

AN ADDRESS
TO THE NATURE, SCIENCE AND MAN
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by

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(Note: This address was read on behalf of Mr. Kerr by D.P. Caplice, Director, Environmental Approvals Branch, Ontario Ministry of the Environment)

It is a pleasure to be invited to give a talk in the Nature, Science and Man Series here at Queen's. Tonight I will attempt to give you some insight into the functions and activities of the Ontario Ministry of the Environment, and then to tell you something about our present and future objectives.

In brief, our Ministry is a service organization, as well as an environmental protection and control agency. The responsibility for providing service to the public and for carrying out the operations of the Ministry rests with our six regional offices, with a further delegation to the 23 district offices where the work is actually carried out. The main office role is that of policy development, program planning, coordination, research and administration.

Therefore, as such, we find our effectiveness in the field depends largely on two-way communication and co-operation with municipalities, with industries and with private citizens throughout the province. Our success and effectiveness especially depends upon the co-operation of individuals, private individuals, private residents such as you -- as students from all disciplines in the university -- for we all have a stake in the environment and your concern represents the future.

When Professor Clark invited me to speak with you, I was impressed by the long list of eminent speakers who have preceded me at this seminar since it began in 1971. I am similarly impressed, and highly pleased too by the fact that, while this lecture series has covered a very broad range of important topics and problems which face our society today, this seminar has placed a strong emphasis on environmental and ecological issues with particular stress on how future problems may be avoided. This alone is reflective of the intellectual progress which we have made in the past few years. We have finally learned and accepted that man cannot contaminate his natural environment without producing dire consequences in the delicate web of inter-related factors which sustain life on this earth.

As you well may know, a public consciousness toward the natural environment, and an awareness of the need for conservation, developed among European peoples much earlier than here in North America. This was undoubtedly because of much denser settlement, the smaller land areas and the adjoining boundaries of the many countries of Europe and, of course, because of the need for Europeans to rebuild their communities following the aftermath of two destructive world wars.

In North America we had such vast virgin lands and waterways to settle and to exploit in our march West that it hardly occurred to us that we could pollute or contaminate such seemingly limitless spaces.

During the post-war expansion boom when we North Americans were busy turning war industries into consumer manufacturing and developing new products and enterprises, we took for granted that our countless resources of land, forest and water would simply renew and replenish themselves. What a rude awakening we've had!

In terms of time, the truth about our careless contamination of our environment -- aside from the cosmetically visible pollution from industrial smokestacks, raw sewage and industrial effluents and garbage dumps, which we thought the elements would simply sweep away or swallow up -- and facts about the ecological implications of such contamination, has dawned upon complacent North Americans only recently.

The individual most responsible for bringing a crunching end to this naive attitude was the late Rachel Carson. Her sharp indictment of the irreparable damage we were inflicting on our own environment was dramatically revealed and pinpointed with the startling research revealed in her famous book, "The Silent Spring" which was published in 1962. Miss Carson jolted the public on this continent and the world at large.

Prior to the publication of Miss Carson's book, public awareness of the nature of the threat of chemicals on our entire ecology was limited. Newly created "wonder" chemicals were being used freely in pesticides and in all sorts of new products and processing methods used in industry with little or no advance investigation of their effect on soil, water, wildlife and on man himself.

Suddenly Miss Carson was to point out to the lay reader and the complacent citizen-at-large the interaction of these many new chemical substances on nature and the drastic effect chemicals have had in inflicting irreparable damage on all life forms.

She warned us in "The Silent Spring": "Only within the moment of time represented by the present century has one species -- man -- acquired significant power to alter the nature of his world." With undeniable evidence based on her painstaking research she convinced us... that the most alarming of all man's assaults upon the environment was the contamination of air, earth, rivers and the sea with dangerous and even lethal materials... chemicals to which life was asked to make its adjustment... synthetic materials brewed in man's laboratories which had no counterparts in nature.

"To adjust to these new chemicals would require time on a scale not in years but in millenia," Miss Carson concluded.

The picture she painted, along with the findings of her carefully indexed research, was enough to keep the public awake at night -- and fortunately, it did just that!

