



CANADA

CANADIAN WEEKLY BULLETIN

INFORMATION DIVISION • DEPARTMENT OF EXTERNAL AFFAIRS • OTTAWA, CANADA

Vol. 21 No. 46

November 16, 1966

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PRODUCTIVITY – THE KEY TO OUR FUTURE

The following is part of a recent address by the Minister of Industry, Mr. C.M. Drury, to the Seminar on Automatic Process Control at McGill University, Montreal:

...The period from the peak of the Egyptian civilization to the first industrial revolution spanned 45 centuries, whereas only one century elapsed between the first and second industrial revolutions. Technology has been improving and diversifying our processing and manufacturing industries for over 150 years, but it is only with the last decade that we have seriously begun to automate industrial operations....

Tonight I should like to suggest to you that there is a vast untapped potential for the application of computers to controlling production processes in our manufacturing industry, which may rival their use for data-processing both in terms of numbers and importance. This is especially significant for Canada, where such an important sector of our industry is concerned with the extraction and processing of the products of our mines, forests and farms.

ISSUE OF UNEMPLOYMENT

Before proceeding with my main thesis, however, I should like to deal with the issue of unemployment resulting from technical change, which may deter progress toward the introduction of automatic process control. An exhaustive survey by the National Commission of Technology, Automation, and Economic Progress in the United States in 1965 showed that technological change is not a primary factor in the

volume of unemployment. The fundamental forces are the growth in the labour force, the growth of total demand for goods and services, and the increase in output per man hour.

This is not to deny that technological change along with other forms of economic change have caused, and will continue to cause displacement and temporary unemployment of particular workers at particular times and places. However, experience with the introduction of electronic computers for processing business data may offer some reassurance on this score. Over the decade from 1955 to 1965, during which the number of computer installations in Canada increased almost a hundredfold to 850, the proportion of clerical workers in the labour force actually rose from 11.7 per cent to 13.5 per cent. Thus we find that almost 300,000 new jobs were created, many of which may be attributed to the exploitation of the vast potentialities of the computer in the worlds of commerce and industry.

In speaking to the Canadian Chamber of Commerce in Edmonton earlier this month, I suggested that our economic expansion must be closely geared to increased productivity, which in the post-war period has averaged about 3 per cent *per annum*. Last week, Dr. Herbert A. Simon of the Carnegie Institute of Technology, speaking at the University of Toronto, expressed the view that, if the full potential of automation could be exploited, the rate of growth of industrial productivity might be doubled to almost 5 per cent *per annum*. To emphasize the significance of this factor, such a rate of productivity increase

could effect a doubling of real personal incomes within less than 20 years. The realization of this possibility would, of course, require corresponding increases in the rate of investment in new plant and training of manpower. Nevertheless, there is no doubt in my mind that, for our process industries at least, there is a latent potential for worthwhile improvement in productivity by the application of automatic process control which we cannot afford to overlook.

PROCESS CONTROL CENTRES

The case for automatic process control centres around the quest for improved plant efficiency and the achievement of higher product quality. With the increasing complexity of manufacturing processes, the demands for greater uniformity of product and the need for higher rates of output, the efficient control of modern industrial plants is rapidly passing beyond the capability of the unaided human operator no matter how skilled he may be. The multiplicity of parameters which must be taken into account and the speed with which decisions have to be taken and control adjustments made, virtually dictate the use of computers for this purpose.

In controlling industrial processes, I understand that techniques very different from those involved in data processing are required, since the computer must interface with a complex dynamic system and operate in a real time environment. Moreover, in addition to replacing the mechanical functions of the human operator, the computer must learn the "feel" of the process (corresponding to the human judgement factor), so that each practical application has to be developed from scratch. This necessitates the employment of technical personnel with multi-disciplinary skills and, in the case of sophisticated processes, may take two years or more from planning to implementation. Automatic process control is, therefore, not something that can be brought off-the-shelf and installed on a moment's notice. Rather, it is a technique which must be learned for each industry and the optimum solution must be tailored to the specific needs of each individual situation....

INTERNATIONAL ASPECT

Exports of primary products account for something like 16 per cent of our gross national product, and it is vital to our economy that the prices of such products remain competitive on the international market. Therefore, we must strive for the maximum efficiency in the extraction and processing of our primary products to offset any handicaps arising from the exploitation by foreign producers of higher-grade resources, lower labour costs or technological advances. Certainly, even very small improvements in the efficiency of process industries with large "throughputs" resulting from the introduction of automatic process control could pay large dividends in earning capacity.

On a related theme, I am sure there will be general agreement that we should seek every opportunity to upgrade the value of our exports of primary prod-

ucts by further processing in Canada. This, of course, is not always economically feasible, particularly where we must compete against well-established or larger-scale producers. I should like to suggest however, that by fully exploiting the resources of new technology generally and automatic process control in particular, we can make significant progress toward this desirable goal.

