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NOTES FOR A SPEECH BY

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TO

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## INCENTIVE FOR INNOVATION IN CANADIAN INDUSTRY

Ladies and Gentlemen, it is a great pleasure for me to be here today to speak to you about a subject with which many of you are closely involved: namely, the situation in Canada with respect to technological innovation. It is a matter which is under intensive review in virtually every country in the world and is the subject of studies by a number of international institutions including the United Nations, the International Development Bank and the Organization for Economic Co-operation and Development. These reviews are examining not only the economic effects of such innovation, but also the social and political implications.

The matters of the proper focus for research and development activities, and the problems of using the results of such activities to the benefit of the country, are of great interest to me and are the main function of the Ministry of State for Science and Technology, or MOSST, as we call it.

MOSST is not an operational Ministry in the traditional sense. That is, it does not run research laboratories, give out research grants, or administer programs of its own. MOSST's primary function is policy formulation. Our tasks are the recommending to government of broad lines of policies for the optimal use of science and technology; the development of coordination mechanisms for governmental science and technology policies and programs that are already underway; and the evaluation of the interaction of those policies which affect science and technology and those affecting the achievement of other national goals.

One of the main avenues available for a country to enjoy the benefits of advances in the scientific sphere is to apply these to the industrial process. Such an application is generally termed industrial innovation and I would like, today, to focus my attention on some of the avenues open

to the Canadian government in its efforts to improve the innovative ability of Canadian industry and the incentive for investment of time and resources in innovation. Perhaps a few preliminary comments on innovation generally and on its importance to the current Canadian objective of more and better jobs now, and in the future, might help to provide a framework for the main theme of this discussion.

When I use the expression "better jobs", I am referring to jobs that are more remunerative, because of the skill and talent required for the performance of the task or because of the increased productivity of the work performed or because of the greater personal satisfaction realized in performing these tasks.

Innovation can lead to more and better jobs in several ways. For instance, if research and development facilities are located in Canada, many highly paid and highly interesting jobs will be available to Canadian scientists, engineers and technicians, and if the use of the new process or the production of the new good or service is located in Canada, rather than elsewhere, more, and possibly better, jobs will be created for Canadians with many different skills or, at the very least, jobs will not be lost to Canadians through such use or production elsewhere.

The "Gray Report" on Foreign Direct Investment in Canada published by the government in May of last year, noted that of seven major factors, including greater realization of economies of scale, fuller utilization of productive capacity and improved educational levels of the work force, the largest single contributor to economic growth was

technological change.

The report gave an estimate of thirty per cent as the suggested share attributable to technological development in accounting for the increase in the Canadian Gross National Product; the estimate for the United States was about 40 per cent. In addition to this, the contribution made by education also involves, in part, the more effective diffusion of our knowledge of technological possibilities.

Any given innovation can have a tremendous impact on an economy and a society: the airplane, the telephone and the freezing of foods are prime examples. That impact may be full of ironies and have negative aspects -- Schumpeter has referred to technological change as "the wind of creative destruction" -- but the price of not innovating is far greater still than the price of innovating.

On the cost side and in the short run, introduction of technological innovations is a risky venture which may mean a negative income for a firm, the loss of jobs and the obligation for numbers of workers to move to another occupation or locality. On the benefit side and in the long run, business stands to increase its profits, labor to increase its real income, better its working conditions and its job satisfaction, and the economy to increase its efficiency and its comparative trade advantage.

Further, to lose the power to innovate in a rapidly changing environment is to yield control of the future to those who retain that power. To a considerable degree, this has already occurred in Canada.

Dependence on foreign technology can be measured in different ways, but various indicators reveal the same pattern. A number of studies indicate that about 95 per cent of patents issued in Canada are registered to foreign owners. What is alarming is not that some 25 thousand patents are issued to non-residents but that only about 1400 patents are issued to residents. Among industrialized countries, Canada is twentieth in patents issued per thousand population and yet we have one of the most highly educated populations in the world. An OECD study based on four performance indicators of technological innovation suggests that Canada has the worst performance record amongst the ten most advanced industrialized countries.