Her message and findings were sufficiently startling to capture headline attention in America and abroad. Her book sold millions of copies and an alarmed public demanded full disclosure of the facts as well as immediate controls and legislation from their governments to curb the abuses of the industries which she indicted as the major polluters of the earth.

Today, almost 15 years after publication of "The Silent Spring", much credit must go to Rachel Carso for awakening the public to the fact that man's future depends on a partnership with nature. What followed, as we all know, is that during the past dozen years or so an avalanche of legislation to protect the

natural environment has come into effect throughout the United States, Canada and abroad.

I am going to sketch briefly the progress we have made here in Ontario since Miss Carson shattered our complacency and kindled our awareness.

I do not believe it is self-serving, nor am I trying to embellish the record of our government, when I say that Ontario is acknowledged universally as having as fine a water and sewage management program that might be found anywhere in the world. Authorities from around the world come to study our program every year.

As far back as 1956 -- fully six years before Miss Carson's book was published -- The Ontario Government anticipated the strain which our growing population and booming economy would put on our water resources, and created the Ontario Water Resources Commission, now the basis of the Water Resources Branch of our Ministry, in order to guarantee a good supply of drinkable water and to keep our rivers and lakes free of pollution. Your government has spent more than \$2.5 billion on water and sewage treatment during the past 20 years.

The establishment of the Ontario Water Resources Commission was the beginning of formal, organized environmental protection -- and action -- in Ontario. I now intend to explain how we expanded our water management program; how it led to other pollution abatement programs, and how we got to where we are today.

We now have a subsidy program, initiated in 1969, which has provided \$150 million for municipal water and sewage works, and these subsidies are still being approved at the rate of five a month. In addition to this program of financial assistance, our Ministry has constructed and now either operates or supervises more than 400 water and sewage facilities serving over 200 municipalities throughout the province.

I believe that you are aware of the international effort to clean up pollution of the Great Lakes, which began in 1971, and still continues through the Canada-U.S. agreement. Ontario led the way in this pollution control program, sharing with Ottawa the \$250 million costs of new trunk and sewage treatment facilities on the Great Lakes, with provincial monies administered by our Ministry.

To date, most of our work has entailed arresting the deterioration of Lake Erie, Lake St. Clair and the connecting channels, and through secondary sewage treatment construction, cleaning up pollution in the Lower Lakes. We're now about to sign an extended agreement with Ottawa, with greater emphasis placed on surveillance for toxic chemicals, controls on offending polluters and on research into new treatment methods.

I am pleased to report that our province has met its deadline of this past December in the Canada-Ontario agreement for clean-up of the Lower Great Lakes, with permanent phosphorus removal facilities now in operation, or practically completed, at 200 sewage treatment plants with the result that the Lower Lakes are virtually free of phosphorus contamination.

I'm proud also to say that as first Minister of the Environment -- though we were then known by another name -- I convened an initial meeting in Toronto in 1970 with the governors and representatives of seven of our neighboring

U.S. states, the Province of Quebec, and our own federal representatives, to discuss how we might best tackle this most urgent and mammoth pollution problem -- one that was threatening to destroy the greatest system of lakes in the world. That initial meeting was the forerunner leading to formation of the Great Lakes Water Quality Board of the International Joint Commission.

Perhaps few of us stop to realize how very blessed, and yet dependant, Ontario is to have its shores extend from the Lake of the Woods through the entire Great Lakes system and nearly 150 miles on down the St. Lawrence River, an enormous internal waterway which is unique in the world. Yet this great waterway is now reflecting the build-up from the abuse of widespread contamination which the lakes have suffered on both sides of the border for the past 200 years. Eight U.S. states to the south of us also border on these great waterways with much greater density of major industry and population, therefore making the lakes vulnerable to pollution from vast industrial and urban complexes.

With this in mind, Madame Jeanne Sauve, at the time, Environment Canada's Minister, addressed the Annual Conference of the Water Pollution Control Federation in Miami, Florida last October. She expressed concern for the delay in construction of U.S. projects which could affect the Canadian environment and urged the United States to give priority to its clean-up program in the Great Lakes.

