



CANADA

# CANADIAN WEEKLY BULLETIN

INFORMATION DIVISION • DEPARTMENT OF EXTERNAL AFFAIRS • OTTAWA, CANADA

Vol. 19 No. 38

September 16, 1964

## CONTENTS

- Encouraging Canada's Industrial Growth..... 1
- Pacific Nations on the March..... 3
- Visa Agreement with Japan..... 3
- Course in Forest-Fire Control..... 3
- Spain-Canada A-Agreement..... 3
- First Canadian Fishing Chart..... 4

- Big Air-Passenger Increase..... 4
- Architectural Contest..... 4
- Pearson and Johnson to Meet..... 5
- Statistics on Labour Organizations..... 5
- New Historical Stamp..... 5
- Incidence of Tuberculosis..... 5

## ENCOURAGING CANADA'S INDUSTRIAL GROWTH

*The following is a partial text of an address by the Minister of Industry, Mr. C.M. Drury, to the Conference of Canadian Industrial Research at Ottawa on September 2:*

...Since 1945, the industrialized nations of the world have been experiencing a "technological revolution" stemming from the systematic application of science to the development of new products and processes. Initially, this revolution was based on the scientific advances achieved under the impetus of World War II, but the process has now become regenerative and is proceeding at an ever-increasing pace. As a case in point, one of our larger and long-established electronic firms recently estimated that almost all of its current business is derived from new products which were not even on the market ten years ago. Another firm in the business-machine field has experienced a 75 percent change in their product line over the past five years!

In order to account for the dynamic growth experienced by the advanced industrial nations in recent years, economic theorists have had to introduce a fourth factor of production, namely "technology" (in addition to the classical factors of land, labour and capital). A recent study, attributes 90 per cent of the rise in U.S. productivity over the past 50 years to "technical progress", of which almost half results from the advance of knowledge. A graphic illustration of this point is presented by the so-called "science-based industries (e.g. electronics, plastics), which have consistently demonstrated the highest rates of growth in recent years. It is no accident that these industries also display the

highest research intensity (i.e. ratio of research expenditure to sales). In fact, the Federation of British Industries has reported differences in growth rates as high as two-and-a-half times between firms with the highest and lowest R-and-D budgets in the chemical industry.

Similarly, on a national scale, recent data show evidence of a correlation between economic growth, *per capita* income and the proportion of gross national product allocated to scientific endeavour. By coincidence or otherwise, those countries having a higher research ratio seem to enjoy higher growth rates and their manufactured goods appear to fare better on the export market (e.g. Japan, Germany, France, Sweden and the Netherlands).

At the risk of preaching to the converted, I believe that it is a fair contention that science and technology are vital catalysts for growth in an industrial economy. The development of new and better products by Canadian industry would not only expand the domestic market but would also open up new opportunities for our manufactures in world markets.

## RESEARCH AND DEVELOPMENT

IN CANADIAN INDUSTRY  
Turning now to the Canadian scene, it is instructive to examine the level and distribution of our scientific research and development activities. Over the most recent five-year period for which statistics are available, overall R-and-D expenditure has shown a slow but steady growth from \$220 million in 1956 to \$320 million in 1961. However, when we look at the amount performed by Canadian industry, we discover

(Over)

that stagnation prevailed, for the 1961 level of \$115 million is only slightly higher than the 1956 level of \$110 million, without allowing for inflationary cost trends. During the same period, industrial output rose by 10 per cent, so that the industrial-research ratio actually declined by some 6 per cent. While this situation has improved somewhat since 1961, primarily as a result of various forms of government assistance, it will be apparent that we still have a great deal of ground to catch up.

Comparing Canada's performance with other industrial nations, we find that our 1961 national research ratio of 0.85 per cent GNP is relatively austere compared with 1.7 per cent for Sweden and France, 1.4 per cent for the Netherlands and Switzerland, and 1.3 per cent for West Germany and Japan. At the same time, the corresponding U.S. figure has risen to 2.8 per cent and the U.K. ratio is 2.4 per cent owing in part to their higher defence expenditure. Even if the latter are deducted, the balance of their civil R-and-D effort is in the neighbourhood of 1.5 per cent GNP for both countries.