Canada is as prosperous and as advanced as it is today partly because we have been in the past, and are likely to remain in the future, large net importers of technology. We can import technology in a number of ways, three of which are: through finished products, through licensing arrangements or through foreign direct investment. The conditions under which these imports occur can either result in great benefits for Canadians, or damage to our economy and even to our sovereignty. The choice is entirely ours, and we do have a choice. With changes in technology and in trade patterns occurring as they are today, the closest scrutiny of our technology import mechanisms is essential.

In summary, then, our aims with respect to industrial technology are: to increase the amount of innovative activity taking place in Canada and to import technology in the ways most beneficial to the Canadian economy.

What, then, are some of the means available to the government to achieve those aims? One thing which seems clear to me is that while federal regulations or incentive programs specifically oriented towards those goals may be able to create a direct positive impact, they can be greatly enhanced, or even negated, by other factors in the economic framework. There are a wide range of government policies which exert a powerful - and, together, a decisive - influence on the performance of Canadian industry with respect to innovation.

Some examples are:

- fiscal and monetary policies;
- foreign ownership, competition and patent policies;
- standards and environmental policies;
- provincial industrial policies;
- and all the social considerations affecting such things as the motivation of labour and the effect on labour of technological change.

The Senate Special Committee on Science Policy put the problem this way:

> "It is obvious that decisions taken in most ... (federal government) sectors are inspired by national goals other than the encouragement of industrial innovations and R & D ... . Policies contradict each other and thus substantially reduce their net beneficial affects ... . A conscious and systematic attempt should be made to measure the kind of impact they are likely to have ... (on) industrial and technological strategy." (end quote)

MOSST is concerned with assessing the impact of these policies, and assist in their co-ordination and formulation.

In the broadest sence, the objective of MOSST is to assure the optimal use of science and technology in support of Canadian national objectives. Within a short time of its creation, the new Ministry brought out its first concrete proposals for the achievement of that goal.

In August of last year, my predecessor as Minister of State for Science and Technology, the Honourable Alastair Gillespie, announced the government's new "contracting-out", or "make-or-buy" policy, under which all new R & D requirements of the federal government, except those falling within certain narrow criteria, will be contracted out to industry instead of being undertaken in government laboratories.

It is a fact that Canadian industry does much too little R & D relative to its output, as well as in comparison to other industrialized nations, while government expenditures on in-house research are as high or higher than those of

these other nationas. At the same time, governmental activity in research has continued to grow, while that of secondary industry as a whole has been constant for the past two or three years. Indeed some Canadian industrial research laboratories have been closed recently. By implementing the new "Make or Buy" policy, we hope to reverse these trends.

The intention of the "Make-or-Buy" policy is to plant seeds of innovation closer to the point of potential application. The principle is that, as well as performing government funded R & D, the contractor will be in a position to identify commercially promising results arising from that R & D, and will be in a better position to exploit these results.

The basic indicator of success of the new policy will be the performance of Canadian industries in marketing new products, processes, and services over the next five or ten years.

A policy such as the make-or-buy policy is, of course, only one of a wide range of government policies affecting incentive for innovation by Canadian industry. There are two others that I would like to discuss.

First, we must make sure that our tariff and trade arrangements do not result in a restriction of our markets. We are constantly reminded that Canada is one of the very few advanced industrialized nations without free access to a market of 100 million or more consumers for its finished products. And while trade barriers do not necessarily bar the products of a highly innovative economy from penetrating foreign markets, they can represent a serious impediment.

Canada expects to enter this year into trade negotiations on a multilateral basis under the General Agreement on Tariffs and Trade, and will continue bilateral negotiations with the European Economic Community, Japan and the United States. Whether or not developments in the near future result in a lowering of barriers facing Canadian exports, the Canadian government and Canadian industry must act in full awareness of those factors which can enable us to optimize our competitive advantage.

The second government policy I want to discuss is that on foreign ownership, particularly in relation to federal R and D incentive programs. But first, let us look at the two separately.

There are a wide range of federal incentive schemes for R & D, such as those of the Department of Industry, Trade and Commerce, of the National Research Council and the Defence Research Board. To name but four, we have the Program for the Advancement of Industrial Technology (PAIT), and the Industrial Research and Development Incentives Act (IRDIA) under Industry, Trade and Commerce; the N.R.C.'s Industrial Research Assistance Program (IRAP); and the Defence Industry Research Program (DIR) under the Defence Research Board.