She said that "Canadians are naturally disappointed that slippage occurred in the original schedule, and there are several Canadian communities which are wondering why they are spending their money on sewage treatment plants when completion of plants across the boundary is significantly behind schedule."

Madame Sauve reminded our neighbors that: "The simple fact is that if it were not for the assimilative capacity of the Canadian portion of the Lakes, as well as the earlier start on sewage treatment in Canada, and of course the much smaller size of Canadian population in the basin, the waters of the American portion would have long since reached a state which would have been completely unacceptable." She said: "We simply ask that the partnership sanctified by treaty be fair to both parties in achieving the goal of restoring the viability of one of the greatest lake systems in the world."

The necessity to continue our work to restore and maintain the water quality of the Great Lakes is underlined by the fact that, though we've managed to clean up the phosphorus problem on our portion of the lakes, we are now finding new harmful chemicals surfacing.

Consider, for example, PCB's -- or, as they are scientifically called, polychlorinated biphenyls. These are man-made compounds first developed in the 1920's and used in the manufacture of paints, printing inks, paper coatings and plastics, and also as insulating fluids in electrical transformers. Their main benefit to industry is that they are very stable and are resistant to chemical and heat breakdown -- the very factor which makes them harmful to the environment.

Evidence has recently surfaced which shows these PCB compounds are hazardous to certain species of wildlife -- such as fish and herring gulls -- which have real implications of adverse health effects on man. Although their use has been controlled since 1970 and the sales of the compound limited since 1972,

PCB's have recently been discovered in the water of the Great Lakes. Only in the past month it was discovered that PCB's are interfering with the spawning and reproduction of striped bass in the St. John River in New Brunswick, in an area where little industry exists. In PCB's we have an environmental problem of international magnitude, since PCB's flow by sea and air without regard for international boundaries separated by oceans.

In fact, PCB's are a lot like DDT -- both being members of the chlorinated hydrocarbon family of chemicals, and both being extremely persistent or degradable. As you know, the use of DDT is now banned, and Ontario was the first province in Canada to ban its use in 1970.

At the present time, we are working as closely as possible with Ottawa agencies at both technical and ministerial levels on all matters associated with PCB's. The Department of National Health and Welfare announced last November a temporary guideline of two parts per million for PCB's in fish, a guideline which we in Ontario are enforcing.

My Ministry has already taken measures to control and eventually eliminate this hazardous contaminant from industrial use. I have served notice to all industries operating in Ontario that they should begin a search for alternate harmless materials to replace PCB's. And it is only a question of brief time until both Canada and the U.S.A. ban the chemical entirely, in Canada under the new Environmental Contaminants Act which was proclaimed recently by the Governor-General.

Another similar problem is mercury. We first became aware of the hazard and extent of mercury contamination in the province in the late 1960's and we immediately initiated an all-out program to determine the public health hazard and to provide effective control of mercury in our air and water. The English/Wabigoon and St. Clair River systems were closed to commercial fishing and, through control orders issued by our ministry in 1972, the flow of mercury in industrial effluents was restricted. At the end of 1975, the discharge of mercury into Ontario lakes and rivers from known industrial sources and processes such as chloralkalai, had been stopped. But mercury residues tend to stay in the sediments at the bottom of rivers and lakes and it may take decades for the waters to purify naturally. However, six years of careful monitoring by our ministry shows a steady and significant improvement in mercury levels in Lake St. Clair fish, after our control programs have virtually eliminated industrial discharges of this contaminating metal to the water system.

Today, the Province of Ontario -- and our Ministry in particular -- is as well-equipped as any jurisdiction to ferret out new polluters. We are monitoring, sampling, testing and forecasting, to make sure that these insidious "wonder" chemicals that we now know to be hazardous are controlled, curtailed and eventually eliminated.

In this regard, Ontario welcomes the recent proclamation of the new federal Environmental Contaminants Act, which we believe provides a major advance toward the elimination of the use of hazardous chemicals and substances. I hope this new legislation brings the day nearer when all products of a chemical nature imported into this country or developed here will be assessed as to their potential environmental danger before these substances are permitted to go on-stream in the industrial process.

My Ministry's recreational lakes program and our responsibility for control over all private sewage systems in the province, such as septic tanks, are also important activities of our water management program.