Although the foregoing has emphasized applications for primary industry, I am equally certain that similar opportunities exist in the secondary sector, such as chemicals, petroleum products, synthetic materials, and food products, to name a few.... I am not suggesting that automatic process control is a panacea for all our industrial ills, or that every firm can benefit. However, as a technique for increasing industrial efficiency, I consider that it merits serious study by all segments of our processing industry.

ENHANCING PRODUCTIVITY

Finally, I should perhaps say something of the role which the Government is playing in this regard. When the Department of Industry was formed in 1963, it was given some fairly explicit terms of reference, but I think our primary mission is best summed up in the phrase "to enhance industrial productivity". The three principal factors affecting productivity are, of course, the state of technology, the scale of operation and the skill of management and labour. All of our endeavours for enhancing productivity are designed to contribute to improvement in one or other of these categories and I should like to mention briefly some of the relevant programmes which have been initiated for this purpose.

On the technological front, our major effort has been to stimulate technical innovation by providing financial incentives and assistance for research and development activity in Canadian industry. In addition to the general tax incentive, there are four programmes of direct financial assistance.... I should expect that there are many aspects of the application of automatic process control which might qualify for support under one or other of these programmes.

On the production side, we are proposing to provide for the remission of customs duties on production machinery not available from Canadian sources as a means of encouraging our industry to equip itself with the most modern plant. Other programmes aimed at modernizing different sectors of our secondary manufacturing industry are also under current consideration.

On the upgrading of industrial skills, one of the most important factors is the rapid and effective dissemination of technical information, and better means for achieving this objective are being actively investigated by the Department. Another facet of this subject is, of course, the sponsorship of seminars.... as a means of promoting the introduction of new technology. In this regard, the direct communication between users, suppliers and the universities will afford opportunities for mutual co-operation, which, I am sure, will lead to worthwhile results in grappling with the wide range of technical problems confronting our manufacturing industries....

IMPORTANCE OF EXPORTS

Mr. Robert H. Winters, the Minister of Trade and Commerce, carried the Government's export campaign into the United States recently, when he spoke to the fifty-third convention of the National Foreign Trade Council. His audience consisted of some 1,500 businessmen engaged in the promotion of international trade and investment.

The Minister stressed the special importance of exports to Canada, pointing out that foreign markets were almost four times more vital for Canada in relation to gross national product than for the United States. The concern of the Federal Government to increase its share of the export market, he said, accounted for its continuing interest in the performance of foreign subsidiaries, which had contributed, and would continue to contribute, greatly to Canada's development.

FREE DEVELOPMENT

"The Canadian Government is most desirous that subsidiaries remain free to develop their full potential within the Canadian community, free from interference, either from the Canadian Government, the government of the parent company or from the parent company itself," Mr. Winters declared. He referred to the list of guiding principles established by the Canadian Government, which he described as "indicative, rather than mandatory". The Government's only desire, he said, was that "companies incorporated in Canada should act as good corporate citizens of Canada".

INTERNATIONAL TRADE

Turning to the current world-trade situation, Mr. Winters stressed the interdependence of the U.S. and Canadian economies, pointing to the enormous trade across the international border. "This mingling of our economic destinies," he said, "has been immensely beneficial to both our countries." It was not surprising, Mr. Winters continued, that Canada and the United States, as two of the world's great trading nations, had a mutual interest in the way international trade was conducted throughout the world. They also shared a willingness to bring their trading problems to the bargaining table, he said.

Canada placed great hopes, according to Mr. Winters, on a successful outcome of the "Kennedy round" of tariff negotiations to "reduce to more manageable proportions" the great problems of the exporting world. Although there were still uncertainties, he expressed confidence that the results would be considerable and that arrangements would be reached to assist the developing countries, which have been "pressing in every international trade and economic forum" for new and special arrangements to meet their problems.

ROLE OF EXPO '67

The Minister spoke of the challenge he had placed before Canadian exporters for 1967, seeking an increase of \$1.25 billion in exports, thereby bringing the total to \$11.25 billion during the coming year. This, he said, would be about \$562.50 *per capita*,

compared to \$141 for the United States in 1965 and \$251 for Britain. He stated that Expo '67, opening in Montreal next April, offered the world's business community a unique way of promoting trade in 1967. The International Trade Centre, sponsored by Canada's chartered banks, the Expo Club and the Business Development Bureau would be united in this unique trade promotion activity. It would be the first time in the history of world exhibitions, he said, that such services had ever been provided for businessmen.

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EDUCATION EQUIPMENT MISSION

A three-man fact-finding mission sponsored by the Department of Trade and Commerce left Canada recently for Paris, Geneva and Turin, Italy, to investigate the export market potential for Canadian-made technical educational equipment.