#### CANADA'S RESEARCH DEFICIENCY

By any standard, it must be admitted that our R-and-D performance is low, particularly in the industrial sector. Moreover, only two-thirds of the 1961 industrial R-and-D figure cited above (i.e. \$77.5 million) or 0.6 per cent of sales, is directly relevant to secondary manufacturing industry, with which we are concerned here. To give some ideas of the order of magnitude of this deficiency, we may draw a comparison with Japan, which began industrialization at about the same time (i.e. around 1900) and which, like Canada, has relied heavily on imported technology in the past. To match the performance of Japanese industry, which has been expending 1.2 per cent of gross sales on R and D, it would have been necessary for Canadian industry to exceed its 1961 effort by a factor of 2.5 to attain an overall level around \$300 million *per annum* (i.e. an absolute increase of about \$175 million). This in turn, would have raised our national research ratio to a more respectable figure of 1.3 per cent GNP. To match Sweden, we should have to increase our industrial-research ratio by a factor of four, and to keep pace with the U.S.A. would require over six times our 1961 expenditure!

#### RELIANCE ON FOREIGN TECHNOLOGY

Our shortcoming in industrial R-and-D activity may be a reflection of our dependence upon imported technology owing to the subsidiary character of much of our manufacturing industry. In the past, Canadian industry has benefited enormously from the skills and knowledge which have been acquired from our American and European partners, and we certainly hope that this situation will continue where it is to our mutual advantage. However, it must be appreciated that there are also certain inherent disadvantages in relying too heavily upon imported technology. Any industry which is dependent upon licensed or imitated designs will always lag behind the "state-of-the-art" by at least one generation and is at an obvious disadvantage in the export market, quite apart from the problem of competing directly with the

licenser. Nor is it clear that the needs of our domestic market are always best served by this practice, at least to the extent that the Canadian environment differs from other countries. Finally, perhaps the most unfortunate consequence of all is the lack of opportunity afforded to our best graduates in science and engineering to practice their skills in Canada and thus contribute to the progress of their native land.

Hence, while our institutional research in government establishments and universities has shown a steady growth and its level now appears reasonably comparable with other countries, the conclusion seems inescapable that a serious deficiency exists in the scale of effort exerted by Canadian industry toward the application of new scientific advances. This constitutes the "development gap" referred to by Mr. J.R. Johnson in his paper presented at the opening session of this conference... Thus, we are failing to exploit in industry the output of our research laboratories, or even to keep abreast of current advances in the "state-of-the-art".

#### GOVERNMENT ASSISTANCE FOR INDUSTRIAL RESEARCH

In order to sustain a rising standard of living and provide employment for a growing population, it is my conviction that we must expand the industrial sector of our economy. To do so will require not only a substantial increase in capital investment (preferably from Canadian sources) but also a radical upgrading of the inherent technological capability of Canadian industry; for the achievement of technical superiority in our manufactured products seems the best way to ensure competitiveness and to develop new markets, both at home and abroad. This problem has now been recognized, and the Federal Government has recently introduced a number of specific measures designed to alleviate this critical situation by means of tax incentives or direct financial assistance for industrial research and development in both the civil and defence sectors.

Perhaps the most comprehensive measure in this context is the recent tax-incentive programme whereby firms are permitted to deduct from taxable income 150 per cent of any increase in their R-and-D expenditures (both capital and operating) over the 1961 base year. This programme will remain in force for an initial period of five years, and effectively reduces the net cost of new corporate R-and-D activity to 25 cents on the dollar. Although statistical data are not yet available, preliminary indications are that this scheme induced a 10 per cent rise of industrial R-and-D activity in its first year of operation.

Unfortunately, however, we cannot rely exclusively upon tax incentives to solve our problems because of certain inherent limitations. In the first place, tax remission is not likely to benefit the young or rapidly-expanding firm, which is usually not in a profit-making position. Nor will it appreciably help the small specialty firms (where many of the brightest ideas originate), owing to the relatively large volume of business required to support even a minimal R-and-D effort on any continuing basis. Finally, to achieve progress in the more highly speculative

(Continued on P. 6)

## PACIFIC NATIONS ON THE MARCH

The communique issued after the recent meeting in Kuala Lumpur of the Commonwealth Economic Consultative Council, which was attended for Canada by the Minister of Trade and Commerce and the Parliamentary Secretary to the Minister of Finance, was tabled in the House of Commons on September 8. Mr. Sharp prefaced the act of tabling with the following remarks:

...On the way to Kuala Lumpur, we paid short visits to Hong Kong and Singapore, meeting local government officials and businessmen interested in trade with Canada. While in Hong Kong, we had the opportunity of discussions with representatives of the China Resources Company, which...has been buying substantial quantities of wheat from the Canadian Wheat Board on behalf of mainland China.

In Hong Kong, in Singapore, in Kuala Lumpur and later in Tokyo, we were enormously impressed by the high rate of economic activity. Everywhere one looked factories were being erected, roads were being built, apartment houses were rising. There can be no doubt that these Pacific countries are on the march and have great potential as markets for Canadian products.

### A JARRING NOTE

The Commonwealth Economic Consultative Council met in Kuala Lumpur on the first anniversary of the foundation of Malaysia. We were happy to join in the celebrations. I regret to say that the celebrations were marred by less happy events and I draw attention to the text of the communique in which the ministers from all the 18 independent Commonwealth countries joined in recalling the assurance given by the Commonwealth prime ministers of their sympathy and support of Malaysia's efforts to preserve its sovereign independence and integrity and to achieve a peaceful and honourable settlement of its current differences with its neighbours.

The discussions at Kuala Lumpur were notable for their emphasis on the problems of the developing countries, both within and without the Commonwealth. We were happy to be able to say that Canada is stepping up the level and quality of our external aid, particularly in the field of education, and that the Government of Canada supports strongly the international efforts that are being made to improve the trading position of the developing countries.

\*\*\*\*

### VISA AGREEMENT WITH JAPAN

The Secretary of State for External Affairs announced on September 8 in the House of Commons that negotiations between the Canadian and Japanese Governments for an agreement abolishing the non-immigrant visa requirement for short-term visits by citizens of either country had been concluded during the recent Canada-Japan ministerial meeting in Japan. The agreement, which is in the form of an exchange of notes, was signed on September 5, 1964, at Tokyo, by Mr. Martin on behalf of the Government of Canada and by the Honourable Etsusaburo Shiina, Foreign Minister of Japan, on behalf of his Government.

### TERMS OF AGREEMENT

Under the terms of the agreement, which comes into effect on September 20, citizens of Canada and Japan who are *bona fide* non-immigrants (visitors not seeking employment or permanent residence) and who are in possession of valid national passports may enter the other country without visas for periods not exceeding three consecutive months, provided they meet the normal laws and regulations governing non-immigrant entry into the country concerned.

Visas, when required, shall be free of charge and valid for any number of entries within 12 months from the date of issue. The issuing government, however, retains the right to grant visas valid for a single entry in particular cases.

\*\*\*\*

### COURSE IN FOREST-FIRE CONTROL

During August, 30 forestry officials from 15 countries were given a two-week forest-fire control study tour and seminar in Canada. The visit, coordinated by the federal Department of Forestry in co-operation with the Department of Lands and Forests of Ontario and Quebec, was sponsored by the Food and Agriculture Organization of the United Nations.

Participants came from Australia, West Cameroun, Chile, the Dominican Republic, France, India, Iraq, Iran, Malagasy, Mexico, West Pakistan, Turkey and Uganda, with observers attending from Britain and the United States.

At the Ontario Forest Ranger School at Dorset and the Quebec Forest Ranger School at Duchesnay, delegates were shown the various modern methods of fire suppression used in this country. The visitors expressed interest in the vital role of an informed public, as well as in lookouts and aerial patrols and forest-fire detection. They were also interested in specially-developed suppression equipment as modern back pumps and portable power pumps. Many delegates said they hope to introduce some of the methods and equipment they had seen into their own countries.

\*\*\*\*

### SPAIN-CANADA A-AGREEMENT

The Secretary of State for External Affairs, Mr. Paul Martin, recently announced that an agreement between the Governments of Canada and Spain for co-operation in the peaceful uses of atomic energy had been signed in Ottawa. Mr. Martin signed for Canada and the Spanish Ambassador, His Excellency Francisco Javier Conde, signed for Spain. The agreement is to be ratified and will come into force upon the exchange of instruments of ratification.

This agreement provides the framework for co-operation in a variety of forms, including the exchange of information, the supply of equipment and materials, and access to and use of facilities. It is similar to eight others so far signed by Canada. Such agreements for co-operation on a bilateral basis are consistent with membership in and support of the International Atomic Energy Agency, to which both Canada and Spain belong.

## FIRST CANADIAN FISHING CHART

A fisheries chart has just been issued by the Canadian Hydrographic Service to help fishermen on Canada's east coast to increase their catches substantially.

Chart No. 4041 covers the Atlantic coast banks of Banquereau and Misaine, which lie off Nova Scotia between Scatarie and Sable islands. It is an accurate, detailed picture of the shape and depth of the sea bottom, enabling fishermen to select the most favorable areas and banks for fishing. It is drawn on a scale of 1,300,00, or about four miles to the inch, and is thus four times the scale of previous Canadian charts covering the area.

### GENESIS OF IDEA

The conception of the new chart grew out of an investigation by the Fisheries Research Board of Canada that revealed the inadequacy of existing charts. The appearance on the market during the past ten years of larger and better equipped boats, using otter trawls, has drawn more and more Canadian fishermen away from traditional inshore fishing waters to the more productive off-shore banks. The efficient use of such boats depends on a detailed knowledge of depths and of the bottom.

To provide the fisherman with this knowledge, the Canadian Hydrographic Service, a division of the Marine Sciences Branch of the federal Department of Mines and Technical Surveys, made a survey of the continental shelf off Nova Scotia. The CHS took hundreds of thousands of soundings, which it accurately positioned by modern electronic means, and combined the resulting data with details of the nature of the sea floor.

### USE OF CONTOURS

The new chart enables the fisherman, through the use of a small contour interval, to avoid those areas of the sea where the bottom is uneven. It illustrates depths primarily by contour lines. The contours are shown as a solid blue line spaced at ten-fathom intervals to a depth of 100 fathoms, at 20-fathom intervals to 200 fathoms, and thereafter at every 100 fathoms to a depth of 1,000 fathoms.

General depths are indicated by three shades of blue. Depths of less than ten fathoms are shown as a dark blue; the extensive fishing banks of between ten and 50 fathoms of water, by a medium blue and the areas containing over 50 but less than 100 fathoms, by a light blue.

\*\*\*\*

## BIG AIR-PASSENGER INCREASE

Air Canada has recorded significant increases in the number of transatlantic passengers carried during the first six months of this year compared to the same period in 1963, following the introduction of the lowest transatlantic air fares in history on April 1, 1964.

Between January and June 1964, the airline carried almost 56,000 passengers on routes between Canada and Britain, Ireland France, Germany,

Switzerland and Austria, an increase of 18 per cent over the first six months of 1963.

Particularly significant was a dramatic increase during the first half of the year in the number of passengers travelling from the British Isles and continental Europe to Canada. Westbound traffic increased 22 per cent over that recorded during the preceding year, a clear indication of the booming European economy and the rising disposable income of Europeans.

### FREIGHT INCREASE

A similar increase in air-freight traffic on transatlantic routes was also recorded by Air Canada. During the first half of 1964, a total of 2,987,000 pounds of air freight was carried by the airline to and from Britain and Europe, an increase of more than 20 per cent over that for the same period in 1963.

This summer, Air Canada operated 18 return flights a week between Canada and the British Isles and daily return flights between Canada and continental Europe, providing more than 3,000 seats weekly in each direction across the North Atlantic on DC-8 jets.

Air Canada, now the world's ninth largest airline, competes with other carriers across a quarter of the globe, carrying 4,000,000 passengers a year over 37,000 miles of air routes throughout Canada, across the North Atlantic, to the United States and to the Caribbean.

\*\*\*\*

## ARCHITECTURAL CONTEST

Canadian architects will have a chance to win 27 prizes, totalling \$31,500 in value, in a contest launched recently by the Canadian Lumberman's Association. The winner of first prize will not only receive \$10,000 but will also see his project erected on the site of the 1967 World Exhibition as the principal exhibit of the Association.

### SPECIFICATIONS

The requirements of the jury are as follows: the project is to be a one-family dwelling, to be built on a lot 75' x 120' at a cost of not more than \$17,000. The house must make the most abundant and intelligent use possible of recognized species of eastern wood trees - in other words, those indigenous species found between Manitoba and the Maritimes. The purpose of the contest is to promote the use of these species of wood in the construction and decoration of one-family homes.

In addition to the first prize, 26 awards will be distributed: a second prize of \$5,000, a third prize of \$2,500, and 20 honourable mentions of \$500, as well as four special prizes of \$1,000 to be awarded for the best use of eastern softwoods, the best use of eastern hardwoods, the best idea for a new use of these woods and the best design submitted by a student.

The judgment of entries will take place on November 30, 1965, and prizes will be distributed in February 1966 at the annual convention of the Canadian Lumbermen's Association, which will be held in Montreal.

## PEARSON AND JOHNSON TO MEET

On September 16, Prime Minister Pearson and President Johnson of the United States will join in ceremonies at the International Peace Arch on the United States-Canadian border between British Columbia and Washington in connection with the implementation of the Columbia River Treaty. These ceremonies will be preceded in Ottawa by the exchange of instruments of ratification between the Secretary of State for External Affairs, Mr. Paul Martin, and the United States Ambassador to Canada, Mr. Butterworth.