There are more than 250,000 private cottages in Ontario and the lakes program, which we undertook four years ago, was designed to ensure that all private sewage treatment systems meet the standards set by our Ministry. Since this program has been in operation, we have examined thousands of private sewage systems and ordered improvements wherever required.

We also have introduced a self-help program for cottagers on 150 recreational lakes to sample the presence of algae in their lakes. In this way changes in water quality can be spotted in time to take remedial action before deterioration of water quality takes place.

On April 1, 1974 our Ministry assumed responsibility for control over all private sewage systems in the province. We've signed agreements with local boards of health or their regional governments across the province to carry out inspections of all septic tank installations and private sewage handling systems. All proposed installations now require prior Ministry approval through the local Board of Health.

I intend now to briefly touch upon a few other aspects of our Ministry's responsibilities, then to tell you about some of our exciting projects for the future -- projects in which we're actually world innovators.

All agencies and activities of the Ontario Government concerned with protecting our natural environment were drawn into the new Ministry of the Environment in April, 1972. Our keystone and our legislative clout is Ontario's Environmental Protection Act of 1971 which I had a personal hand in helping to frame and to guiding through the Ontario Legislature. It is the most comprehensive legislation of its kind in North America -- and it is "open-ended" in the sense that it gives us the authority to take on any challenges to the Ontario environment, including hazards of which we may not be aware at this time.

The Environmental Protection Act provides for a co-ordinated attack on all forms of pollution, including air, water, soil, pesticides, radiation, noise and litter -- such as domestic garbage, industrial wastes, derelict vehicles and non-returnable bottles and cans.

The Act also enables private citizens to initiate legal action against polluters -- and therefore has been called "An Environmental Bill of Rights for the People of Ontario".

The Province established a system of air pollution control in 1967. The overall quality of air over Ontario's major industrial cities has improved appreciably since we established the Air Pollution Index in 1970, which calls for enforced cut-backs of emissions by industries and other offenders when the index and weather conditions warrant such. We operate over 900 air quality monitoring instruments across the province which measure 30 common known contaminants. Monitoring stations have been established in such centres as Metro Toronto, Hamilton, Windsor, Sarnia, Welland, London, Sudbury, Ottawa and Cornwall and, if required, we will extend these to other cities.

An amendment to the Environmental Act in February, 1975 now permits local municipalities to enact by-laws to control noise pollution within their

communities. We consider unwarranted noise as the newest pollutant in urban society.

Also, a year ago, we commenced to clean up the Ontario landscape of abandoned derelict motor vehicles. We've committed \$800 thousand toward this recovery program which involves 16 municipalities in the less densely populated areas of the province. Through this program, we initially subsidize the municipality with the objective of establishing long-term, financially self-sustaining programs for future collection of "clunkers" -- or non-roadworthy cars.

Just as much of a blemish on our landscapes are the non-returnable bottles and beverage cans used in the soft-drink and alcoholic beverage industries. Non-returnable containers have become a major headache and a source of tremendous cost to municipal waste disposal operations. Consequently, as of this past January 1st, our Ministry has banned the use of the flip-top aluminum tab and the use of non-returnable containers larger than 1.5 liters. In terms of an effective, long-term solution, we have given the carbonated soft drink industry until this coming March to increase the use and promotion of returnable containers substantially. We've issued this final warning after repeated pleas to the carbonated soft drink industry to come up with its own solution to remedy this situation within its own industry.

The Waste Management Advisory Board, set up as an independent tribunal under our Ministry, by Bill Newman, my predecessor, has been monitoring the progress of the soft drink industry. This board has also been asked to study the use of non-returnable wine and liquor bottles in the province, and to report to us on how we might also reduce this bottle menace constituting another costly strain on garbage collection and disposal.

The programs I've discussed so far were all set up to deal with what might be termed "after-the-fact" solutions to immediate problems. Now I would like to discuss some of our plans for the future -- the Preventive Projects, which will eventually save many millions of dollars, and repay the investment by all sectors -- government, industry and the individual resident -- many times over.

In fact, if it were not for the monies already spent on research, on water samplings, capital construction projects and all that we've undertaken to date in helping to maintain and restore the condition of our air, soil and water, we would not have discovered the so-called "phantom chemicals", such as mercury, PCB's, asbestos and other problem substances with which we are dealing today. In other words, our investment in research has helped us to police ourselves.

Even though economic issues seem to dominate the headlines and public concern today, the priority of environmental protection to preserve our life-sustaining ecology has not changed.

After hundreds of years of abuse, and particularly the abuse of the first half of this century, we are at last beginning to restore our environment to a healthy condition in which all forms of life, especially man, may thrive and survive. It is vital, therefore, that we proceed now and in the future with corrective measures, continued abatement programs and research. I suggest these three basic reasons for our unrelenting activities and concern:

- (1) First, if we delay, there will be prohibitive costs in the future.

To use one illustration, consider Toronto under the administration of former Mayor Bill Dennison. One of Mayor Dennison's major contributions to the city, though he received much ridicule at the time, was the replacement of aged and leaking sewer and storm pipe throughout Toronto. This replacement today, only a decade or so later, would cost three to four times the price, and would today cause complete upheaval of the city in the light of new construction and development that has taken place since the mid-1960's.

- (2) Secondly, leadtime is needed for research and "ironing out the kinks" in any practical future program, such as the disposal and recycling of garbage and waste, particularly at a time with growing population pressures in our cities and towns. Waste management is a subject I will expand upon in a moment.
- (3) Finally, the risk of permitting irreparable environmental damage to occur in this chemically oriented age is great. Damage is hard to reverse once it happens. Therefore we must maintain constant research, surveillance, monitoring and enforcement controls. It's an awful thought to wake up in the middle of the night having some sort of a nightmare and imagining you're reading the morning paper that says that the Rideau system or the Trent system, or the St. Clair River, or Lake Muskoka, or any of the rivers and lakes in this province is no longer fit to drink from, to swim in, to fish or sail in, or to enjoy because we have permitted environmental damage which we cannot correct.

In trying to restore our environment, we're dealing with actions which often have delayed consequences. Monetary and economic fluctuations in our system will always be cyclical -- but whatever we do with our natural environment tends to stay with us.

Maurice Strong, Canada's retiring Executive Director of the United Nations Environment Program, recently contended that the conflict between ecology and economics must be overcome if the future of mankind is to be assured. He calls the conflict between ecology and economics both artificial and self-defeating.

Mr. Strong stated that: "We must make ecology and economics the allies they can be and we should be evolving a new approach to growth. Conservation must become a way of life and incentives for it must be built into our economic system"... He said: "What an irony it would be if this most enlightened, civilized and powerful generation of human beings should, through its own greed, blindness and neglect, bring about the end of the human experiment."

Mr. Strong sees the inevitability of a complete redesigning of the present industrial system in which technologies for recycling and pollution abatement are not merely added on, but are integrated into the system. Environmentalists must take a lead in effecting a transition to a new growth society, he contends.

Now, I would say that although this so-called collision course between the environment and economics is apparently real, there is no valid reason for it. Though we have economic restraints that we must seriously consider at this time, I am happy to tell you that our budget has not suffered any constraints,

and we intend to go ahead with our major priorities as we see them. Ontario has moved further ahead with environmental controls than other provinces, and it has been important that we have done so because of our heavy urban population growth and because of the heavy industry and manufacturing nature of the province -- both creating greater pollution potential.

Finally, I turn to what I consider are Ontario's three immediate priority projects, in addition to the on-going projects I've briefly noted:

- (1) A program of solid waste management which includes the recovery of valuable resources from domestic garbage and industrial waste which may be recycled into useful materials.
- (2) Second, the extraction of energy and heat from our garbage to thereby reduce the consumption of oil, gas and electricity.
- (3) And, finally, the new legislation known as the Environmental Assessment Act, which had its third reading last July and which will receive Royal Proclamation shortly. I'll explain that new legislation in a moment.

The reclamation of non-renewable resources from solid waste and the conversion of garbage to energy are two phases of what is essentially one plan -- our waste management program.

I needn't provide you with vivid detail on the problems to our society created by our penchant to create solid waste. The residents of Ontario -- and we are all party to this habit -- currently produce eight million tons of garbage each year. This volume results from our affluent consumer-oriented, "throw-away" life style. And it is steadily increasing as our population grows and as we all buy more, use more and discard more.

What we discard are packages of all sorts, goods which were built-in obsolete the very day they were new. We just pitch used cars, clothes, paper, metals, into the garbage cans of Ontario and don't think about it any more unless the garbage collection system breaks down.

Collectively it's a tremendous waste -- of resources and energy used to make the goods, and of dollars and time which we can ill afford. There is an additional and very real problem in the handling of it all. What do we do with it once we've collected it? Traditionally we have buried it in landfill sites and forgotten it. But the stark realities are that we can no longer just pitch and forget.

We are beginning to run out of many of the non-renewable resources contained in our garbage; we are in need of the energy required to make the goods we use and discard; and we are running out of landfill.

Ontario's Waste Management Program is designed to provide solutions to these problems as it proceeds over a 15-year period at an estimated investment by the provincial government of \$500 million dollars.

The major benefits of the program will be these:

- * Inestimable tons of resource materials will be reclaimed, produced as new products and recycled through the economy.
- * Needed energy will be generated from the conversion of solid waste into fuel to run plants, generating stations and heating systems.
- * Landfill sites will be reduced by approximately 80 per cent.

These are the long-term benefits: Here is how the program will proceed.

Initially, we propose to develop six reclamation centres across Ontario and we are currently negotiating with municipalities for establishment of these "front-end" plants in London, Sudbury, three in Metro Toronto and one in Southeastern Ontario.

We're researching the necessary treatment and reclamation methods, and working with private industry to develop markets for reclaimed materials.

Right now, in partnership with Metropolitan Toronto, we're constructing an experimental resource recovery plant, the first of its kind anywhere, in North York. Your government is investing more than \$10 million on this important project, which is expected to be completed later this year. An operational model of this resource recovery plant may be seen at the Ontario Science Centre.

Also, in co-operation with the Ministry of Energy, we're conducting an energy analysis of using garbage to fuel electrical plants, in place of coal.

We call this our "Watts from Waste" project, and the Ministry has signed an agreement with Ontario Hydro and Metro Toronto to construct this facility at the Lakeview Generating Station in Mississauga. We initially intend to turn one thousand tons per day of municipal waste into electrical power by using garbage to fuel the plant. The Province is providing \$5 million in financial assistance to establish this new facility, and we're sure that this dual waste disposal and recovery project is going to save millions of dollars in the future.

You may have read in the Globe and Mail last Saturday about a feasibility study about to be launched into a new steam plant to serve the Ontario Paper Company in Thorold, which would be based on burning garbage collected in the Niagara Peninsula. The proposed steam plant would be a pioneering step in the pulp and paper industry, which is a huge consumer of electricity and other fuels. The Ontario Paper Company has estimated that the new energy process could cut its anticipated fuel bill of \$15 million in 1978 by one-half -- or down to \$7.5 million.

I think that one statistic quoted by the President of the Ontario Paper Company is most interesting. He stated that a ton of garbage yields three to four times as much recoverable energy as a ton of raw material from the Athabasca oil sands.

However, despite all of this progress in waste disposal methods that we look for in the future, the handling and disposal of garbage remains a costly and time-consuming task and a growing burden on the municipalities and the province. The province and municipalities cannot be expected to act alone in coping with the growing accumulation of garbage. Everyone has a stake in resolving the problem since we all produce waste.

If we are appreciable to reduce this unwarranted daily pile-up of domestic garbage, then all of us -- householders, manufacturers, those in the packaging business and in the retail trade -- must start to be concerned about garbage from its very first stage, the generation stage. We simply must find much more practical and economical methods and ways to package and wrap the goods that we consume daily. While manufacturers and retailers have the major role to play in reducing this load of waste, the householder also has an important role to play as the end consumer. The individual can help greatly by insisting

on buying, and advocating the use of, returnable containers and less bulky and more economical packaging.

Certainly those of you who have visited an English or European store or supermarket have observed that the housewife arrives with her wicker shopping basket over one arm, otherwise, she would have to attempt to manipulate a dozen loose items in her arms on her way home. Paper and packaging costs are much higher abroad, consequently unnecessary paper and packaging is kept to a minimum.

Perhaps we would all become more mindful about garbage if there were to be a sudden reduction in municipal garbage pick-up services -- say, one pick-up a week instead of two as they have in several boroughs of Metropolitan Toronto. Such a practice would likely make the householder package his garbage more compactly, and to reduce the amount of it, because of the apparent pile-up in his lane or driveway. One would soon learn to compress tin cans, revert to the use of re-useable cloths in the kitchen instead of paper towels, and develop many other habits that would reduce litter.

As someone has said: "A society founded on trash and waste, is a society built on sand."

There is no doubt that the build-up of pollution of all kinds has coincided with the steady growth of our cities. Though it has not been measured fully, it is now suspected that when the size of an urban centre surpasses a certain limit, the social costs of additional population growth exceeds any marginal economic benefits. Many factors enter into consideration of optimum city size. They include the ability of the finance base to provide and finance local services; the increase of urban congestion, lost labour time and high rents; and the extent of environmental deterioration from additional population. Certainly in the immediate future, governments will have to develop more strategy on population growth and somehow incorporate it into their regional development planning.

The Ontario Government has already begun to encourage more rational and balanced growth in Ontario through its Regional Development Program, its transportation planning and its acquisition of lands for new cities, industrial parks and water services in undeveloped areas of the province.

Finally, I shall conclude with a few words about the new legislation mentioned earlier -- Ontario's Environmental Assessment Act, now awaiting Royal Proclamation.

This legislation should enable us to detect a potential environmental crisis before it happens. Through the Environmental Assessment Act the proponents of all major undertakings must draw up and submit to the Environmental Assessment Board for approval an environmental assessment of the project. The public will be notified of the proposal, permitted to inspect the documents and invited to make their own submissions. In this way, the Ministry can carefully evaluate all the environmental and social considerations which can substantially change or even prohibit a project, before money is wasted on the project and it is difficult to stop.

We are at the present time working on the regulations which will enforce this act and hope to be able to apply it very shortly to major undertakings of the Ontario Government and its agencies -- such as Hydro and other energy

facilities, highways, and many other projects. Later, it will be applied to municipalities and to the private sector once we have gained administrative experience and have the trained staff required.

This is the first step in applying environmental considerations to our lifestyles in perpetuity. I can see in the distant future a time when these same assessments will also be applied to the development of new products and technologies -- just as Maurice Strong has advocated they should be. Had we applied the principle of impact assessment to new chemical substances and compounds before they left the laboratory, we could have saved ourselves from some very hazardous situations, which are consequently costing us many millions of dollars to clean up.

As future leaders of Canada and Ontario, I am sure that you have given serious thought to the environmental issues which so vitally affect us.

My own school generation naively took for granted our rich endowment of plentiful air, water and soil. Unlike my colleagues, you have had the advantage of being much more conscious and aware of the environmental facts of life, and of the risks involved in ignoring the laws of nature and conservation. Your generation is now much more informed of the complex ecological implications of pollution and contamination on a world-wide scale.

We know now that there must be a complete change in human values and policies and, if necessary, a shot-gun marriage between economics and the ecology, if we are to fully realize and practice the ethic that man must live in partnership with nature. For we've already had some frightening lessons from the dire consequences of either ignoring or interfering with the delicate balance of nature that sustains life on this planet.

During the past decade or so, Canadian universities have advanced the store of knowledge in both the fields of ecology and conservation. They have achieved valuable environmentally-oriented research and many have established special schools of environmental studies. Certainly our Ministry would like to encourage your work in research and the establishment of faculties which will put much greater stress on these subjects.

It is most important today that the universities have commenced to produce highly qualified environmentally-oriented people who have a valuable role to play in a large sector of industry, as well as within our own Ministry.

Hopefully, I have conveyed to you some details concerning the important work our Ministry is doing for the sake of preserving our natural environment, and of the urgent need to pursue our objectives without delay. If I haven't covered some area in which you are interested, I look forward to discussing it with you in the informal portion of this seminar.