The members of the mission represent ten Canadian firms interested in making a presentation to UNESCO and ILO, who are increasing their activities in vocational training in the less-developed countries of Asia, Africa and South America. The mission members will investigate the purchasing and procurement policies of UNESCO and ILO, as well as their specifications for and requirements of equipment for electrical and electronic shops, machine, automotive, sheet metal and woodworking shops, and industrial physics training facilities.

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GAS TURBINES FOR RCN

Mr. Paul Hellyer, Minister of National Defence and Mr. C.M. Drury, Minister of Industry, announced recently that a contract worth some \$36 million was being awarded to United Aircraft of Canada Limited, Longueuil, Quebec, for the gas-turbine main-propulsion systems of the four new helicopter destroyers of the Royal Canadian Navy. The first vessel will be delivered in 1970, with completion of the four-ship programme due in 1972. Mr. Drury emphasized that "excellent proposals" had been received from both United Aircraft and from the Marine Olympus Consortium of Britain. An extensive interdepartmental evaluation had taken place, he added, and he was confident that the RCN would be provided with "a propulsion plant second to none".

A "FIRST" FOR CANADA

The decision to employ gas-turbine power-plants in the helicopter destroyers is regarded as one of the most important steps in the history and evolution of warship construction in Canada. A number of other navies have been using gas turbines, in combination with steam and diesel engines, for the propulsion of destroyer and frigate type warships and as propulsion for smaller craft. Canada, however, is the first country to decide to construct warships of destroyer size with all-gas turbine plants.

Advantages of the gas-turbine system over the conventional steam plant include an increase in top speed, the ability to operate at sea longer without refuelling, instant starting, faster response time (for instance, when a sudden threat develops at sea, full speed is immediately available.) Ships will require less time for repairs because engines will be exchanged rather than overhauled in the ship.

It will require a smaller operating crew. In accordance with practice in industry, automation can be applied effectively to gas-turbine machinery. Engine-room crews may be reduced by as many as 15 men a ship.

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NEW COMMISSIONER FOR ICC

Mr. Paul Martin, the Secretary of State for External Affairs, has announced the appointment of Mr. Ormond W. Dier as Canadian Commissioner to the International Commission for Supervision and Control in Vietnam. Mr. Dier will replace early in 1967, Mr. V.C. Moore, the present Canadian Commissioner.

Mr. Dier was born in Vancouver, British Columbia, in 1919 and graduated from the University of British Columbia in 1941. He joined the Department of External Affairs in 1947. He has served with the Department in Chicago, Mexico, Caracas and Copenhagen, and, as Canadian Chargé d'Affaires, in Helsinki. In June 1964, he was appointed Canadian Ambassador to Colombia, with concurrent accreditation to Ecuador, a post he now occupies.

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LOAN TO MEXICO

The signing of an agreement to lend Mexico up to \$5.4 million to help finance a multi-million dollar electrical power expansion programme was announced recently by Robert H. Winters, Minister of Trade and Commerce.

Mexico is borrowing \$156 million to finance the \$324-million project. Of this, \$118 million has been obtained from the World Bank and the remainder will be in bilateral loans from a group of countries which includes Canada.

The agreement, which was negotiated by Export Credits Insurance Corporation under the terms of the Export Credits Insurance Act, provides Canada with opportunities to sell Mexico electrical equipment valued at up to \$16.2 million. The ECIC loan would cover a third, and the World Bank loan the remaining two thirds.

Mr. Winters said the contract, as well as creating export opportunities for Canada, would assist Mexico with its imperative programme of electrical-power expansion.

This loan brings the total of ECIC agreements with Mexico, under Section 21A, to \$86 million. It will be for a term of 15 years, including three years of grace, at a rate of interest of 6 per cent a year.

STRATFORD SEASON '67

The artistic director of the Stratford Shakespearean Festival, Michael Langham, recently announced plans for the company's productions in 1967. These provide for four major plays in the Festival Theatre, another in the Avon Theatre, two operas, Sunday afternoon and Saturday morning concerts and a special exhibition devoted to 100 years of theatre in Canada.

Antony and Cleopatra, directed by Mr. Langham, with Christopher Plummer and Zoe Caldwell in the title roles, opens the season on June 12, 1967. Other Shakespearean plays include *The Merry Wives of Windsor*, directed by David William, and *Richard III*, directed by John Hirsch, with Mr. Plummer in the title role. Mr. Langham will also direct Nikolai Gogol's *The Government Inspector*, which opens at the Festival Theatre in July. The season will close October 14.

At the Avon Theatre the season opens July 7 with Mozart's opera *Così fan tutte*, directed by Jean Gascon. