institute hoped to publish an annual review of social change as well as occasional papers and special reports. A major objective of the institute was to perform the function of catalyst and clearing house for futures studies for the private sector.

IRPP's first significant publication was a study of population trends and developments, with projections to 2000 but with an emphasis on the 1980s. The institute was also engaged in a study of the aging population and its requirements, another of the governance of urban societies that would focus on the institutions, structures, and mechanisms through which the three levels of government interact, and a study of growth in the public service of Canada.

Research areas to be emphasized in future included communal diversity, governmental structures, the provision of public services, resource development and use, labour-management relations, governmental decision-making systems, sex roles, and institutional structures and processes.

In reply to a question about its international affiliations, the institute listed the International Institute for Applied Systems Analysis, the World Ekistics Society, and the World Population Society. Individual members of the institute had had contact with the Club of Rome and the European Economic Commission's Europe †30 project, and in Canada the institute had had contacts with the provincial and federal governments, as well as funding from them. Federal contacts included the Secretariat for Futures Studies, Ministry of State for Science and Technology; the Economic Council of Canada; the Science Council of Canada; Statistics Canada; the Department of National Defence; the Department of Environment; the Department of Industry, Trade and Commerce; and the Privy Council Office.

At a meeting on March 9, 1977, Timothy Reid, Co-chairman of the Co-ordinating Committee on Evaluation and Planning and Acting Deputy Secretary, Planning Branch, in the Treasury Board Secretariat,

described the futures activities of various departments and agencies and explained the origin and work of his committee. It was set up to give central leadership and guidance to federal government departments' futures research and long-term planning efforts. Its members, he said, were at the assistant deputy minister level. The co-chairmen were the Deputy Secretary, Planning Branch, Treasury Board Secretariat, and the Deputy Secretary to the Cabinet (Plans), Privy Council Office. Other representatives came from the Department of Finance, the Privy Council Office, the Treasury Board Secretariat, and the Ministry of State for Science and Technology.

The objects of the Co-ordinating Committee on Evaluation and Planning were to identify major policy planning and evaluation issues, including those likely to have long-term implications, to identify gaps in departments' planning efforts, and to promote comprehensive studies, which would often cut across departmental mandates, to make sure the gaps were filled. The committee also acted as a liaison with some inter-governmental and private organizations. An early activity was to provide advice on the terms of reference and work plan for futures studies at the Institute for Research on Public Policy.

Chapter II

FUTURES RESEARCH IN THE PRIVATE SECTOR

The private sector, which was slow to take up futures research when it first appeared, can now, in mid-1978, be seen to be a major user. In fact it may be about to become the major source of futures studies and of innovations in futures research. Whereas futures research in the federal government is concentrated heavily in a few centres of activity, in the private sector a rapidly growing number of corporations and groups are starting to do futures research as a matter of course. Most of it is in support of the generally more sophisticated level of corporate planning that is emerging in a difficult economy. The prospect for the growth of futures studies in the private sector is certainly greater than it is at the federal level. Although it is likely that the largest and most costly futures studies will continue to be initiated in the federal government, several new institutions in the private sector have recently been assembling groups of clients, predominantly also in the private sector, to support futures studies of comparable size. And though very few companies are ever likely to fund major studies for purely proprietary use, there will always be a few, and as the number of futures-oriented corporations increases, so will the number of large private studies.

This review of the futures effort in the private sector is inevitably impressionistic rather than comprehensive, given the fact that there are a third of a million corporations in Canada. But it does represent the main kinds of futures work going on and does report, if not all, then at least a majority of the most prominent performers in the field.

The most frequently encountered technique of futures research is the economic forecast. Noranda Mines of Toronto uses forecasts of the international demand for copper, zinc, and other commodities as the basis for its formal corporate planning, developing plans for each of 30 operating units from its detailed projections of demand, supply, prices, and other data. The forecasts are updated each year, and as often as every quarter if the trends are changing rapidly. In 1977 the company for the first time made 10-year projections for each of its units, on the grounds that three years is not long enough to bring in a big new mine. The projections are required for exploration, investment, marketing, and engineering, to name some uses.

A somewhat similar approach is taken by major utilities. (Most are now in the public sector, but in their futures research activities their approach is still very similar to private corporations'.) B.C. Hydro, for example, makes forecasts of the demand for electricity, the supply, capital requirements, operating costs, and so on, 10 years ahead, though its futures researchers may make estimates for much longer periods that are not formally presented.

Hydro Quebec's demand forecasts are based on three different sets of projections of population increase and economic growth, introducing another important concept of futures research, the idea of looking at alternative futures -- forecasts, scenarios, or whatever. These scenarios take into account variations in the social, political, and economic context. The Hydro Quebec forecasts

project the demand for all energy, divided by sectors of the economy, divided again by the way the energy demand is distributed among the different fuels, and also take into account the effects of energy conservation measures and of the substitution of one fuel for another. They are presented at two levels of detail, more for the period from now to 1985 and less for the period from 1985 to 2000.

One important use of such forecasts is to uncover threats and opportunities for the company's existing lines of business. Canada Permanent, the large mortgage and trust group, concluded from its reading of the demographic and economic trends that in the future the housing market would not be as large as it had been and that a major part of the company's business would therefore be affected. Forecasts of future capital markets led it to consider diversifying into consumer loans and the supply of industrial capital. It also uses demographic and economic forecasts to try to establish the most fruitful sources of new deposits. The futures researchers also make short-term forecasts for the financial and investment sides of the company.

Many companies have found it useful to collaborate on the making of forecasts. MacMillan Bloedel of Vancouver was a member of the industry working party for the United Nations' Food and Agriculture Organization study, World pulp and paper consumption outlook, which is forecasting international demand to the year 1990. In the spring of 1978 three phases had been completed and two more were under way. Such a study gives a company access to much more information than it could assemble on its own. MacMillan Bloedel

also recently commissioned a study specifically for its own use from the Hudson Institute of Croton-on-Hudson, New York. It dealt with the future of Brazil.

Shell Canada provides several examples of the co-operative use of futures research, a mixture of the proprietary service and the service available publicly -- for a price. It uses world energy projections and scenarios from Shell International Petroleum in London, a service company of the Royal Dutch/Shell Group; the well known Business Intelligence Program of Stanford Research Institute of Menlo Park, California (see Chapter 4); and media content analysis from The Canadian Trend Report (see below). Like most companies in the energy field, it makes its own demand and supply forecasts based on demographic and economic projections; these are taken out to the year 2000 and include forecasts of inter-fuel competition.

An increasingly common form of forecasting is the detailed study of future demand for a product or service. Alberta Gas Trunk Lines of Calgary commits large sums to studies of the developing demand for natural gas before extending a pipeline into a new area, for example, hoping to anticipate the eventual market penetration and the speed of the build-up, covering as well the prospective demand for alternative fuels, and concentrating on the first 10 years of the project. A major study might cost $500,000 to $1,000,000 and take 10-15 man-years of professional effort.

B.C. Telephone has conducted a number of studies of market and technology changes over the years, using futures research to anticipate costs and revenues, problems and opportunities. A study

of fibre optics in 1974, a 10-year technological outlook in 1975, and current work, using computer models, on a rural digital network and the future penetration of digital technology in the lower mainland are examples. A similar approach is taken at Canadian Pacific, where the management looks at 20-30 year forecasts of a potential investment, seeking answers to questions about the richness of a new natural resource project, potential markets, competitors, costs, and prices.

The Canadian Construction Association, looking after the interests of the builders and materials manufacturers that are its members, develops detailed forecasts of the demand for construction, working with the economic consulting firm of Informetrica (see below) and modifying the computer projections on the basis of its own information, for instance, knowledge of specific capital spending intentions or the time schedule of major engineering projects. So far these forecasts have been national but the association is developing regional forecasts. For individual members, and at their expense, the association makes even more detailed projections of the demand for specific building types or in specific metropolitan areas, or both. The association also presents its members with data on government policy, prices, wages, unemployment, and so on, much of it at the provincial level, in such a way as to help them anticipate short-term variations.

Equally specialized is much of the forecasting work of the Pulp and Paper Research Institute. It has studied technological trends, such as the speed of paper-making machines or newsprint machine capacity, and extrapolated the trend lines into the future.

The institute is also developing a series of econometric models of the industry under the name PAPRISIM, which will, it is hoped, allow institute members (pulp and paper companies) to foresee the effects of making changes, for instance, changing the mix of products or the yield from woods operations. In time the institute expects to include the ability to model changes in energy use, labor, chemicals, and so on. Another use of these models is to determine the institute's choice of research projects, at a time when the industry is changing rapidly.

The T. Eaton Company is developing a large-scale model of changing retail demand, down to the level of the type of merchandise and volume of sales in single stores. The company has created projections of the future number of households, year by year, broken down by the age of the head of the household and by income level (10-year age units, e.g. age 25-34, and income level by quintiles). This matrix of household information is combined with data on household purchasing patterns, also identified by the income and age of the head of the household. Trends in these patterns can be tracked and projected (the source is Statistics Canada's urban family expenditure surveys, carried out in 1969, 1972, 1974, and 1976). This projection of the demand for goods and services at the retail level is the basis of the company's main strategic planning. Most of the information is available as a national aggregate of urban demand. A pilot program in two stores in Hamilton and Don Mills, Ontario, is aimed at creating age-income matrix projections for each store's trading area, so that the store manager can be told in some detail the likely nature of the demand. In time this kind

of information passes through the channels of supply to wholesalers and manufacturers.

Forecasting, whether by techniques of projection or by more complex methods using econometric models, usually computerized, can be called the "hard" side of futures research. It is where most futurists start, particularly corporate futurists. But an increasing amount of attention is being paid to "soft" techniques, where judgment is more important than numbers. A well-known technique is brainstorming. Canada Cement Lafarge is one company that has employed this method, bringing in most of the top management. In a session in the fall of 1977 the group produced hundreds of ideas about where the company should be going in the next five to ten years. From these nine were eventually chosen as priorities for corporate development. Shell Canada is another company that uses brainstorming sessions, in its case in a search for significant changes occurring in society.

The Delphi method, an attempt to find consensus among experts about future possibilities, was developed by the RAND Corporation in the 1960s in part to answer criticisms of brainstorming (the band-wagon effect, the effect of dominant personalities). It is now the more widely used technique. The Pulp and Paper Research Institute's largest futures study so far has been a Delphi study of the threats and opportunities for the Canadian pulp and paper industry in the 1980s. It looked at future changes in wood supply and processing technology, at labor, government, and management relations, and at energy supplies.

Bell Canada, an early, innovative, and extensive user of Delphi, later developed the SPRITE technique (acronym from Sequential Polling and Review of Interactive Team of Experts) and uses it frequently. It plays down the search for consensus and emphasizes efforts to develop new ideas.

Attempts to probe and understand the whole environment in which business is operating are becoming a major preoccupation of futures research. Consulting firms continue to offer their corporate clients such analyses; and in more than one case groups of corporations have jointly set up groups to probe the environment. One is the Public Issues Research Forum, which Bell Canada, Imperial Oil, and the Royal Bank of Canada played a role in founding. According to one participant, the group seeks to anticipate the direction and strength of newly arising public issues by identifying and studying underlying shifts in social values. Over a period of time several dozen companies have taken part in the forum.

One of the largest individual company efforts is Imperial Oil's BET Index (acronym from Business Environment Trends), an attempt to assess the impact of social/political trends on the long-range investment climate. To create the index the company measures the responses of five key segments of the public, including the media, politicians, and organized groups, in four areas, among them public vs. private ownership and market decisions vs. regulatory practice. The responses, or indicators, are calculated in two stages. Attitudes are assessed from such sources as public opinion surveys, media content analysis, and legislative records; the indicators are quantified; then a Delphi exercise using an outside

panel projects each indicator. Although the indicators and the resulting indices are given numerical values, the direction and strength of the trend are regarded as the important yield. The process is repeated twice each year. The BET Index is used to maintain a consistent perception of the general investment climate over a period of time, and to enable management to check its own views against an outside view, among other things. The results are incorporated with the company's long-term economic forecasts.

The Molson Companies is another group that keeps an eye on socio-political trends and their economic implications. It has particularly concerned itself with new lifestyles and changes in lifestyles, and most of the diversification in the group and the introduction of new consumer products has followed its perceptions of these trends. B.C. Hydro, to give another example, monitors relevant slices of social activity for pointers (e.g., the development of the electric car). Observations of the way changes in consumer behaviour follow changes in social values have frequently led Eaton's into new retailing approaches. For instance, in the early 1970s the company foresaw the arising of a new hedonism and made innovations in fashion, its travel packaging, and its food sections.

A technique emphasized at Hudson Institute, the scenario, is gaining a stronger following, though it is not the easiest of methods to carry out. The word is sometimes used loosely to describe any collection of assumptions about the future, but properly a scenario is a written outline describing a plausible sequence of events leading into the future, and commonly several alternative scenarios

would be prepared, reviewed, and revised. One company using this technique is Canada Cement Lafarge, which annually prepares five-year scenarios covering political, social, demographic, and economic alternatives as a backdrop to the company's five-year plan and annual budget. Canadian Industries Limited is another company using scenarios: its purpose is to test tentative ideas about changes in the business environment and illustrate possible outcomes. Hydro Quebec, as mentioned, writes scenarios to determine the assumptions for its demographic and economic forecasts.

A broad category of futures studies is concerned with the corporation's place in the community. Primary and secondary industry now puts a significant amount of effort into environmental impact studies, for example. The technique used is very similar to technology assessment (a recent example was the Mackenzie Valley Pipeline Inquiry headed by Mr. Justice Berger, which was itself a full-scale technology assessment and which took as evidence the environmental impact studies of a number of companies and other interested groups). The purpose is to anticipate all the future effects of a proposed piece of construction -- dam, pipeline, mine, plant. Two noted studies preceded the Churchill Falls and James Bay power developments.