### AERIAL INSPECTION

Before the Peace Arch ceremonies, the Prime Minister and the President will make an aerial inspection tour of a considerable part of the upper Columbia River basin, flying over the proposed sites of dams to be constructed in British Columbia under the Treaty, the location of the Libby (Montana) Dam to be built by the United States, and some of the existing downstream United States dams involved.

While in the Pacific Northwest, the Prime Minister and the President will consult with regional leaders in their respective countries regarding cooperative steps to be taken on both sides of the border in implementation of the Treaty. They will also take advantage of this opportunity to discuss current international problems of mutual concern.

\*\*\*\*

### STATISTICS ON LABOUR ORGANIZATIONS

The Department of Labour recently released a summary of the latest figures on labour organizations in Canada, based on its annual survey of labour unions. (Complete results of the survey will be available in the near future in the department's publication "Labour Organizations in Canada, 1964", now being printed.)

At the beginning of 1964, labour organizations active in Canada reported a total membership of approximately 1,493,000, representing 29.4 per cent of the country's non-agricultural paid workers.

The 1964 membership is higher by 44,000 than the previous year's figure. Of this increase, about 37,000 was a net membership gain, while the balance resulted from improved survey coverage.

### UNION AFFILIATION

Of the organized workers, 1,106,000, or 74 per cent, were represented by unions affiliated with the Canadian Labour Congress. A large proportion of these unions are also affiliated with the American Federation of Labor and Congress of Industrial Organizations in the United States. CLC membership increased by 26,100 over 1963. Another 121,500 organized workers, or more than 8 per cent of the total, were represented by unions belonging to the Confederation of National Trade Unions. This was an increase of 11,000 members over 1963. Nearly all of the CNTU members are in Quebec.

### INTERNATIONAL UNIONS

The rest of Canada's organized workers were represented either by unions not affiliated with any central labour body or not affiliated with a central

body in Canada but with the AFL-CIO in the United States. More than a million of the 1,493,000 union members were in international unions, which have branches in both Canada and the United States and in most cases belong to central labour bodies in both countries. In January 1964, there were 111 international unions active in Canada; of these, 88 were affiliated with the CLC as well as with the AFL-CIO, nine were affiliated only with the AFL-CIO and three with the CLC only. The remaining 11 unions had no affiliation.

### NATIONAL AND LOCAL UNIONS

There were 363,500 Canadian workers belonging to 52 national unions in January 1964. Of these 17 were affiliated with the CLC and 13 with the CNTU; the remaining 22 unions were without affiliation.

Outside the international and national unions, 20,200 workers were organized in 224 separate locals chartered directly by the two Canadian central bodies, the CLC and the CNTU. Another 39,600 belonged to the 124 independent local organizations coming within the scope of the survey.

Ten unions operating in Canada reported increases of 1,000 or more members. Among these, the United Steelworkers of America led with an increase of 12,000 members.

\*\*\*\*

### NEW HISTORICAL STAMP

A new five-cent postage stamp to commemorate the hundredth anniversary of the Quebec Conference that led to Canada's Confederation was issued by the Post Office on September 9. It is the seventh special issue in the 1964 programme.

In announcing the stamp, Mr. Nicholson recalled that it was at the Quebec Conference of 1864 that delegates from the provinces that are now Ontario, Quebec and the Maritimes hammered out the 72 resolutions that eventually formed the core of the British North America Act of 1867, Canada's written constitution. The Conference was, therefore, one of the milestones on the road to Canadian nationhood.

The Quebec Conference stamp follows an earlier issue commemorating the conference that took place a month before the Quebec meeting in Charlottetown, Prince Edward Island, at which some agreement had been reached on the principle of a federal union.

The design of the new stamp - a hand holding a pen and a maple leaf - symbolizes the reaching of agreement among the various provinces leading to nationhood. The stamp is being printed in red and brown by the steel intaglio process. The designer is Philip Weiss of Ottawa, who also created the Charlottetown design and has a number of other Canadian stamps to his credit.

A total of 18 million stamps will be printed.

\*\*\*\*

### INCIDENCE OF TUBERCULOSIS

New cases of tuberculosis reported in Canada in May this year numbered 367, with 307 classed as "new active" and 60 as "reactivated". This brought the number in the January-May period to 1,856, versus 2,617 a year ago, comprising 1,586 versus 2,283 classed as "new active" and 270 versus 334 classed as "reactivated".

### FIRST CANADIAN FISHING CHART

## ENCOURAGING CANADA'S INDUSTRIAL GROWTH

*Continued from P. 2)*

areas of advanced technology, where the risk exceeds normal business practice, a "rifle" approach in the form of direct assistance is more likely to be effective than the "shotgun" approach provided by tax incentives.

### NEED FOR SHARPER TOOL

A sharper tool for the support of Canadian "bright ideas" is provided by research-assistance grants administered by the National Research Council and the Defence Research Board in the civil and military sectors respectively. In both programmes, costs are shared 50-50 with industry, and support is extended over a period of years. In 1964, the NRC Industrial Assistance Programme will invest about \$3 million in some 104 civil-research projects, while the DRB Defence Industrial Research Programme will provide almost \$5 million for approximately 100 defence-research projects.

Probably the most difficult stage in translating an idea into a useful product is the development phase, because of the complexity of the process and its relatively high cost (which may exceed the cost of the original research by a factor of ten). In the defence sector, we have evolved the Defence Development Sharing Programme, which complements the U.S.-Canada Production Sharing Programme initiated by the Department of Defence Production in 1958. This programme is supporting some 45 development projects, to the extent of \$19.5 million in the current fiscal year. The list of projects comprising this programme includes such items as STOL and VTOL aircraft, gas-turbine power-plants, reconnaissance and navigation systems, radar and communications equipment. Indeed, the span of our endeavour extends from the earth's surface (rough terrain vehicles and hydrofoil craft) to outer space (atmospheric sounding rockets and satellite communications).

### SHORTAGE OF CIVIL-DEVELOPMENT PROJECTS

The obvious gap in our spectrum of assistance is in the important area of civil (or non-military) development. As indicated earlier, I believe that our most critical shortcoming lies in the application of science to the development of new or better products. In view of the established need for a major expansion of our industrial R-and-D activity, coupled with our successful experience with the Defence Development Programme, we are now actively exploring the possibility of extending direct financial assistance to promising civil-development projects. This would be in line with the practice of many other advanced industrialized nations, and would offset to some extent the relatively modest level of our defence development expenditure, which, in other countries, has served to underwrite technological progress in the civil sector.

In entering the civil-development field, we shall, of course, encounter many new problems and some basic policy questions. For example, what criteria

should be applied to the selection of projects for support? The determination of the market requirement becomes much more complex and economic factors will have to be taken into account. What funds will be required and what proportion of the cost of any given project should be borne by government? Should these development funds operate on a "loan" or a "grant" basis and, in the former case, should it be expected to become self-supporting? What should our patent policy be? Should the Government retain patent rights and seek to recoup its outlay in the form of royalties?

Although the foregoing represents a formidable array of potential problems, I can assure you that they are receiving close attention by my officials and that solutions must be found in the very near future. For, if we are to keep pace with the dynamic technical and economic progress of this modern world, it seems clear that we must seek to double or even triple the level of developmental activity in Canadian industry as rapidly as possible. Obviously, this cannot be accomplished overnight, but I should suggest that a target annual-growth rate of industrial R-and-D of the order of 20 to 25 per cent *per annum*, sustained over a period of five years, will be required to achieve our essential objective of overcoming Canada's "technological lag". As a longer-term goal, we should aim at a progressive growth in all scientific and technical sectors to attain the recommended national research ratio of 2.2 per cent GNP, in order to bring Canada up to parity with other modern industrialized nations.

You may conclude from the foregoing remarks that the Department of Industry is seriously concerned with the relative scarcity of technological resources upon which the future health of our manufacturing industry and indeed our national economy depends. Some philosopher (doubtless an engineer) has said that "innovation is the yeast in the industry brew". In any view, science and technology must permeate our industrial structure, and management should recognize the material and economic benefits that can accrue from their rapid and efficient exploitation.

Our task seems clear - we must create an intellectual climate which will stimulate new ideas, we must develop a business attitude which is receptive to technological progress, and we must broaden and strengthen the creative capability of our industry. This means more scientists in industry, better research facilities, many more engineers to apply results of scientific progress and the re-investment of a large share of company earnings in research and development. We must also achieve a much closer "coupling" between the scientific activities of our government research establishments, our universities and our industry. Above all, we must abandon our "follow-the-leader" or "branch-office" complex and begin to exercise our native talents and initiative; for it is not merely a matter of short-term profit or loss, but may ultimately become a question of our economic survival as a nation....

\*\*\*\*\*