The fundamental objective of these incentive programs its to strengthen the industrial capability of Canadian industry and to encourage innovation in Canada. Innovation is an essential part of developing areas of industrial competence in which Canada can obtain an absolute or comparative advantage in world trade.

On the foreign ownership issue it is generally acknowledged that foreign-owned subsidiaries, if they are contributing fully to Canadian economic development, must actively engage in this process of innovation; they should also have full freedom to specialize and freedom to export from Canada.

We are all agreed that we must encourage the development in Canada of more and of stronger Canadian controlled enterprises. The present government is moving to implement measures aimed at achieving this objective. The recent speech from the throne dealt with this question and my colleague, Mr. Gillespie, has since elaborated on some of the proposed measures. One such measure involves the establishment of a mechanism to screen all foreign takeovers of Canadian owned business. Another concerns the transfer of technology from abroad and access to it by Canadian entrepreneurs.

Nevertheless, the fundamental issue with which, we both in government and industry, must be concerned now and in future, is the creation of a favourable climate for innovation in Canada through positive measures of encouragement so as to give full play to the technological and entrepreneurial talents of our people and our industry.

The inexorable advance of science is continually throwing up new opportunities for exploitation by those who can successfully master their practical application and I would suggest that technological innovation offers the most promising and practicable method for widening domestic and export markets, increasing productivity and profitability and generally realizing the full economic potential of our industry.

The creation of a climate favourable for innovation and for the development of Canadian enterprise, depends upon many factors. Some of these factors are primarily, or even entirely, within the control of government. In this category I would include laws, regulations or practises governing patents, tariffs, taxation and government purchasing policies. In my Ministry we are conscious of the importance of these factors and we are in the process of instituting a group whose prime responsibility it will be to assess and to advise on the impact that various policies may have on the climate for innovation.

However, the extent to which the climate is favourable for innovation does not depend exclusively upon the action, or inaction, of government - industry itself has a most important role to play in this regard.

The process of innovation benefits not only the producer of the new product or process but it also has a stimulating effect upon the companies with which the innovator deals; benefits are conveyed to suppliers of materials, of parts, of services and of capital goods. If the innovating firm deals with Canadian companies these extrinsic benefits will remain in Canada and serve to strengthen our industrial base and our overall ability to innovate. If on the other hand the innovating companies deal primarily with firms outside of Canada, many of these extrinsic benefits will be lost to Canada.

When a company develops a new product or process, it requires new materials, new services and new capital goods. If the product is technologically advanced, the required materials, services and capital goods are also likely to be of a technological sophisticated nature.

When the innovating company has been relying for most of its technology upon a foreign parent, with more experience than itself, it will frequently follow the path of least resistance and seek the new materials, services and capital goods that it needs from the parent or from the parent's suppliers. By this process, Canada loses many of the potential benefits of the innovation and instead finds itself importing materials, supplies and capital goods.

The same can occur in the case of a Canadian owned company that buys technology from a foreign source and proceeds to use it precisely as it was used in its country of origin.

Maximum benefits from innovation will thus accru to Canada when a firm behaves in an autonomous fashion, in full interaction with its Canadian industrial environment. By this behaviour it helps to create a favourable climate for industrial development in Canada.

This brings me to some conclusions and alternatives with respect to our R & D assistance programs. Should we not give greater incentives to those companies and to those projects that contribute most to the development of the Canadian industrial infrastructure. Using the criterion of favoring companies and projects most likely to bring optimal benefit to the Canadian industrial environment would usually mean favoring Canadian controlled firms, both large and small, for in general they behave in this fashion. This system would also favour the foreign-owned firm that was well integrated into the Canadian environment and that interacted effectively with other Canadian companies. Finally this system would provide a positive incentive for other foreign firms to adjust their practises so that they too could confer greater advantage to Canada and thus qualify for additional incentives.

So now, ladies and gentlemen, that I am drawing near the end of this discussion, I wish to thank you again for your welcome and ask you what your feelings are on this subject. For it is necessary for MOSST, in order to carry out its functions, to maintain an ongoing dialogue with industry about industrial research and development strategy and about innovation in general. Therefore, your views on incentives for innovation are both welcome and needed at my ministry.