Another activity is the effort to establish guidelines for corporate responsibility in the community. Crown Zellerbach, CIL, and Shell are companies that have undertaken such studies. In the past four years Great-West Life Assurance has sponsored two symposiums, The Dilemmas of Modern Man and Values and Morals in Modern Society, and in November 1978 will sponsor a third, Ethics and the

Future, that are corporate contributions to the community's desire to ponder questions about the future and also part of the company's assessment of its own changing place and responsibilities. An internal study called Scenario 2000 was one outcome.

Some research and development activities should be noted because of their concentration on new needs as well as new solutions. Hydro Quebec maintains a multi-million dollar R&D centre, the Hydro Quebec Research Institute, which has a staff of more than 250 scientific personnel and leads the world in some fields, for instance, high voltage work. B.C. Hydro similarly studies new technologies and technical innovations in the present system, keeping a watching brief on energy sources that it is not using, nuclear energy, for example, and non-traditional sources such as solar power. Alberta Gas Trunk Line as an R&D subsidiary, Algas Resources, that concentrates on basic research into new forms of energy, coal, gastification, solar, wind, methane, and so on. Though on the edge of futures studies, such activities colour the futures research of many Canadian companies.

Two major corporations

The common aim of futures research in the private sector is to give the corporation an advantage, or maintain it. Bell Canada, probably the most active of all Canadian companies in futures research, long ago set up its Business Planning Group as the centre of futures studies (it has recently become the

Long-Range Planning Group). "The group has been charged by the company with the responsibility of identifying potential new business opportunities (emerging in the ten to fifteen year time frame) and to alert the company to developing threats to existing markets," a paragraph in a recent Business Planning Group documented noted, and this is probably as good a description of the purpose of such groups as is likely to be found. The company makes constant use of its elaborate short-term and long-term forecasts. Short-term annual forecasts are reviewed by top management every month. Longer-term forecasts going out as far as 25 years not only forecast the demand for communications but go into such detail as capital and manpower needs. These too are revised systematically every two or three years. With these forecasting studies as a continuous background the company has also made a number of large, special studies that are widely regarded as being unusually thorough and innovative. One, carried out over a period of two years, studied what caused business people to choose between travel and telecommunications as they do; it included a survey of 30,000 business travellers. Another study evaluated the use of computer-augmented management systems, including text editing devices, output processors for formatting documents, and message handling -- the framework of the automated office. A third major study analysed teleconferencing media, including audio conference calls, studio-based video conferencing, and graphics conferencing. A fourth studied energy consumption by main inter-city transportation modes. A fifth evaluated the impact of the use of more lavish business and residential communications services, sometimes called the "wired city" concept.

This spectrum of activities focuses the attention of senior managers much more on the future than on the present.

Another company with a considerable range of futures activities and a substantial outside reputation for its futures research is the Royal Bank of Canada. Three departments are actively involved. The economics department uses its econometric model, "Leo", to make two-year forecasts of Canadian economic conditions, and the investment, inflation, GNP growth, and consumer spending output goes into two other models: the Bank of Canada monthly model, a modified version of which the Royal Bank runs, which generates financial market forecasts; and "Regulus", an accounting identity model, also monthly, that is used to project some 75 asset and liability items for the Canadian banking system. Judgments of monetary policy and estimates of loan demand are among other variables that are fed into "Regulus". All these figures are then broken down to provincial level, and some volume forecasts are made at a much more detailed level. The department also simulates the operations of the bank itself, using a model called "What If", which has a four-year time horizon. Among other projects is a continuing detailed evaluation of the risks in lending to each of 110 countries.

The public affairs department attempts to anticipate changes in social values and behaviour that could have an impact on the bank. Through the department, the bank helped to start the Public Issues Research Forum, a futures research program involving more than two dozen companies, which is concerned with the environment for business. The department also initiated an internal task force

on changing social values which includes representatives from the marketing department and others. It has used a literature search and a modified Delphi technique among other methods. The department produces position papers on public policy issues, such as national unity and Quebec's language bill.

The corporate planning department is identifying the top five or six long-term issues, internal and external, that affect the bank and looking for appropriate strategies for dealing with them. An example is the bank's strategy in Europe. The corporate planning department provides staff support to top management, which is the bank's strategic planning group.

Futures research and forecasting institutes

Some of the most significant futures studies are being carried out not by government or industry but by organizations exclusively devoted to futures research (or to policy analysis) or, if not exclusively in futures work, at least spending enough time and money on it to make a serious effort. Some of them, including several of the largest, are not clearly in the public or private sector. They may have endowments of public money but be independent of government control, or they may be non-profit institutions with public and private clients. For convenience, all are included in this chapter.

The objective of the Institute for Research on Public Policy, which was incorporated in 1972, is "to improve the quality of informed decision-making in matters of public policy." It operates on the income from a large endowment and on government

contracts. A futures studies program was established to fulfill a three-year, $1,360,000 contract from the Privy Council Office to identify points of rapid social change, make projections of existing data series, and examine the social effects of economic and technological change. This will include studies of short-term, medium term, and long-term futures. But most of the institute's programs are in effect futures studies, examining as they do policy that is either itself due for change or in a field expected to change significantly in the next five to 25 years. Some recently completed or now under way are studies of the aging population, the growth of urban societies, the growth of public sector employment, and the future of linguistic groups in Quebec.

Hudson Institute of Canada, founded in 1974, is supported by client memberships and by fees for research projects. It has published a comprehensive study called Canada Has A Future (see Chapter 5), and is working on studies of the future of Quebec, the future of Western Canada, and the future of Australia. It also contributes to work done by the parent institution, the renowned Hudson Institute of Croton-on-Hudson, New York, directed by Herman Kahn. Hudson of Canada's chairman is Arnold Smith, the former Commonwealth Secretary-General.

GAMMA (acronym from Groupe Associé Montreal/McGill pour l'étude de l'Avenir) is best known for its study of the Conserver Society, but is doing or about to start four other major projects. One, begun in 1976 under the Bourassa government of Quebec and continuing under the Levesque government, is a study for the provincial government of the future of Quebec, with emphasis

on six sectors: economics, ecology, technology, the geographical distribution of economic activity, values, and Quebec's relations with the rest of Canada and the rest of the world. Some 26 technical papers were expected in spring 1978 and the final report in 1979. Another study is looking at the future of communications, particularly the implications of an information economy; it is funded by the federal Department of Communications, private firms, and organizations such as CBC and CRTC. GAMMA and the Faculty of Environmental Studies at York University, Toronto, are the Canadian representatives in an international study of development called GPID (for Goals, Processes, Indicators, Development). It is a project of the U.N. University in Tokyo and is being directed by the futurist and peace researcher Johan Galtung in Geneva. It is expected to run from 1975 through 1979. Scheduled to start in the summer of 1978 was a study of the methodology of forecasting, partly funded by the University of Montreal.

The Institute for Policy Analysis was founded in 1967 at the University of Toronto, under the name the Institute for the Quantitative Analysis of Social and Economic Policy, and soon afterwards took over one of the first large econometric models in Canada, TRACE (acronym from Toronto Annual Canadian Econometric model). TRACE can be roughly compared to the CANDIDE model of the Economic Council of Canada (see Chapter 5), though about a quarter the size; that is, it is based on annual data and can be used to make detailed 10-15 year projections of the Canadian economy and to test the effects of given economic policy decisions. One reason for building the model was that all other existing

comparable models were then in government hands and their results were not made public. It has been used for some special studies, including alternative energy projections and alternative immigration assumptions. Another model, FOCUS, is the latest in a series of quarterly models used for short-term (two to three years) forecasts and policy analysis. Both models are used about equally for university research, teaching, and consulting. The institute's clients, in the public and private sectors, take part in the Policy and Economic Analysis Program, which presents them with the results of economic analysis in data form and at regular conferences. The institute also carries out many future-oriented studies.

The Conference Board in Canada provides information on management practices and economic trends to its more than 600 clients, most of which are corporations. It runs business outlook conferences as well as about 30 seminars a year, publishes a quarterly survey of consumer buying intentions, and produces a detailed, quarterly, short-term (under two years) economic forecast on its AERIC model (acronym from Applied Economic Research and Information Centre). The institution was set up in 1954 to accommodate the large number of Canadian companies that had joined the parent organization, the Conference Board, an American business research institute founded in 1916.

Informetrica, the Ottawa economic consulting firm, was founded by M.C. McCracken, project manager of the team building the CANDIDE model at the Economic Council of Canada from July 1970, when the project started, to April 1972. Informetrica operates a version of the CANDIDE model and offers its clients not only the company's

latest detailed 10-year forecasts of the Canadian economy, with conferences, but also the chance to derive specific forecasts for their own industry from it.

Data Resources of Canada is the Canadian arm of Data Resources Inc. of Lexington, Mass. When it first opened its Canadian office it offered clients U.S. forecasts from its parent company and the Canadian forecasts of the Institute of Policy Analysis's TRACE and FOCUS models. It has now built its own Canadian econometric model, which is based on a stages-of-processing principle.

The Muskoka Institute of the Future (Don Toppin, Bracebridge, Ontario) holds summer conferences in the Muskoka area of central Ontario and arranged a series of four evening meetings in Toronto in collaboration with the Canadian Council for Christians and Jews, to be held from March to June 1978, on such topics as alternatives to growth, appropriate technology, and political involvement in the future.

The Institute for Canadian Futures (Don Wilson, Mississauga, Ontario) began operation in February 1978 with a number of corporate clients and 50 individual members. It announced a series of corporate planning seminars and a journal, Canadian Futures.

Prominent among institutions offering specialized services is the Canadian Energy Research Institute, located at the University of Calgary, Alberta. It is sponsored by the federal Department of Energy, Mines and Resources, the Alberta Department of Energy and Natural Resources, the Private Energy Research Association, and the University of Calgary. Founded in 1975, it conducts economic research in the energy field. Among recent and current projects are studies

of the capital needed to develop energy supplies, future energy demand, the effects of rising energy costs on industry, and alternative energy sources.

Trans-Canada Social Policy Research of Montreal produces The Canadian Trend Report for its clients, which include 11 corporations, the Prime Minister's Office, and the Privy Council Office. The company, which was established in Canada in 1977, works on the same principle of measuring the amount of newspaper space given to various topics as The Trend Report produced in the U.S. by the Center for Policy Process; both were started by the same person. The Canadian report covers all daily newspapers and a number of weeklies, a total of 150 newspapers. Over a period of time the measurements provide an indication of changes in social trends. The company presents its main reports every four months, but interim reports are made orally to clients and the company will produce reports on special issues on request. In the period May-August 1977, out of 130 topics measured the four receiving the most coverage were, in order, language policy, resource management, land-use planning, and native rights. Most of the client companies use the material to anticipate the arising of new public issues that will have an impact on their operations.

The Canadian Peace Research Institute of Oakville, Ontario, produced a computer study of various forms of violence, 1982, which it expected to publish in April 1978. The study is based on analysis and extrapolation of cyclical changes in the trends that lead to civil and international violence and includes recommendations for adjustments that could be made in the trends to create a more

compassionate and equitable world. It is the outcome of most of the institute's work in recent years. The report has a foreword by the Dutch economist, Jan Tinbergen. The publication date was chosen so that the study could have an impact on the scheduled May-June 1978 discussion of disarmament in the United Nations General Assembly.

Construction Forecasts Company of Toronto offers research and consulting services in the construction field, among which are monthly newsletters forecasting construction volume and seminars on the topic of construction forecasting. The company uses computer-generated forecasts and Delphi studies.

A number of institutions are engaged principally in other kinds of work but carry out occasional futures research.

The Business Council on National Issues, with offices in Toronto, was set up by a large group of senior businessmen concerned with long-term public policy. It has four task forces, dealing with national unity, economic development, social policy, and government organization and operations; the task forces are at present identifying the most significant policy issues in these areas. The next step will be to suggest policy alternatives that would be remedial. The council is carrying out a major historical research project with the Conference Board in Canada to try to determine whether what has happened to the Canadian economy since 1945 is primarily structural or cyclical.

The Bras d'Or Institute at the College of Cape Breton, Nova Scotia, is a vehicle for involving the college's faculty in community problems, including the need for industrial and social development,

and for stimulating research and development in Cape Breton Island.

The Canada West Foundation of Calgary was set up in 1973 to do economic and social research on Western Canada. Its first studies dealt mainly with industrial development but current work includes the study of alternative systems of federal government, the potential of agriculture, the prospects for coal, and the future of western fresh water resources.

The Fraser Institute of Vancouver was established in 1974 by Anthony Fisher, the founder of the Institute of Economic Analysis in Britain and the International Institute of Economic Research in Los Angeles, California. It is an economic and social research institution specializing in studies intended to improve the working of the market economy. Among a dozen or more projects now under way, a number are future-oriented, including Confederation at the cross-roads: the search for a federal-provincial balance and An economic-geographic view of Western economic development.

The C.D. Howe Research Institute, formed in 1973, is the successor to the Private Planning Association of Canada. It carries out short-term economic policy analysis, concentrating on international trade and federal government budgetary policy. Its annual policy review and outlook sometimes goes beyond the short-term boundaries of the majority of its studies and publications. Its Accent Québec studies are looking at the future of Quebec; a new Policy Watch series will present prompt responses to new policy issues; two major special projects are focussing on the future of Canada-U.S. relations.

The Niagara Institute of Niagara-on-the Lake, Ontario, founded in 1971, is best known for its executive seminar program, occasional

seminars on the public policy process and public/private sector relations, and corporate public affairs programs. It is looking at corporate social performance and community responsibility and now hopes to begin studies of economic and social issues such as the goals of a mixed economy, the problems of adapting to slower economic growth, and the quality of working life.

The Vanier Institute of the Family, Ottawa, established in 1964, is interested in developing social consciousness in family and community life. Activities that are notably future-oriented include its research into alternative and emerging lifestyles, the development of alternative images of the future for the family, and collaboration with groups helping to create alternative kinds of society.

Woods, Gordon & Co., the Toronto management consultants, publish a future-oriented market research study under the title Get ready for tomorrow's customers, which has appeared periodically since 1964 (annually through most of the 1970s). The 1977 edition contained forecasts of the population, births, immigration, labour force, income, and other economic data and included other current market information. The 1978 edition is expected to be more comprehensive than previous editions.

Most financial institutions -- banks, trust companies, brokerage houses -- publish their annual economic forecasts, commonly covering gross national product, inflation, unemployment, housing starts, and one or two other indicators. Among those that appear regularly are:

Bank of Montreal

Bank of Nova Scotia

Banque Canadienne Nationale

Burns, Fry Ltd.

Canada Permanent

Canadian Imperial Bank of Commerce

Dominion Securities Ltd.

F.H. Deacon, Hodgson Inc.

Greenshields Inc.

Richardson Securities of Canada

Royal Bank of Canada

Woods, Gordon & Co.

The United States Connection

Futures research institutions in the United States are active in Canada. The Conference Board of New York, N.Y., Data Resources Inc. of Lexington, Mass., Hudson Institute of Croton-on-Hudson, N.Y., and the Strategic Planning Institute of Cambridge, Mass., are among those that have established subsidiaries here. Stanford Research Institute and the Institute for the Future, both of Menlo Park, California, have both run special Canadian studies for clients in this country. Management Horizons of Cleveland, Ohio, which concentrates on the interests of retailers, also has a number of Canadian clients. And, as was mentioned above, The Canadian Trend Report is an offshoot of the American Trend Report.

Associations and societies

Three groups with wide membership have influenced the development of futures research in Canada.

The most influential to date has been the World Future Society of Washington, D.C., which was founded in 1966 by a newspaperman, Edward S. Cornish, now its president and the editor of its journal The Futurist. Its main influence in Canada is in making people aware of futures research and in bringing like-minded people together. In September 1977 there were 1,640 World Future Society members in Canada, compared with 3,810 in California, 2,678 in New York State, and fewer than 1,640 in any other state or country; the total membership was 27,532.

The history and activities of the Canadian Association for Futures Studies are described in Chapter 3. It is worth mentioning here that the association was founded in 1976, mostly as a consequence of a conference of the World Future Society that drew many Canadian members to Washington, and now has more than 500 members.

The North American Society for Corporate Planning was established in 1966 and now has over 1,700 members, who are professionally concerned with planning in the private and public sectors. Canadians play an unexpectedly large role in its activities. Four of its 13 chapters are in Canada (Montreal, Ottawa, Toronto, and Vancouver). Four of its 13 officers and directors, including its president, are Canadians (Brian Marley-Clarke, Ottawa, president; Warde L. Shearing, Vancouver; Roger L. Fournier, Montreal; Ewout van Dishoeck, Vancouver). The editor of its bi-monthly Planning

Review is Robert Allio, vice president, technology and development, of Canada Wire & Cable in Toronto; and a quarter to a third of its articles are contributed from Canada.

City futures groups have sprung up in the last two or three years; examples are the Montreal Future Society, Ottawa Future Society, and Toronto Future Society. Most draw their membership from among members of the World Future Society, though there is much overlapping between the membership lists of the WFS and the CAFS. The Canadian association has begun to appoint city or regional co-ordinators, and plans are being made for regional conferences in 1978. These may spur development of the city groups.

Futures research in education

Academics have been attracted to futures research in what seem to be disproportionately high numbers. Nonetheless, there is no university or college program offering a degree in futures studies in Canada (there are several in the United States) and most of the courses that are taught turn out to be courses in something else with a futures tinge to them or concentrate on a narrow part of futures research. No doubt this simply reflects the fact that studying the future is not yet a science if indeed it is ever going to be.

Post-secondary courses

Most of the courses uncovered by the research for this report are at universities. All are believed to have been taught within the last two years. The listing is geographic:

Dalhousie University, Halifax, N.S.; Department of Political Science. Prof. Don Munton. "Futurology and politics": senior undergraduate and graduate seminar. Includes world models, Canadian domestic futures, international futures.

McGill University, Montreal; Faculty of Education. Prof. Norman Henchey. "Education and the future": post-graduate. Includes scenarios, issues that concern futurists.

Concordia University, Loyola Campus, Montreal. Prof. John McGraw. "Futures studies": undergraduate course. Includes "the writing of future history", world crises.

Dawson College, Montreal, Prof. Harry Wagschal. "Creating future alternatives": 1st and 2nd year. Includes changing values, communications, alternative lifestyles.

Carleton University, Ottawa; Office of Continuing Education. H. Alan Raymond and Dr. K.E. Solem. "Futures of the international system": extension course. Includes futures methodology, international sources of stress and value changes, trade and military strategies.

Queen's University, Kingston, Ontario; School of Business. Profs. D.V. Nightingale and Hugh Fullerton, John Kettle. "Futures research": 4th year, Commerce. Includes futures methodology, global parameters, future changes in organizing systems. (Prof. Nightingale teaches a similar course in the MBA program).

Trent University, Peterborough, Ontario. Prof. John S. Marsh. "Geography of future environments". Includes futures methodology, change and the future of cities, science fiction references.

University of Toronto, Ontario; Faculty of Management Studies Prof. A.J. Sawyer. "Business cycles and forecasting models": 2nd year MBA.

University of Toronto, Ontario; New College. Prof. Leslie Mezei. "Futures study": 3rd year. Includes population, disarmament, growth, politics, futures methodology, values.

University of Toronto, Ontario; New College. Prof. Leslie Mezei. "Information science concepts": 3rd year. Includes operations research, cybernetics, management science, general system theory.

York University, Toronto; McLaughlin College. Alex Jupp. "Futurology: a study of man's alternative futures": 1st year. Includes futures methodology, issues arising from change, ways of influencing the future, the notion of alternatives.

York University, Toronto; Faculty of Science. Prof. Sam Madras. "Principles of systems": 3rd year. Includes computer modelling.

York University, Toronto; Faculty of Science. Prof. Sam Madras. "Technological man at the critical stage": 3rd year.

Sheridan College of Applied Arts and Technology, Oakville, Ontario. Cedric Merrick. "Insights to the year 2050 A.D." Includes issues and challenges facing human society, forecasting exercises, group preparation of scenarios.

Sheridan College of Applied Arts and Technology, Oakville, Ontario. J.M.R. Quistwater. "Man and science". Includes scientific problems (population, ecology, genetic, food, habitat), implications for mankind's future, possible solutions.

University of Waterloo, Ontario; Faculty of Environmental Studies. Prof. Peter Nash. "Introduction to the study of the future": 1st year.

University of Waterloo, Ontario; Faculty of Environmental Studies. Prof. Peter Nash. "Alternative future environments": 3rd year.

University of Western Ontario, London; Faculty of Education. Prof. Hugh A. Stevenson. "Policy making in education": M.Ed.

University of Western Ontario, London; Department of Geography. Prof. Robert McDaniel. "Evolving concepts of analysing and forecasting spatial development": masters' and doctorate. Includes futures methodology, computer modelling.

University of British Columbia, Vancouver; Faculty of Medicine. Dr. John Milsum. "General and applied systems workshop". Includes critique of world modelling.

Secondary school courses

Ten of the 15 high schools in the Halton Board of Education area (Burlington, Ontario) have been teaching a course called Futures I to grade 9 and 10 students for the past six years. Most of the schools have now developed extensive futures libraries. The course includes futures methodology and units on energy, peace and war, education, science and technology. The course was developed by George Munro with interested teachers.

About 25 Manitoba high school teachers have been working with Prof. T.R. Morrison of the University of Manitoba, Winnipeg, developing courses in futures studies, which include futures methodology and content derived from futures concerns.

Other futures studies in education

A number of university instructors and administrators undertake futures studies outside the classroom, frequently as consultants. Prof. Colin Clark at the University of British Columbia's mathematics department has developed ways of modelling renewable natural resources, for instance the salmon fishery, which he describes as bio-economic modelling and which have been used in research for the Canadian, American, and Australian governments. He is the author of Mathematical bio-economics. Prof. Sam Madras of York University's faculty of science developed a model of the impact of the energy crisis on the urbanized areas around the Great Lakes, which was presented at a computer simulation conference in Houston, Texas, and he is now working on a model of the energy requirements of municipalities. At UBC's faculty of medicine Dr. John Milsum is working with a small interdisciplinary group to develop a way to game the socio-political dynamics in futures policy studies; he considers that most big macro-economic models suffer from the lack of this element.

Prof. Thomas S. Major of the University of Manitoba's faculty of administrative studies constructed a model to predict enrolment in the province's post-secondary institutions that has been used since the 1972-73 academic year. It is sponsored by the Universities Grants Commission and the province. A group headed by Dr. Ben Hoffman and J.E. Nykoluk has developed an improved and more elaborate version, Post-secondary Demand and Enrolment Model II. Dr. Hoffman also helped develop "The post-secondary option", a decison-making game to help students

understand the choices facing them after high school; it was based on studies of over 5,000 students.

Prof. Don Munton of the Centre for Foreign Policy Studies at Dalhousie University, Halifax, carried out a Delphi study of the future of Canadian-American economic relations up to 1985, using a panel of 30 Canadian academics. A chapter in Canada's foreign policy: analysis and trends, edited by Brian Tomlin and to be published in 1978, and an article in the May-June 1978 issue of International perspectives are two products of this research. He is also taking part in the centre's project on Canada and the new international order. Prof. T.F. Carney, now at the University of Windsor, Ontario, recently published a book on mind-expanding techniques, No limits to growth, which includes sections on scenarios, communications, and values. It was written while he was at the Natural Resource Institute of the University of Manitoba.

Prof. Hugh Stevenson of the University of Western Ontario's faculty of education, who published an early bibliography of futures literature related to education, is now compiling an annotated bibliography of Canadian policy literature and futures literature published between 1967 and 1977. He is also developing a quarterly journal, tentatively titled Apprise, that will provide a critically annotated guide to major world policy (futures) literature.

Several years ago Prof. Robert Logan of the University of Toronto's New College started a futures discussion group, punningly called the Club of Gnu, that continues to meet weekly.

Prof. T.R. Morrison was one of a small group in the University of Manitoba's faculty of education who worked on the social concerns

and curriculum development project. Prof. Morrison's part was to determine the images of the future held by young people (they were generally pessimistic, escapist, believed they had no control over their environment, but expected to be rescued by technology). He also uses futures research techniques to help school staffs think about the direction they want their schools to take. To date he has held seminars with teachers in Selkirk, Manitoba, Brantford, Ontario, Winnipeg, and Calgary.

Chapter III

THE CANADIAN ASSOCIATION FOR FUTURES STUDIES

The Canadian Association for Futures Studies was founded in 1976 at a meeting in London, Ontario, but it may be said to have had its inception in June 1975, when between 100 and 200 Canadians attended an international congress of the World Future Society in Washington, D.C. A number of the Canadians attending held a meeting during the congress and two of them, Hugh Stevenson, a professor of education at the University of Western Ontario, and Saul Silverman, an Ottawa political economist, agreed to organize a meeting of futurists in Canada.

Stevenson had already published a bibliography called Canadian education and the future and thus knew quite a number of Canadian academics and writers who were interested in futures studies. Another formative influence was the fact that the World Future Society by then already had 1,400 Canadian members, and this list proved to be the main source of names of people who might be interested in attending a meeting.

The association was founded during the meeting, which was held at the University of Western Ontario in February 1976, and attended by 200 people.

A provisional executive was elected with Stevenson as president and was instructed, among other things, to organize another conference within 18 months. The executive not only did that, they also signed up 525 charter members, drafted a constitution, and established a journal called Futures Canada, which took its title from the name the Senate Science Policy Committee had proposed

for a grass-roots futures studies organization.

The second CAFS conference took place at Queen's University, Kingston, Ontario, at the invitation of the School of Business there, through the initiative of Professor Don Nightingale, who was teaching a fourth-year course in futures research. Professor Nightingale was made chairman of the conference committee, which decided not to give the conference a single theme, such as Confederation or energy, but to seek speakers who had conducted futures studies of different kinds or spoken out on major social or economic issues, "speakers who appeal to data and research evidence to support their views and ... others who would approach issues intuitively." By the time the conference was held in June 1977 there were 65 separate sessions organized in eight parallel series, arranged so that it was difficult though just not impossible for a participant to attend all the sessions on a single topic, but easy to try out various subjects. Nearly 600 people took part in the conference, and by the end of the two and a half days there was broad agreement that it had been unique in successfully mixing most of the people in Canada who are professionally engaged in futures research with a large number of participants attending solely out of interest in the future. A notice of the meeting by Cathy Starrs in Social Sciences in Canada made the point that "those professionally engaged in futures studies were on the whole more open and attentive to the points of view expressed by citizens and colleagues than is the norm for professional gatherings."

The association's stated aim is "to encourage and enable Canadians, individually and institutionally, to recognize and accept

their responsibility for shaping Canada's future in the global context." Its objectives are "to recognize, study, and understand: the major trends of Canadian and global society and the implications of these trends for the future; the major constraints and possibilities that may arise in the future; and the environments and the actions which are necessary to sustain and enhance the human condition." The association is a member of the World Futures Studies Federation in Rome.

The new president of CAFS, elected at the conference to succeed Hugh Stevenson, is Fred G. Thompson of the Privy Council Office Ottawa. The association now has executive members or area co-ordinators in British Columbia (Vancouver Island), Alberta (Calgary, Edmonton), Saskatchewan (Prince Albert, Regina), Manitoba (Winnipeg), Ontario (Kingston, London, Niagara Peninsula, Ottawa, Peterborough, Toronto, Windsor), Quebec (Montreal), and Nova Scotia (Halifax).

At the beginning of the year two regional conferences were being planned for 1978, one in Ottawa and the other in Montreal, and other events were being considered. The association executive was holding preliminary talks on an annual conference in Toronto in 1979.

Chapter IV

FUTURES RESEARCH OUTSIDE CANADA

Thousands of people around the world are today occupied with the study of the future -- although since the activity is still so loosely institutionalized it is impossible to say exactly how many. Three directories of organizations in the field of futures research have been published in the past three years* and the smallest lists nearly 200, many with scores or in a few cases even hundreds of research workers (some also with just a handful, it should be added); the largest directory lists nearly 450 futures research organizations. Each of the three also identifies several hundred people known individually for their work in the field. Some of them such as Bertrand de Jouvenel, Herman Kahn, and Alfin Toffler have acquired international reputation.

Some 70 organizations, because of their budgets, staffs, or influence, make a major impact in futures research.

Economics

Many futures research organizations are primarily interested in economic research, or have developed out of economic research organizations, such as the Japan Economic Research Centre in Tokyo,

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* Social and human forecasting, IRADES (Institute for futures research and education),(Rome: Edizioni Previsionali, 1975). John McHale and Magda Cordell McHale, ed., The Futures directory (London: IPC Science & Technology Press, 1977). Edward S. Cornish, ed., The Future: a guide to information sources (Washington: World Future Society, 1977).

the Kiel Institute and Wickert Institute of West Germany, the Bureau d'Informations et de Prévisions Economiques in Neuilly, France, or Stanford Research Institute in California, with its Business Intelligence Program. Smaller ones are to be found all over the world. The Institute for Futures Studies of Copenhagen, with a staff of 15, founded in 1969, is as well known in Denmark as Mens en Ruimte of Brussels, with a staff of 12, is in Belgium, or Prognos A.G. of Basel is in Switzerland. Countries such as Japan and the United States have enough economic research organizations to allow them to specialize, as Wharton Economic Forecasting Associates of Philadelphia does in the development of statistical series and elaborate econometric models or as Predicasts Inc. of Cleveland, Ohio, does in abstracting economic forecasts from over 1000 sources and in deriving its own composite forecasts. Abt Associates of Cambridge, Mass., the Conference Board of New York, N.Y., and the Institute for the Future of Menlo Park, California, are other well known American economic futures research organizations. In Japan the best known include the Institute for Social Engineering and Nomura Research Institute, both of Tokyo.

Government

Institutes set up to advise governments about the future have also had a large influence on the development and institutionalization of futures research. The pattern seems to have been set in the communist countries, which characteristically use a social science unit in the national academy of sciences to carry out various kinds of futures research, social, technological or economic. In the

Soviet Union it is the Institute for Social Research, established in the U.S.S.R. Academy of Sciences, that performs this function. In Poland it is the Group for Social Prognoses, a division of the Institute of Philosophy and Sociology in the Polish Academy of Sciences. In Hungary it is the Institute of Sociology in the Hungarian Academy of Sciences. In the Ukrainian S.S.R., slightly varying the pattern, the relevant unit is the science policy studies group in the Institute of Cybernetics of the Ukrainian Academy of Sciences. And so on. Similar organizations with a less formal relationship to the government exist in some of these countries. Poland, for example, has both a planning commission that was set up to advise the Council of Ministers and a Poland 2000 committee in the academy of sciences (but separate from the Institute of Philosophy and Sociology) established to advise the planning commission.

In many European countries futures research activities are carried out directly by departments of government set up principally or solely for that purpose. A notable example is the Netherlands, which has its Scientific Council for Government Policy and its Social and Cultural Planning Office, as well as an academy-type organization, the Central Planning Bureau, which was established as a non-profit private institution but works exclusively for the government.

Among other large futures research organizations in European governments, the Central Policy Review Staff (first headed by Lord Rothschild) and the Programme Analysis Unit, concentrating on technological impact questions, in Britain and the Economic Planning

Centre in Finland are well known.

Sweden's practice is closer to the socialist countries': the Swedish Association for Futures Studies, a non-profit subsidiary of the Royal Swedish Academy of Engineering Sciences, advises the government on futures research. Switzerland is similar, with two academic advisory institutes, the Swiss Federal Institute of Technology and the St. Gallen Centre for Futures Research: both are completely funded by the federal government.

In the United States, four major instruments through which the government receives advice are divided between government offices and agencies more like the academies of science. The Defense Advanced Research Projects Agency, the research organization of the U.S. Department of Defense, has a staff of 65 and an annual budget of $250 million. The Office of Technology Assessment, with an $8 million budget, advises the U.S. Congress on the impact of new technology. The RAND Corporation, which grew out of the U.S. Air Force's Project RAND (for R and D, or research and development), is now a large private company which still receives most of its contracts from U.S. government agencies, not all of them in the area of defence. The Institute for Defense Analysis, another private institution that lives entirely on government contracts, has a staff of 200 professionals.

Worth mentioning are two international organizations which are similar to those just described. Europe 430 is a project of the European Economic Commission, located in Brussels, primarily occupied with futures studies and long-range planning. The International Institute for Applied Systems Analysis does not advise

governments, at least not directly, but is supported by the academies of science in the 14 member-countries, which include Canada, the Soviet Union, the United States, Japan, and a number of Eastern and Western European states, and one of its stated functions is to close the gap between scientists and decision-makers.

Policy Analysis

The broad field of futures research is sometimes called policy analysis, though strictly speaking the two terms are not identical. Policy analysis is taken to imply a concern with the national welfare, perhaps even with the activities of government, though in fact it is by no means limited to public policy. Here it is convenient to use the phrase to cover the work of research organizations that study many aspects of the future and in most cases come up with recommendations for action.

Most policy research institutes are in the United States. The best known, probably, is Hudson Institute of New York, which has 45 full-time professional staff. Its founders graduated from the RAND Corporation and not until fairly recently did the balance of Hudson's work swing over to the civilian from the military. Other noted centres of policy (mentioned here in alphabetical order) are the Brookings Institution of Washington, D.C., the Center for Policy Alternatives at Massachusetts Institute of Technology, The Futures Group of Glastonbury, Connecticut, the Institute for World Order of New York, N.Y., Operations Research Inc. of Silver Spring, Md., Stanford Research Institute's Center for the Study of Social Policy in California, and General Electric's

TEMPO Center for Advanced Studies, also in California.

Resources and Environment

A growing group of futures research organizations are studying the earth's natural resources and the environment. The Club of Rome, renowned for its ability to raise funds and commission important studies, can well stand at the head of this list. It first came to notice for its sponsorship and promotion of the Limits to Growth study of the effect of increasing industrialization and pollution on the world's population, carried out by a group headed by Dennis Meadows. Since then it has sponsored studies by Mesarovic and Pestel, Ervin Laszlo, Hans Linnemann, and Jan Tinbergen. The last few of the five reports may have received less media coverage, but there is no doubt that they constitute a formidable body of futures research.

Resources for the Future, an early entry in the field, founded in 1952, has a staff of 90 and is funded by the Ford Foundation. Worldwatch Institute of Washington, D.C., has published some striking papers on population, energy and resources. The Center for Integrative Studies moved recently from the State University of New York to the University of Houston, Texas; it has pioneered in the assembly and analysis of world resource data. Earth Resources Research Ltd., is a British addition to the list, with a staff of 12 full-time professionals.

Technology

A field that has attracted a number of private institutions is technological forecasting, particularly associated with innovation

studies. Such huge consulting companies as Arthur D. Little Inc. Battelle, and the Mitre Corporation are pioneers. Another U.S. company is Forecasting International Ltd. In Britain the Science Policy Research Unit at the University of Sussex has made a sizable impact.

Development

The Bariloche Foundation of Argentina has become known around the world for its model of development, now known as the Latin American World Model.

Other futures research organizations have done occasional studies of the problems of development, but a few, including the Bariloche Foundation, have specialized in them. Another is the Centre for the Study of Developing Societies, based in Delhi, India. In France, DATAR, the Agency for National and Regional Land Use Planning, has despite its rather restricting name involved itself actively in development studies for the world as well as France.

Futures Research

A number of organizations have concentrated on developing the philosophy and techniques of futures research, either exclusively or as the main part of their futures research activities. Some have specialized in collecting and disseminating futures information or in publishing or in organizing seminars and conferences. Some, one suspects, exist simply because some powerful individual enjoys the ambience of futures research without having any specific topic to study.

Futuribles International of Paris is famous as the home base of Bertrand de Jouvenel and his son Hugues. The father is one of the grand figures of futurism, the originator of the word futuribles, meaning possible future developments. The association gathers, collates, co-ordinates, analyses, and publishes.

System Dynamics Group at Massachusetts Institute of Technology, directed by Jay W. Forrester, developed the computer modelling technique used in the Limits to Growth study and also in urban and other socio-economic models. It now has a full-time professional staff of 20.

Similar organizations are scattered throughout Europe. Mankind 2000, headquartered in Brussels, brings together such futurists as John McHale, Elise Boulding, and Robert Jungk, helped establish a foundation for social innovation, organized several international futures conferences, and in general pursues the function of catalysis.

IRADES, the Institute for Futures Research and Education, of Rome, is best known outside Italy for its series of directories of futures researchers and organizations.

The Forecasting Research Centre of Wroclaw, Poland, has a total staff of 40, published a forecasting dictionary, has done studies of simulation techniques, and runs a forecasting school and a post-graduate course in technological forecasting. It is based at the Technical University of Wroclaw.

Somewhat similar is the International Centre of Methodology for Future and Development Studies, in the University of Bucharest, Romania. Its prime concern is futures research methodology and its

application in management and research and development.

The Berlin Centre for Futures Research houses two well reputed futurists, Ossip Flechtheim and Robert Jungk, publishes Analysen & Prognosen, studies futures methodology including content analysis, and sponsors lectures, symposia, and seminars. It has 14 full-time professionals on staff.

The World Future Society of Washington, D.C., is more than a club of people interested in the future, though it is that, and certainly the world's largest. It publishes The Futurist and several special interest newsletters, has a large annual conference, and produces tapes, slide shows, and directories. Among its 27,500 members are 3,800 from California, 2,800 from New York State, 1,500 from Illinois -- and 1,640 Canadians. (It has 1,300 members outside North America). It also actively influenced the founding of the Canadian Association for Futures Studies.

Of the 70-odd futures research organizations mentioned, about 40% are in the United States, 40% in Western Europe, and 12% in the Soviet Union and Eastern Europe.

Among smaller futures research organizations, a surprising number have been concerned with the future of individual states of the Union: Iowa 2000, Commission on Maine's Future, Hawaii Commission on the Year 2000, and so on. The Anticipatory Democracy Network in New York City, based on an idea of Alvin Toffler's, is oriented toward the future in its structure as well as its area of interest. The same seems to be broadly true of such groups as the Findhorn Foundation, a Scottish community of a few hundred people looking for ways to live in the next stage of earth's evolution, and the

Lindisfarne Association, a similar community in Long Island trying to anticipate the demands of an emerging planetary culture. The Society for the Investigation of Recurring Events of Linden, N.J., and the journal Cycles, on the other hand, both pursue one of the oldest approaches to divination of the future. Surprising to those not involved in the movement is the number of groups connecting futures studies to the work of Teilhard de Chardin. Among them are the Teilhard de Chardin Association Centre for Research on the Future of Man in Florence, Italy, the Center for Future Development in Denver, Colorado, which sponsors a Teilhard Center and a number of courses on the late Catholic priest's thinking, and the Teilhard Centre for the Future of Man in London, England, which publishes the quarterly Teilhard Review.

The World Future Society's guide to futures information lists over 100 periodicals. The best known of those of general interest are:

Analysen & Prognosen, published by the Berlin Centre for Futures Research (editors, Ossip Flechtheim, Robert Jungk, Hans Buchholtz);

Cycles, The Foundation for the Study of Cycles, Pittsburgh, Pa. (editor, Gertrude F. Shirk);

Futures, IPC Science & Technology Press, Guildford, England (editor, Ivan Klimes);

Futuribles, Futuribles International, Paris (editor, Hugues de Jouvenel); successor to Analyse & Prevision and Prospectives;

The Futurist, World Future Society, Washington, D.C. (editor, Edward S. Cornish);

Planning Review, The North American Society for Corporate Planning, New York City (editor, Robert J. Allio, Toronto);

Technological Forecasting & Social Change, American Elsevier (editor, Harold A. Linstone).

Some of the most familiar names in the field of futures research work at one or other of the large, influential organizations mentioned in the main part of this chapter -- are the raison d'etre of those organizations, in a number of cases. Others are known mainly for their writing or for some other reason that is not their chief occupation, which in many cases is teaching. These are some of the leading futurists (innovations, former affiliations, and best-known books or editorships in brackets):

Roy Amara, Institute for the Future, Menlo Park, California (Stanford Research Institute).

Daniel Bell, Harvard (Commission on the Year 2000, The Coming of post-industrial society).

I.V. Bestuzhev-Lada, Institute for Social Research, U.S.S.R. Academy of Sciences, Moscow.

Kenneth E. Boulding, University of Colorado, Boulder (The meaning of the 20th century).

James R. Bright, Industrial Management Center, Austin, Texas (forecasting).

Harrison Brown, California Institute of Technology, Pasadena (The challenge of man's future).

Lester R. Brown, Worldwatch Institute, Washington, D.C. (By bread alone).

Marvin J. Cetron, Forecasting International, Arlington, Va. (forecasting).

Arthur C. Clarke, Sri Lanka (Profiles of the future).

Norman C. Dalkey, University of California, Los Angeles (RAND, Delphi).

Yehezkel Dror, The Hebrew University, Jerusalem (RAND, policy analysis).

Peter F. Drucker, New York University, N.Y.C. (The age of discontinuity).

Ossip Flechtheim, Berlin Centre for Futures Research (Analysen & Prognosen).

Jay W. Forrester, System Dynamics Group, MIT, Cambridge, Mass. (World dynamics).

Dennis Gabor, University of London, England. (Inventing the future).

Theodore J. Gordon, The Futures Group, Glastonbury, Conn. (Institute for the Future).

Willis W.Harman, Center for the Study of Social Policy, Stanford Research Institute, Menlo Park, California.

Robert L. Heilbroner, New School for Social Research, N.Y.C. (The future as history).

Olaf Helmer, University of Southern California, Los Angeles (Institute for the Future, RAND).

Bertrand de Jouvenel, Futuribles International, Paris (The art of conjecture).

Robert Jungk, Berlin Centre for Futures Research (Mankind 2000, The future is already here).

Herman Kahn, Hudson Institute, Croton-on-Hudson, N.Y. (RAND, The year 2000).

Lawrence R. Klein, Wharton Econometric Forecasting Associates, Philadelphia, Pa.

John McHale, Center for Integrative Studies, University of Houston, Texas (Mankind 2000, The future of the future).

Dennis L. Meadows, Dartmouth College, Hanover, N.H. (The limits to growth).

Hasan Ozbekhan, University of Pennsylvania, Philadelphia, Pa. (planning, systems).

Robert Theobald, Wickenburg, Arizona (Futures conditional).

Jan Tinbergen, University of Rotterdam, the Netherlands (Central Planning Bureau, Reshaping the international order).

Alvin Toffler, New York City (Future shock).

Chapter V

FOUR MAJOR FUTURES STUDIES

Although much futures research produces results that are confidential or proprietary, some exceptionally interesting studies have been made public in the last few months. Four of them are described at some length in this chapter: two reports by international agencies, two produced in and about this country.

It would have been possible to review many other almost equally interesting studies. An example is Reshaping the International Order, a recent report to the Club of Rome, which sponsored the trend-setting Limits to Growth study. The RIO study was carried out by a group of 21 specialists led by the Dutch economist Jan Tinbergen. "Any nation that chooses to stand for a rigid adherence to the international status quo must expect to be on the defensive in virtually all relationships between nations," the report observes at one point. "In the present international order, huge power is concentrated in industrialized nation-States. Seen from a world viewpoint, this must be deemed undesirable ... The new international order of today ... can result in a reduction in inequalities and in the equitable distribution of global opportunities and, in doing so, lay the foundations for real co-operation." The main components of new development strategies identified in the report are the satisfaction of needs, the eradication of poverty, self-reliant and participatory development, the exercise of public power, and balanced eco-development. The final report was presented in Algiers and Amsterdam late in 1976.

An earlier Club of Rome study, Strategy for Survival, by Mihajlo Mesarovic and Eduard Pestel, is now regarded as one of the most optimistic of current world studies, in contrast to the pessimism of the Limits to Growth study. The Bariloche Foundation of Argentina developed another global model based on sophisticated community welfare maximization.

Project LINK, an attempt to combine national short-term macroeconomic models in a consistent way through trade flows, has attracted the interest of econometricians in many countries. It is headed by Dr. Lawrence Klein, chairman of Wharton Econometric Forecasting Associates, at the University of Pennsylvania. The Systems Analysis Research Unit at the United Kingdom's Department of the Environment is developing another world model, which emphasizes agriculture. The MOIRA model at the Free University of Amsterdam also deals with international relations in agriculture. The SIMLINK model of the World Bank is one of the few models concerned only with the evolution of the developing countries. The MOISE model, on the other hand, was developed by the Groupe d'Etudes Prospectives Internationales in France to study the major linkages between the industrialized nations of the West.

In Canada, the Institute for Research on Public Policy produced its first report, Leroy O. Stone and Claude Marceau's Canadian population trends and public policy through the 1980s. It is a synthesis of opinions about public policy issues that will confront Canada during the next 15 to 20 years, particularly issues arising out of population trends such as labour force growth, metropolitan area growth, education, language balance, and immigration

policy.

Environment Canada's Fourth quarter-century trends in Canada analyzes the significant factors affecting environmental management. The study examines many trends and projections. In the major sectors -- population, urbanization, economic activity -- alternative scenarios of development are presented and the various environmental consequences are considered.

Industry, Trade & Commerce's CEM project (Canadian Explor Model) grew out of the department's partial sponsorship of the first phase of the Battelle Institute's Explor Multitrade 85 project, a generalized international trade model applied to 10 countries, which was started in 1962. CEM is an input-output model with a 68-by-68 matrix of Canadian imports and exports that simulates world trade, with target-year solutions in five-year leaps from 1970 to 2000.

Another fairly large model is Statistic Canada's Long-term Simulation Model. It is a strategic simulation model of the Canadian economy designed to examine forecasts over the next 50 years. It has four main blocks, a population model, from which economic demand is circulated, from which in turn levels of industrial activity are calculated by input-output transformations, from which finally labour, capital, energy, and other resource requirements are obtained. The model requires the user to make economic decisions to handle dis-equilibriums or inconsistencies produced by his starting assumptions.

Another significant study was described in the Science Council's report, Canada as a Conserver Society: resource uncertainties and the need for new technologies, published in October 1977. It came in the train of four year's work by the council on the concept of the

Conserver Society. Concentrating on the scientific and technological implications of resource conservation, this study is concerned with renewable energy sources, recycling of materials, new business and employment opportunities in the transition from Consumer Society to Conserver Society, and government policy considerations.

Canada played some role in all four of the major studies now to be described. As a member of the United Nations it automatically had some share in the U.N.'s contribution to Wassily Leontief's study, The Future of the World Economy (though the main funding came from a single country). But Canada is a direct sponsor, one of 17, of the Organization for Economic Co-operation and Development project, INTERFUTURES, and has been taking an active part in its development. The third study, long-term projections of the Canadian economy on the CANDIDE econometric model, is a project of the Economic Council of Canada, a public-sector agency. The fourth, Canada HAS A Future, produced by the Hudson Institute of Canada, was financed by grants from eight Canadian private-sector companies.

The link between these four studies is that all make efforts to look past the short-term future, much of which is already virtually locked up in existing economic and political commitments, into more open reaches where decisions made today could bring about enormous changes. All four consider numerous alternatives, testing them for plausibility and their capacity to warn us of future problems and opportunities. All look at the kinds of decisions that will have to be made if these futures are to be realized. This world of careful scenarios and computerized projections is far from the enigmatic utterances of the Delphic oracle and the visions of Nostradamus.

It is a realm ruled by managers who have learned to use the tools of futures research in order to handle the huge and complex systems that have begun to develop in the past third of a century.

(a) United Nations Study, THE FUTURE OF THE WORLD ECONOMY

This three-year study of the future of the world economy, funded principally by the Government of the Netherlands through a grant to the United Nations, was directed by Nobel Prize winner Wassily Leontief and carried out by a team recruited chiefly from Brandeis and Harvard Universities. The basis of the study is a large input-output model, the econometric analytical technique pioneered by Leontief.

The original impetus for the study appears to have been a concern for the future of the world's physical environment, a desire "to arrest the deterioration of the human environment ... and to promote activities that will help maintain the ecological balance on which human survival depends," to quote the action program of the second United Nations Development Decade. The model was constructed to study environmental policies, mainly pollution, mineral resource restraints, and food production, as they are likely to be affected by world economic development. But since that required what is basically a general-purpose economic model, which could be used to analyse other questions, the scope of the study was broadened to include problems of structural changes in regional economies, balance of payments, and changes in international economic relations, and these dominate the final report.

Some idea of the size of the model may be gathered from the fact that it divides the world economy into 15 regions, each of which

is divided into 48 producing and consuming sectors described by 269 variables and 175 equations (for a total, therefore, of about 4000 variables and 2600 equations). The regional sub-models are joined by links describing exports, imports, capital flows, aid transfers, and so on. These are the 15 regions:

	MARKET ECONOMIES	CENTRALLY PLANNED ECONOMIES
DEVELOPED REGIONS	North America Two parts of Western Europe Japan Oceania Southern Africa	Soviet Union Eastern Europe
DEVELOPING REGIONS	Two parts of Latin America Two parts of Africa Part of Asia Mid-East & Africa oil countries	Part of Asia

A mix of labour and other inputs was calculated for each unit of production for each industry. Extractive industries absorb natural resources. Households absorb consumer goods and supply labour. "Public households" are represented by government activities of various kinds. Besides the flows of current inputs, each sector also uses stocks of buildings, machinery, inventories, and so on. In addition to the production accounts in value units, the model maintained balances in physical units for four types of agricultural products, fish, six metals, three fossil fuels, eight pollutants, and fertilizer.

Input-output tables are available for about 70 countries, but not all are of equal standard and for several developing regions very few single-country tables were to be had. Many of the regional tables were therefore estimated. The estimates were obtained by regressing specific coefficients against per capita income, the most widely available economic datum, using statistical series from the most reliably analysed countries.

To make projections, the coefficients in the input-output tables had to be changed to reflect changing conditions. For instance, the input requirements for mining activities would increase as lower grades have to be brought into production: this could also be expected to raise price levels. A number of input coefficients, particularly consumption coefficients, would alter as per capita income increases. It could be expected that new technology would alter the mix of industrial inputs. Step functions had to be estimated for each coefficient in each regional table. It was also necessary to estimate consumption expenditure patterns for countries with higher average per-capita income than had ever been observed (for example, per-capita gross domestic product grew from $4,600 in 1970 to $9,100 in 2000 in one run of the model): detail from the upper end of an income-specific study of U.S. consumption patterns was used.

Although it might be thought that this kind of model could best be used, or even only be used, to discover the effects of given causes, in practice the set of linear equations that make up an input-output table allow the investigator to reverse this process and approach the relation between cause and effect from the other end. The Leontief study reports eight projections made with the

model. "Seven of the eight projections are anchored in given sets of developmental targets described in terms of specific levels of per capita GDP to be attained by various less developed and developed regions in 1980, 1990 and 2000," the authors note. "In other words, the projections ... represent alternative paths -- all steep, some hardly traversable -- towards the attainment of the same set of developmental goals." The eighth projection did proceed from cause to effect, however. It was based on the assumption that most economic patterns from before 1970 would be continued. The result is described as "pessimistic": the ratio of per-capita GDP in the developing countries to that in the developed countries in 2000 is about the same as in 1970. The reasons for this poor performance under what the study calls the "old economic order" scenarios are to be found in its assumptions: "there is no provision for any substantial increases in internal or external investment rates, which would be required in order to accelerate growth in the developing areas; except for the extrapolation of current trends, no provision is made for major increases in export shares and import substitution in the developing countries, which would make possible the alleviation of their balance-of-payments problems."

The other seven runs of the model used one of three sets of assumptions about the growth rates of population and per capita GDP. For five of the projections it was assumed that population growth would be "medium" (0.7% a year on average in the developed regions, 2.3% in the developing regions) and that per-capita GDP growth would be "high" (3.3% in the developed regions, 4.9% in the developing). In the sixth and seventh projections, per-capita GDP growth in the

developed regions was assumed to be "low" (3.0%) but remaining high in the developing regions: population growth was "low" in one scenario, "high" in the other. As the report notes, "With the income targets for 1980, 1990, and 2000 given, the question to be answered is, what would the world economy have to look like ... if it were to attain -- while operating within the limits of the given technical and physical constraints -- these fixed objectives? In particular, what would the levels of the labour inputs, the volume of investment, and the rate of mineral resource use have to be in each of the 15 regions; and what would the pattern of international trade and payments have to be so as to permit the actual realization of these targets?"

The main variations in the seven scenarios were these. One assumed a larger reserve of mineral resources. Another assumed low-income Asia could become self-sufficient in food by 1980. A third raised the aid and capital export coefficients for developed countries and reduced the rate of interest on foreign debt. A fourth reduced some import coefficients and raised some export coefficients in three low-income regions. The other three were the base scenarios for the three sets of population and GDP assumptions.

These are the main conclusions of the Leontief study:

* With qualifications, the productivity of agricultural land can be increased enough to meet the needs of the world population. Land reform and other social and institutional changes will be needed, however.

* There will be a tremendous growth in the world consumption of minerals. "Known resources of metallic minerals and fossil fuels are generally sufficient to supply world requirements ... probably into the early part of the next century." However, there may be regional shortages and high prices.
* "For many types of industrial and urban pollution, technologies are currently in existence which make it possible to significantly reduce the actual emission of pollutants to at least manageable levels" and at acceptable cost.
* "Accelerated development in developing regions is possible only under the condition that from 30 to 35 per cent, and in some cases up to 40 per cent, of their gross product is used for capital investment." This may require drastic taxation and credit policies.
* "Accelerated development poses the danger of large potential trade and payments deficits in most of the developing regions." One way out of the problem is simply to reduce the rate of development. The other is to stabilize commodity markets, stimulate developing countries' manufacturing exports, and increase financial transfers.
* "For developing regions which are not large net exporters of minerals or agricultural goods, the main way to reduce the potential trade imbalance is to significantly reduce their import dependence on manufactured products in the course of industrialization, while at the same time increasing their share of world exports of some manufactured products, particularly those emanating from light industry."

(b) The OECD INTERFUTURES Project

The Organization for Economic Co-operation and Development is in the last year of a three-year futures research project called INTERFUTURES. It was begun at the start of 1976 by 14 member-countries of the organization (later enlarged to 17: Austria, Belgium, Canada, Denmark, Finland, France, Greece, Italy, Japan, Netherlands, Norway, Spain, Sweden, Switzerland, United Kingdom, United States, and West Germany), at the suggestion of Japan. Its purpose is to study the future of the advanced industrial countries and the evolution of their relations with the underdeveloped countries.

Two features distinguish the INTERFUTURES project from other large-scale futures studies. One is that it is attempting to study the complex relations between the developed nations, which are already strongly connected by trade and political ties (and which can be considered as a fairly homogeneous unit, "the North"), and the less developed countries, which are by no means so strongly tied butwhich share characteristics of poverty and development needs that group them ("the South"). Most global studies so far have either concentrated on the interests of one of these two groups or have lumped them together with little distinction. The other feature is that the study is trying to avoid oversimplifying the diverse network of problems and relations that webs the world and instead is studying the issues at a level of some complexity. The research team hopes these features will make its findings useful to the governments of the member-countries and meaningful to the exports on world problems whom they employ. It is possible that the effort to combine these features is over-ambitious and that the project will

fall short of its full objectives, but the attempt seems to be justified by the nature of the world's problems and by the fact that previous projects of this scope have not produced solutions that led to new policy. If INTERFUTURES succeeds, it should for the first time help the sponsoring governments to discuss long-term developments and the policies they require.

A number of points had begun to look significant to the team during the first half of the project. One was that the major challenges facing the First World countries were more socio-political than physical. Another was that despite the magnitude and nature of their own problems, the countries of the North should recognize that the problems of the South were not only very large too but also different in nature.

Three major challenges were identified by the team at that stage. The existence and maturing of the Third World, which could be regarded as the external proletariat of Western civilization (in Arnold Toynbee's phrase), implies a long, deep, and unavoidable change in world relations, which cannot be simply determined at a few North-South conferences but might take half a century and several major crises to achieve.

The second challenge was the U.S.S.R. The INTERFUTURES team saw the Third World as torn between the First and Second Worlds. Instead of the North, it might be better to speak of the East, meaning the Communist blocs, and the West.

The third challenge was the emergence of a whole new set of values and objectives, centering today on the new attitude to growth, which co-exist with well-established old values and objectives.

Many people now look simultaneously for security and self-management, while efficiency is ignored, taken as given. The main problems, in short, are not basically physical.

The elites of the countries of the South are interested in their own problems, which means that in looking for solutions they start with a completely different picture of the world. The Law of the Sea conferences may be considered characteristic of the way problems will have to be handled in the future, when so many will turn out to be global in nature but affecting the interests of different countries and groupings in quite different ways.

The INTERFUTURES project has four phases. In the first two, now nearly complete, the team scanned existing methods and research results and made its own examination of several critical world problems with an eye to developing policy recommendations for the sponsoring governments. This is a partial list of the research:

* A comparative evaluation of the main world econometric models.
* A description of the evolution of international relations since the end of World War II.
* A study of the impact of Second World (communist bloc) countries on the First World and Third World countries.
* Examinations of population, energy, natural resources, the environment, trade, the monetary system, the future of technology.

The third phase is analytical and policy-oriented. A task force is making its own macroeconomic projections, relying only in part on existing econometric models. Another is studying change in the economic activities of developed and less developed countries.

A third is creating global scenarios as part of an effort to integrate all the research. The fourth phase is to communicate the results to the member-governments.

(c) The Economic Council of Canada's SIMULATIONS WITH CANDIDE TO THE YEAR 2000

An important part of the work of the Economic Council of Canada is its use of its large econometric model of the Canadian economy, CANDIDE. This model, more than five years old now and in its third version, known as CANDIDE Model 1.2M, incorporates over 2000 variables and equations. Another 500 variables must be supplied from outside the model as inputs to the computations. The model calculates the production of 60 industries and estimates 170 categories of final demand in the economy.* The main uses of CANDIDE are to make forecasts of the future of the economy under changing conditions and to assess the effects of particular influences or discontinuities on the behaviour of factors in the economy; thus it can be used to test proposals for new policies.

The model is in six main blocks. One determines final demand expenditures. The second derives industrial levels of production. The third calculates labour force and employment.

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* The council will soon be operating a completely reorganized and rebalanced CANDIDE, Model 2. The result of about ten man-years of professional work, it exploits a number of new principles of model-building. Industry is divided into 44 micro-industries for which all key indicators are calculated (outputs, wages, prices, and so on). Government is shown at six levels, including hospitals and pension plans. The whole demographic block has been rewritten. There is more feedback of economic phenomena. The model is of about the same size as Model 1 but is considered to be much more powerful and useful.

The fourth obtains labour income and net output prices by industry. The fifth developes prices for all domestic components of final demand. The sixth provides interest rates and the capital account of the balance of payments. Estimates from each of these six blocks become inputs to calculations in several of the others. For instance, industrial production is derived from final demand by the use of input-output tables.

The variables supplied from outside (the exogenous variables) include such things as economic activity in other countries, import and export prices, tax rates, and details of the Canadian population. For instance, the number of children is used to estimate school enrolment and therefore the demand for teachers. The number of young children influences women's labour force participation rates. Population details help establish total demand in general and in such detail as family allowance and old age pension payments.

Other equations reflect the influence of accumulated stocks of capital goods, not only business stocks but also the stock of dwellings and consumer durables. A parallel set of equations calculates the equivalent of stocks for services and non-durables, which are regarded as habit-forming rather than stock-forming. Habits build up and wear off much as stocks are accumulated and depleted. The model also recognizes the difference between short-run and long-run responses to changes in incomes and prices. Given a sudden increase in disposable income, consumers are likely to put two thirds of it into savings and durables; if incomes continue to rise, more and more is spent on other items. The mechanism modelling these responses is based on the idea of a gradual approach to a

desired level of stock.

CANDIDE has typically been used for runs of up to 10 years into the future. Recently the council decided to see whether the model could be used for longer runs. One factor that prompted this experiment was CANDIDE's inherent advantage as a long-term study tool, which is that it allows the inquirer to look not only at the direct effects of policy decisions on the economy but also at the many resulting interactions between different sections of the economy. Another was growing interest in problems that take longer than 10 years to develop, such as energy-related capital investments or how industry will adapt to increased foreign competition or higher commodity prices. The 25-year simulations reviewed here were more like a test of the feasibility of doing long runs on CANDIDE than studies of actual long-term problems, but for all that, the results are more than interesting.

First, the researchers, B.L. Eyford and Bobbi Cain, made a base run (the "reference solution"), adjusting the model so that some vital measures would fall within rather narrow limits. The government deficit or surplus should not be more than 2% of the gross national product, they decided, nor should the current account balance; the unemployment rate should fall within a range of 4%-5% average; and so on. Although some economic developments that would be neither unreasonable nor unfamiliar were thus excluded, these limits allowed the researchers to look closely at the developments they were interested in: for instance, to look at the factors that constrain supply, such as the labour force, investment, and the balance of trade.

For the main runs of the model they also developed three pairs of partial scenarios. There were two trade scenarios, one based on high export volumes and low foreign prices (growing at 4.0% a year), another based on lower export volumes and higher foreign prices (4.8% a year). There were two demographic scenarios, a high population scenario (giving a population of 31.8 million in 2000) and a low (28.2 million). And there were two energy scenarios, one based on moderate prices (crude oil prices growing at 4.5% a year throughout the period), which increases demand but restricts frontier development and thus requires higher spending for electric generating plant in the 1990s, and the other on higher prices (growing at 5% a year through 1985, 4.5% thereafter), with lower demand as a result and less need for investment in the 1990s. Four of the eight possible combinations were chosen:

* High export volume, moderate energy price, low population (this is the reference solution).
* High export volume, moderate energy price, high population.
* Low export volume, high energy price, low population.
* Low export volume, high energy price, high population.

Later, variations on the high export-high population scenario and the low export-high population scenario were also run.

The reference solution developed three distinct parts, a period of rapid expansion in the energy sector from 1977 to 1985; a troublesome period of transition at the end of pipeline construction from 1986 to 1988; and a period of reduced population growth and capacity growth in real output from 1989 to 2000. Gross national expenditure slows from an actual 5.2% in the 1960s to 4.2% in 1977-1985 and to

3.0% during the 1990s. The growth of output in the service sector is slower than it was in the 1960s as well as slower than in the primary and secondary sectors. Most of the employment increase stems from the service sector; however, labour productivity continues to grow in the goods sectors. The rate of inflation in domestic prices tends to converge on the rate of foreign inflation. Exports rise from 24% of gross national product in 1975 to 33% in 2000 and imports rise from 30% of GNE to 34%. The balance of payments continues in deficit. The investment in energy resources does not appear to over-burden the economy ("We cannot say if room has been made for these investments by the process of substitution since we have not made a systematic study of this problem"); but residential construction is down as a result of the declining population growth. Personal taxes and contributions rise from 19% of personal income in 1975 to 32% in 2000, and the average savings rate declines.

In scenarios with higher population growth, the researchers found, "increasing the rate of growth ... produces a rise in unemployment which causes wages to fall by more than prices. Domestic prices are sticky because of fixed foreign prices and this leads to a reduction in the real wage which ... outweighs the employment increase due to import substitution and increased domestic demand."

Comparing the high-export, moderate-energy-price scenarios with the low-export, high-energy-price scenarios, the researchers noted that real disposable income is higher in the second class of scenarios, even though exogenous expenditure on investment and exports is lower.

The main point of the projections was to find out if CANDIDE was a suitable instrument for analysing long-term socio-economic problems. "The demand for energy can be met with different technologies, or combinations of technologies, all of which require substantial time for installation," the researchers wrote in their report. "As a result, several alternatives strategies (were) drawn up for study. The choice of the best plan, be it the cheapest or the most flexible, is complicated because the projection of future energy demand and the associated prices is not independent of the strategy to be adopted. This interaction is due to the magnitude of the investments and therefore a structural framework is required to investigate problems of this type." Could CANDIDE be used for this kind of study? The exercise reviewed here was more an attempt to establish a base for a future study of the economic consequences of investment related to energy and similar long-term questions than the study itself. The researchers concluded that although such exercises were bound to be full of difficulties, "we have produced a reference solution and examined sufficient variations from it to conclude that it is satisfactory for use in certain long-term studies."

(d) HUDSON INSTITUTE OF CANADA'S STUDY, CANADA *HAS* A FUTURE

Hudson of Canada's 100,000-word study of Canadian futures derives its title from the question people asked the institute when they heard it was studying Canada's future and the answer the institute returned. "Today, most Canadian images of the future are pessimistic," the authors, Marie-Josée Drouin and B. Bruce-Briggs,

note in their introduction. (Ms. Drouin is executive director of Hudson of Canada. Mr. Bruce-Briggs is a consultant to the parent Hudson Institute of Croton-on-Hudson, N.Y., and the three other contributors to the study are on the Hudson staff). Their report is more optimistic than is now generally fashionable: "we ... make a strong case that a positive future is possible -- that there is no necessity for things to go badly." It also rejects the idea of limits to growth: "we believe the neo-Malthusian theory to be almost completely wrong." It also, with qualifications, rejects the idea "that Canada is merely a few steps behind the British, inexorably sliding toward economic stagnation, class conflict, bureaucratic tyranny, moral degeneration, and national collapse."

The report takes some pains to establish that much of the future will be like the past and present, unsurprising, an extension of what is and has been. It starts by listing some more or less fixed conditions of Canadian life, such as the hard climate, the abundant natural resources, and the persistence of political democracy, parliamentary government, traditional values, the family, the dominance of Toronto, Ottawa, and Montreal, French-English and federal-provincial conflicts, the importance of foreign trade, American influence, anti-Americanism, and other influences on the Canadian character.

It also observes a score of long-term trends, including the rise of a New Class of bureaucrats, academics, and journalists, "a more equal (or less unequal) distribution of access to the desired things of society," increasing affluence ("under the most adverse conceivable credible conditions, Canada remains one of the richest countries in the world and continues to become richer"), the erosion

of authority, increasing ethnicity, the rise of the West, the decline of the British connection, the rise of France, and the increasing importance of the Pacific rim.

The scenario has always been a keystone of Hudson studies. This one develops three central scenarios. The standard or "business-as-usual" scenario is built on continued slow population growth, from 23 million people in 1976 to about 29 million in 1996, and moderate economic growth, an increase of about two thirds in the gross national product in the next 15 years or growth in GNP per person of about 2.3% a year on average. Unemployment remains in the 7-10% range, the balance of payments continues in deficit, governments' importance in the society grows, Quebec does not secede, and social values become "neo-conservative" in the short run but later revert to a longer-term liberalizing trend.

This business-as-usual or "B" scenario is bracketed by a scenario envisaging accelerated growth ("A") and another showing constrained growth ("C"). In the "A" scenario the population is increased by higher birth rates, higher immigration, and lower emigration and reaches 32 million in 1996. The GNP grows by 75% or more in the next 15 years, under the stimulus of long-term growth-oriented policies. The growth of government is slowed or reversed, unemployment drops, western and northern development becomes more rapid, Quebec "simmers," there is greater willingness to co-operate with the U.S., and there is some return to traditional values. The "C" scenario anticipates very low birth rates, controlled immigration, increasing emigration, and a 1996 population of 25 million that is no longer growing. The GNP grows by about 40% in the

next 15 years, an average annual growth in per-capita GNP of about 1.7%. There is more emphasis on the distribution of wealth than on its production, more government involvement, an emphasis on conservation, a tough environment for business, restraints on foreign and Canadian multi-national companies, and an emphasis on new values.

All three scenarios are treated as being reasonable futures, not the most optimistic or pessimistic imaginable. Most of the topical chapters give more details about these three core scenarios; they also look at some more extreme possibilities.

About half the report is devoted to three substantial chapters on population, the economy, and resources, the quantitative base for the scenarios. The population chapter, for example, makes a detailed study of the ideas and trends influencing changes in the birth rate, immigration, and emigration. The chapter on the economy contends that the worldwide boom from 1950 to 1973 was exceptional. "While industrial nations have grown an average 2 or 3 per cent through most of modern economic history, gross world product climbed at an average annual rate of 5 per cent ... in the twenty-three year post World War II period ... We had a golden age -- yet how many Canadians were aware of it?" All three scenarios assume the economy will grow fairly rapidly for a short time to catch up "as Canada climbs out of the recession," but that growth will then get slower and slower. "A continuation of the trends of 1971-1975 would not be "business-as-usual" but a nightmare scenario .... To achieve the economic prospects of the standard or accelerated growth scenarios, however, it will be necessary to restore the idea of the legitimacy

and desirability of economic growth and to curb the common current mental attitude that encourages low morale or hostility to growth."

The report says that export competition from less developed countries will inevitably intensify, and Eastern Europe and the Soviet Union are also developing a competitive trading capacity. The "A" scenario assumes more open trade with the United States and a rapid growth of Pacific trade. "Japan might be induced to invest more in assembly as well as production in Canada, for the U.S. market as well as for itself." The "C" scenario anticipates a growing deterioration of Canadian manufacturers' international competitiveness, growing protectionism, and increasing trade friction with the U.S.

No major shortages of natural resources or agricultural land in Canada are expected.

The remainder of the Hudson of Canada report consists of six chapters on more qualitative questions. The authors expect that the proportion of the Canadian population living in metropolitan areas will continue to grow, but that the growth will be suburban and overall densities will drop. "Except for a few isolated groups, all Canadians are (now) 'urbanized', think in urban terms, and live in an urban manner." The suburbanization of industry and commerce will follow, the report conjectures, and after that there will be a trend to exurbanization or a kind of urbanized development farther away from the city centres and at an even lower density. The report expects that by 1991 "Toronto will more than ever be the great Canadian city, ... the hub of a huge urban region ... around the western end of Lake Ontario." Montreal will experience difficulties, particularly if Quebec separates("(a separate) Quebec is not large

enough to support such a great city as Montreal"). Vancouver will suffer from its "limits-to-growth" mentality, but Ottawa, "Canada's most characteristic company town," will continue to grow.

The report's chapter on the future of Confederation is prefaced by the observation that Hudson of Canada is now engaged on a special study of the future of Quebec, which should be considered as the second volume of the Canada study. The authors believe that it is not so much that separatist sentiment has increased in Quebec as that nationalist sentiment throughout the country, including Quebec, has waned. "If forced to bet on the outcome of the current tension, we would say that the odds are against Quebec achieving outright separation from Canada during the next generation." Various futures are examined by the device of considering the response to different referendum questions. Extreme scenarios are deliberately played down.

The final chapter considers future changes in values and social goals. "The very existence of such a topic is in itself indicative of a culture in drift. Where values are firmly established, they are not the subject of discussion." The authors expect a short term of what they call neo-conservatism -- preoccupation with order, production, fiscal responsibility, defence of received values and established institutions, the maintenance of standards and privileges, concern with the survival of the nation, attacks on the spread of government, and unwillingness to go much further in liberalizing censorship, for example, or alcohol and drug laws. But "sometime soon ... Canada will move back toward the new values of personal liberation and rejection of tribal and

economic man, and we will take another halting step toward earthly paradise, or pandemonium."

APPENDIX i

MAJOR DOMESTIC FUTURES RESEARCH ORGANIZATIONS

Canadian Association for Futures Studies

President: Fred G. Thompson

Privy Council Office
Room 408
Langevin Block
Ottawa, Ontario
K1A OA3

Objectives and interests:

To encourage and enable Canadians, individually and institutionally, to recognize and accept their responsibility for shaping Canada's future, in the global context.
(Does no research)

The Conference Board in Canada

Suite 100
25 McArthur Road
Ottawa, Ontario
K1L 6R3

Objectives and interests:

Conducts an extensive research and conference program to provide industry with sound and objective information on economic issues and trends and on management practices.

GAMMA (Groupe Associé Montréal/McGill pour l'Etude de l'Avenir

Suite 210
3535 Queen Mary Road
Montreal, Quebec
H3V 1H8

Objectives and interests:

Policy research, socio-economic forecasting and futures studies.

Informetrica Limited

Suite 1007
350 Sparks Street
Ottawa, Ontario
K1P 5P9

Objectives and interests:

Provides a unique approach to research in Canada by integrating economics and statistics with computer science.

Institute for Canadian Futures

Suite 206
2323 Confederation Parkway
Mississaugua, Ontario
L5B 1R6

Objectives and interests:

Policy analysis and forecasting, bringing futures research to the solution of Canadian problems.
(Has not yet publish any research)

Institute for Research on Public Policy

3535 Queen Mary Road
Room 514
Montreal, Quebec
H3V 1H8

Objectives and interests:

To improve the base for informed choice and decision by the people of Canada and its leaders on issues of public policy.

Club of GNU

President: Professor Robert Logan

Department of Physics
University of Toronto
Toronto, Ontario
M5S 1A7

Objectives and interests:

The Club of Gnu is an informal group of students, professors and some members of the business, media, government and arts community which has met at New College, University of Toronto weekly for the past two and one-half years.
(Does no research)

Hudson Institute of Canada

Suite 701
666 Sherbrooke St. West
Montreal, Quebec
H3A 1E7

Objectives and interests:

To study public policy, especially those related to long-range perspectives to Canada and world order, to social and economic development, and to urban affairs.

John Kettle Inc.

135 Maclean Avenue
Toronto, Ontario
M4E 3A5

Objectives and interests:

Consulting in the field of futures studies.

APPENDIX ii

MAJOR FOREIGN FUTURES RESEARCH ORGANIZATIONS

The Brookings Institution

1775 Massachusetts Avenue, N.W.
Washington, D.C. 20036
U.S.A.

Objectives and interests:

Policy-oriented research, education, and publication in economics, government, foreign policy, and the social sciences generally.

BIPE (Bureau d'informations et de previsions economiques)

122 Avenue Charles de Gaulle
Neuilly 92522
France

Objectives and interests:

To analyze the principal factors that affect economic growth; to improve forecasting methods.

Center for Integrative Studies

College of Social Sciences
University of Houston
Houston, Texas 77004
U.S.A.

Objectives and interests:

Primary objectives -- future studies and long-range planning. Special interests -- social and cultural futures, human needs and priorities, world trends, and resource projections.

Central Planning Bureau

Van Stolkweg 14
The Hague, The Netherlands

Objectives and interests:

Public policy research on the economic aspects of domestic and international issues; short, medium, and long-term forecasting on economic matters; national economic cost-benefit analysis.

Centre for the Study of Developing Societies

29 Rajpur Road
Delhi 110054
India

Objectives and interests:

Analytic, normative, and policy-oriented work on the stresses and challenges facing societies; comparative studies, futuristic work at both national and global levels.

The Club of Rome

163, Via Giorgione
00147 Rome
Italy

Objectives and interests:

World problematique

Commissariat General du Plan

18, rue de Martignac
75007 Paris
France

Objectives and interests:

Five-year plans and future-oriented studies relevant for the preparation thereof.

The Conference Board

845 Third Avenue
New York, New York 10022
U.S.A.

Objectives and interests:

To foster broader understanding of business and the economy for the enlightenment and practical benefit of those who manage business enterprises and of the society which shapes the business system. Major areas of research include business economics, general administration, finance, personnel administration, marketing, international operations management, and public affairs.

The Danish Committee on Futures Studies

c/o Secretariate of Danish Research Councils
Holmens Kanal 7
1060 Copenhagen K
Denmark

Objectives and interests:

To coordinate and initiate futures studies in various fields.

DARPA (Defence Advanced Research Projects Agency)

1400 Wilson Boulevard
Arlington, Virginia 22209
U.S.A.

Objectives and interests:

To provide the U.S. with the long lead-time and some of the background data which decision-makers need in order to answer questions which could become the national security issues of the late 1980's; to serve as the central research organization for the Department of Defence; to generate options and prevent technological surprise; to serve as a catalyst for change by pulling diverse technologies and groups together; to provide a mechanism whereby new ideas and concepts can be explored without preordaining a commitment to go into full-scale development.

DATAR (Delegation a l'amenagement du Territoire et a l'action regionale)

1, Avenue Charles Floquet
75007 Paris
France

Objectives and interests:

Land use planning; the international socio-economic situation; the development of French society.

Earth Metabolic Design, Inc.

P.O. Box 2016
Yale Station
New Haven, Connecticut 06520
U.S.A.

Objectives and interests:

Application of what R. Buckminster Fuller has called "Comprehensive Anticipatory Design Science" -- the application of the principles of science to the conscious design of our total environment. Specific objectives include research and planning, education, and contact products. Special interests are shelter, energy, food, and resources/economics.

Earthrise, Inc.

P.O. Box 120 Annex Station
Providence, Rhode Island 02901
U.S.A.

Objectives and interests:

Research, education, and design of alternative human futures concerned with creating a more peaceful, just, and ecologically balanced society.

Forecasting International Ltd.

1001 North Highland Street - Penthouse
Arlington, Virginia 22201
U.S.A.

Objectives and interests:

Futures studies, technological forecasts, technology assessments, resource allocation models, corporate planning (especially concerning energy, technology transfer, and scientific and technical communication).

Formedlingscentralen for Framtidsstudier AB

Box 5073
S-102 42 Stockholm
Sweden

Objectives and interests:

To support long-term study teams in Swedish government offices and industrial firms with information from the futures studies field.

Fundacion Bariloche

Casilla de Correo 138
San Carlos de Bariloche
Provincia de Rio Negro
8400 Argentina

Objectives and interests:

Research and postgraduate training in arts and sciences, mathematics, computing, biology, natural resources, energy, sociology, political science, music, science policy, world and regional modelling, etc.

Futuremics, Inc.

2850 Connecticut Avenue, N.W.
Washington, D.C. 2008
U.S.A.

Objectives and interests:

To assist individuals, groups, and organizations in programming their activities togward the definition and achievement of preferable and desirable futures. The structure of Futuremics is itself experimental, in that the company attempts to embody concepts which the staff believes to be relevant to the future, such as democractic decision-making, worker self-management, and maximization of personal growth.

The Futures Group, Inc.

124 Hebron Avenue
Glastonbury, Connecticut 06033
U.S.A.

Objectives and interests:

Policy analysis and forecasting; assisting management in anticipating the consequences of change; bringing futures research to the solution of practical problems of short-term and long-range planning.

Futuribles International

10 rue Cernuschi
75017 Paris
France

Objectives and interests:

The aim of the Association is to act as a center for information, documentation and coordination in futures studies (who is doing what, where, how), as well as to analyze, stimulate and undertake research on the facts, ideas, and options on which the future of our society depends.

Hudson Institute

Quaker Ridge Road
Croton-on-Hudson
N.Y. 10520
U.S.A.

Objectives and interests:

To study public policy, especially those related to long-range perspectives to Canada and world order, to social and economic development, and to urban affairs.

Industrial Management Center, Inc.

1411 West Avenue
Austin, Texas 78701
U.S.A.

Objectives and interests:

Post-university education and consulting in topics related to the management of technology.

Institute for the Future

2740 Sand Hill Road
Menlo Park
California 94025
U.S.A.

Objectives and interests:

Futures planning on domestic and international issues for both the public and private sector. Primary focus on social environment, economic trends, consumer attitudes, regulatory matters, and technological (primarily energy, computer, communications) developments.

Institute for Social Engineering, Inc.

Aoyama Building, 1-2-3, Minato-ku
Tokyo, Japan

Objectives and interests:

Public policy research on urban and regional development; short, medium, and long-term forecasting on economic, social, technological, and political matters; surveys of opinions.

Institute for World Order, Inc.

1140 Avenue of the Americas
New York, New York 10036
U.S.A.

Objectives and interests:

Through a broad program of education and policy research, the Institute seeks to develop an awareness among academic and non-academic audiences of the need for new systems of social/political/economic institutions built on humane values. The scholars and educators who compose the Institute look at world problems from an analytical perspective, looking to advance the first part of a process that may be used to initiate an effective, continuing public discussion of these matters in the U.S. and the world. The Institute plans to eventually mobilize political constituencies toward world order goals.

Instituttet for Fremtidsforskning

Vester Farimagsgade 3
DK-1606 Copenhagen V.
Denmark

Objectives and interests:

Short, medium, and long-term forecasting on economic and political, national and international development.

International Center of Methodology for Future and Development Studies

3-5 Mihail Moxa Street
Bucharest 7000
Romania

Objectives and interests:

Methodology for futures and development studies; application in management and research and development.

International Creative Center

Colladon 20
Geneva, CH-1209
Switzerland

Objectives and interests:

Study and promotion of problems concerning the future in the sciences, economics, and the arts; research aiming at synthesis of most advanced techniques as well as new truths to bridge the gap between technology and spiritual values.

The Japan Economic Research Center

Nikkei Bldg., No. 9-5
Ohtemachi 1-Chrome
Chiyoda-ku, Tokyo 100
Japan

Objectives and interests:

Economic research, with particular emphasis on economic forecasting.

The Kiel Institute of World Economics

Duesternbrooker Weg 120/22
D-2300, Kiel
Federal Republic of Germany

Objectives and interests:

Empirical research on economic relations among industrial countries, industrial and developing countries, and industrial and socialist countries. In addition, analyses of current business cycles (including forecasts), and country studies in various economic issues, such as trade, industrial structure, employment, foreign investment, raw materials.

Mankind 2000

1 rue aux Laines
1000 Brussels
Belgium

Objectives and interests:

To support and promote all aspects of human development in the individual, within and between groups, and in the emerging world community, with special reference to the mental, moral, and essential well-being of each person and of the human community as a whole. Also to encourage such conditions and techniques that will ensure that the future development of mankind becomes centered on the person as a human being.

Mitre Corporation

Box 28
Bedford, Massachusetts 01730
U.S.A.
AND
Westgate Research Park
McLean, Virginia 22101
U.S.A.

Objectives and interests:

To perform research, development, engineering, and advisory services of a scientific nature to solve public problems.

Osrodek Badan Prognostycznych

Wybrzeze Wyspianskiego 27
53-370 Wroclaw
Poland

Objectives and interests:

Methodology of exploratory and normative forecasting; technological forecasts; long-term research and development planning; management of research and development projects; management of technological innovation.

Polish Academy of Sciences, Institute of Philosophy and Sociology, Group for Social Prognoses

Nowy Swiat 72
00-330 Warsaw
Poland

Objectives and interests:

Problems of cultural change; changes in lifestyle.

Predicasts, Inc.

200 University Circle Research Center
11001 Cedar Avenue
Cleveland, Ohio 44106
U.S.A.

Objectives and and interests:

A major contributor to the development of information technology, Predicasts is devoted to helping clients access business and economic information. Services are directed toward providing librarians with comprehensive indexes to business information and bibliographies of pertinent material; satisfying the analysts' need for reliable reports on the status of technology, the marketing climate, and the economy; giving the planner rapid access to rational forecasts -- both general and specific; and bringing to executives the sophisticated studies needed to evaluate alternate strategies and determine policy.

Prognos AG, European Center for Applied Economic Research

Viaduktstrasse 65
Basle CH-4011
Switzerland

Objectives and interests:

Industrial market research and marketing; management consulting for industry (particularly industrial structure and growth), trade, services, and public administration; urban and regional planning; economic and public policy consulting; general economic research.

Programmes Analysis Unit

Chilton, Didcot
Oxon OXLL ORF
United Kingdom

Objectives and interests:

Application of futures studies to public sector decision-making, particularly in relation to technology.

The Rand Corporation

1700 Main Street
Santa Monica, California 90406
U.S.A.

Objectives and interests:

To perform research and analysis on problems in national security and public welfare of the United States.

Resources for the Future, Inc.

1755 Massachusetts Avenue, N.W.
Washington, D.C. 20036
U.S.A.

Objectives and interests:

To advance the development, conservation, and use of natural resources and the improvement of the quality of the environment through research and education, with energy as a special concern.

Schweizerische Vereinigung Fur Zukunftsforschung

Weinbergstrasse 17
CH-8623 Wetzikon
Switzerland

Objectives and interests:

Coordination of future research in Switzerland; understanding of future problems; development of new methods of research; bulletin on future research subjects; cooperation with other international organizations.

Sekretariatet for Framtidsstudier

P.O. Box S-103 10
Stockholm, Sweden

Objectives and interests:

Background material for decision-making in a long-term perspective; promotion of public debate on future-oriented questions.

Selskapet for Fremtidsstudier (SEFREM)

P.O. Box 8401
Hammersborg, Oslo
Norway

Objectives and interests:

To serve as a forum for futures studies; to provide an information service and library on the future.

Social en Cultureel Planbureau

J.C. van Markenlaan 3
Rijswijk
The Netherlands

Objectives and interests:

National planning in the field of social and cultural policy.

St. Gallen Zentrum fur Zukunftsforschung

Guisanstrasse 92
CH 9010 St. Gallen
Switzerland

Objectives and interests:

Long-term economic development of Switzerland

Stanford Research Institute

333 Ravenswood Avenue
Menlo Park
California 94025
U.S.A.

Objectives and interests:

An ongoing, international, multiclient, research program, studying the business world and reporting on any change -- economic, social, technological, or political -- that will have major implications for corporate management.

Stichting Toekomstbeeld der Techniek

Prinsessegracht 23
The Hague
The Netherlands

Objectives and interests:

The aims of the Foundation are twofold; to study, from the viewpoint of the engineering sciences, possible future technological developments and explore their interaction with other social trends; and to give wide publicity to the construction of a more integrated picture of the future pattern of life in the Netherlands.

Science Policy Research Unit, University of Sussex

Mantell Building, Falmer
Brighton, Sussex BN1 9RF
United Kingdom

Objectives and interests:

To contribute to the advancement of knowledge of the complex social process of research, invention, development, innovation, and diffusion of innovations, and thereby to a deeper understanding of policy for science and technology. To study the research-innovation complex of events in industry and in government, as well as in universities, and in the context of the environment in developing countries, as well as in industrialized societies. The range of interests inherently has an important forecasting component, since any innovative activity requires imaginative guesswork about the future.

Taloudellinen Suunnittelukeskus

Erottaja 15-17
00130 Helsinki 13
Finland

Objectives and interests:

Long-term macro-economic forecasting and planning; structural problems of the economy.

United States Congress, Office of Technology Assessment

Washington, D.C. 20510
U.S.A.

Objectives and interests:

Public policy research to provide early indications of the probable beneficial and adverse impacts of the applications of technology, and to develop other coordinate information which may assist the Congress.

USSR Academy of Sciences, Section on Social Forecasting

Institute of Social Research
Novo-Cheremushki, 46
Moscow 117418
U.S.S.R.

Objectives and interests:

Social forecasting methodology; forecasting of social needs and societal way of life.

Wharton Econometric Forecasting Associates, Inc.

One University City
4025 Chestnut Street
Philadelphia, Pennsylvania 19104
U.S.A.

Objectives and interests:

Econometric modelling of domestic and international economies and use of model to investigate issues of public policy and finance.

Wickert Institute of Tubingen for Market, Opinion, and Economics Futures Research

Wilhelmstrasse 102
7400 Tubingen
Federal Republic of Germany
and
Kirchplatz 5
7919 Illereichen
Federal Republic of Germany

Objectives and interests:

Futures research in economics, in connection with market and opinion research.

Worldwatch Institute

1776 Massachusetts Avenue, N.W.
Washington, D.C. 20036
U.S.A.

Objectives and interests:

To identify emerging global issues and encourage a reflective approach to global problem-solving; to bring these issues to the attention of decision-makers and the general public through the media and through Worldwatch publications.

Zentrum Berlin fur Zukunftsforschung

Giesebrechtstrasse 15
1000 Berling 12
Federal Republic of Germany

Objectives and interests:

Content analysis; studies on methodology, future-diagnosis and therapy; education of future-oriented generalists.

APPENDIX iii

BUSINESS CORPORATIONS WITH FUTURES RESEARCH ACTIVITIES

The Alberta Gas Trunk Line Company Limited

205-5th Ave. S.W.
P.O. Box 2535
Calgary, Alberta
T2P 2N6

A.E. Ames & Co. Limited

320 Bay Street
Toronto, Ontario
M5H 2P6

The Bank of Montreal

129 St. James Street
Montreal, Quebec
H2Y 1L6

The Bank of Nova Scotia

44 King Street West
Toronto, Ontario
M5H 1E2

Banque Canadienne Nationale

500 Place d'Armes
Montreal, Quebec
H2Y 2W3

Bell Canada

1050 Beaver Hall Hill
Montreal, Quebec
H3C 3G4

B.C. Hydro & Power Authority

970 Burrard Street
Vancouver, B.C.
V6Z 1Y3

B.C. Telephone

768 Seymour St.
Vancouver, B.C.

Burns Fry Ltd.

P.O. Box 39
Toronto Dominion Center
Toronto, Ontario
M5K 1C8

Canada Cement Lafarge Ltd.

606 Cathcart Street
P.O. Box 490, Station B
Montreal, Quebec
H3B 3K3

Canada Permanent Trust Co.

320 Bay Street
Toronto, Ontario
M3H 2P6

Canada Wire & Cable Co. Ltd.

147 Laird Drive
Toronto, Ontario
M4G 3W1

Canadian General Electric Co. Ltd.

Commerce Court North
P.O. Box 417
Toronto, Ontario
M5L 1J2

Canadian Imperial Bank of Commerce

Commerce Court
Toronto, Ontario
M5L 1A2

Canadian Industries Ltd.

630 Dorchester Blvd. W.,
P.O. Box 10,
Montreal, Quebec
H3C 2R3

Canadian National

935 Lagauchetiere West
P.O. Box 8100
Montreal, Quebec
H3C 3N4

Canadian Pacific Ltd.

208 Windsor Station
Montreal, Quebec
H3C 3E4

Canadian Tire Corporation, Limited

P.O. Box 770, Station K
Toronto, Ontario
M4P 2V8

Consumers Glass Company, Limited

701 Evans Ave.,
Suite 510
Etobicoke, Ontario
M9C 1A3

Crown Zellerbach Canada Ltd.

815 West Hastings Street
P.O. Box 2079
Vancouver, B.C.
U6B 3T1

F.H. Deacon, Hodgson Inc.

2 Place Ville Marie
Montreal, Quebec
H3B 2C9

M.M. Dillon Limited

485 Richmond Street
P.O. Box 426
London, Ontario
N6W 4W7

Dominion Securities Corporation

Commerce Court S.
Floors 2-4
P.O. Box 21
Toronto, Ontario
M5L 1A7

Dupont of Canada Limited

555 Dorchester Blvd. West
P.O. Box 660
Montreal, Quebec
H3C 2V1

The Eaton Company Limited

1 Dundas Street West
Toronto, Ontario
M5B 1C8

Ford Motor Co. of Canada Ltd.

The Canadian Road
Oakville, Ontario
L5J 5E4

Great-West Life Assurance Co.

60 Osborne Street N.,
P.O. Box 6000
Winnipeg, Manitoba
R3C 3A5

Greenshields Incorporated

4 Place Ville Marie
Montreal, Quebec
H3B 2E8

Hudson's Bay Company

77 Main Street
Winnipeg, Manitoba
R3C 2R1

Hydro-Quebec

75 Dorchester Blvd. West
Montreal, Quebec
H2Z 1A3

Imperial Oil Limited

111 St. Clair Avenue, West
Toronto, Ontario
M3W 1K3

INCO Limited

Copper Cliff
Ontario
POM 1NO

Insurance Corporation of British Columbia

1055 W. Georgia Street
Vancouver, British Columbia
V6E 3R4

MacMillan Bloedel Limited

1075 West Georgia Street
Vancouver, British Columbia
V6E 3R9

The Molson Companies Limited

P.O. Box 6015
Toronto A.M.F.
Ontario
L5P 1B8

Noranda Mines Limited

Commerce Court West
P.O. Box 45
Toronto, Ontario
M5L 1B6

Ontario Hydro

700 University Avenue
Toronto, Ontario
M5G 1X6

Pitfield, MacKay, Ross & Company, Limited.

Suite 3400
Toronto-Dominion Centre
P.O. Box 185
Toronto, Ontario
M5K 1H9

Polar Gas

P.O. Box 90
Commerce Court West
Toronto, Ontario
M5L 1H3

Richardson Securities Canada

29th Floor, One Lombard Place
Winnipeg, Manitoba
R3B OX2

The Royal Bank of Canada

1 Place Ville Marie
P.O. Box 6001
Montreal, Quebec
H3C 3A9

Shell Canada Limited

P.O. Box 400, Terminal A
Toronto, Ontario
M5W 1E1

The Steel Company of Canada, Limited

Toronto-Dominion Centre
P.O. Box 205
Toronto, Ontario
M5K 1J4

Swifts Canadian

2 Eva Road
Etobicoke, Ontario
M9C 4V5

The Toronto-Dominion Bank

Toronto-Dominion Centre
P.O. Box 1
Toronto, Ontario
M5K 1A2

Wood Gundy Limited

Royal Trust Tower
P.O. Box 274
Toron to-Dominion Centre
Toronto, Ontario
M5K 1M7

Woods Gordon & Company

Toronto-Dominion Centre
P.O. Box 253
Toronto, Ontario
M5K 1J7

APPENDIX iv

OTHER INSTITUTIONS WITH FUTURES RESEARCH ACTIVITIES

Bras d'Or Institute

P.O. Box 760
Sydney, Nova Scotia
B1P 6J1

Canada West Foundation

P.O. Box 1030
810A - 1st Street, S.W.
Calgary, Alberta
T2P 1T9

Canadian Construction Association

Construction House
85 Albert Street
Ottawa, Ontario

Canadian Energy Research Institute

University of Calgary
Calgary, Alberta

Canadian Institute of Steel Construction

201 Consumers Road
Suite 300
Willowdale, Ontario

Canadian Manufacturers Association

1 Yonge Street
Toronto, Ontario

Canadian Peace Research Institute

119 Thomas St.
Oakville, Ontario

Construction Forecasts Company

180 Dundas Street West
Toronto, Ontario

Data Resources of Canada

80 Bloor Street West
Toronto, Ontario

Fraser Institute

626 Bate Street
Vancouver, B.C.
V6E 3M1

C.D. Howe Research Institute

Room 2064
1155 Metcalfe Street
Montreal, Quebec
H3B 2X7

Institute for Policy Analysis

University of Toronto
150 St. George Street
Toronto, Ontario

Muskoka Institute of the Future

P.O. Box 960
Bracebridge
Muskoka, Ontario
POB 1CO

Niagara Institute

P.O. Box 1041
Niagara on the Lake
Ontario
LOS 1JO

Office de la Construction

3530 Jean Talon Street West
Montreal, Quebec

Royal Commission on Electric Power Planning

14 Carleton Street
Toronto, Ontario

Strategic Planning Institute

1027 Yonge Street
Toronto, Ontario

Trans-Canada Social Policy Research Ltd.

Suite 730
1253 McGill College Place
Montreal, Quebec
H3B 1C5

Vanier Institute of the Family

151 Slater Street
Ottawa, Ontario

APPENDIX V

SECRETARIAT FOR FUTURES STUDIES: FUTURES WORKSHOPS

Futures Methodology I

R.B. Hoffman, Statistics Canada: Long-Term Simulation Model*

Dr. P.J. Arnopoulos, Concordia University, "A model for social forecasting"*

W.H.C. Simmonds, National Research Council, "Current shifts in futures research"*

Warren Johnson, Industry, Trade & Commerce, The Explor Model*

Dr. Andrew Michrowski, Secretary of State, "The dynamics of social forecasting"*

Futures Methodology II

Fred G. Thompson, Canada Post Office, "Delphi and other methods applied to corporate planning"*

Bobbi Cain and Brian Eyford, Economic Council of Canada, extension of CANDIDE econometric model to a 25-year term*

Futures Stability of the International System

Dr. George Lindsey, National Defence, "The size of nations and the implications for stability"

Capt. (N)(Ret.) B. Thillaye, National Defence, "The military element and the future stability of the world system"

Dr. Philip Uren, Carleton University, "Future Europen stability -- the state of Eastern Europe"

Erik Wang, External Affairs, "Terrorism and its implications for future stability"

The New International Economic Order

Dr. A.R. Demirdache, Ministry of State for Science & Technology, chairman of the Interdepartmental Committee on Futures Research, "Introductory remarks"

Chris Davis, External Affairs, "The New International Economic Order"

Dr. Rick Bower, Treasury Board Secretariat, "The OECD INTERFUTURES project"

* Paper available upon request.

Dr. André Barsony, Economic Council, "Future relations with the developing countries"

D. Donida, Canadian International Development Agency, "CIDA's strategy and the New International Economic Order"

Energy futures for Canada

Fred Belaire, Energy, Mines & Resources, overview of the Canadian energy situation.

Dr. Ara Mooradian, Atomic Energy of Canada Ltd., "The future of nuclear energy"

Ross Richards, National Energy Board, and R.W. Blackburn, Atomic Energy Control Board, "Energy supply and control"

Second phase of the Long-term Simulation Model

R.B. Hoffman, Director, Structural Analysis Division, Statistics Canada

K. Hamilton, Structural Analysis Division, Statistics Canada.

Long-range energy projections

Jo-Anne Raynes, Shell Canada, Social forecasting at Shell Canada

Adrian Loader, Shell International, London, Long-term scenario writing at Shell International.

APPENDIX vi

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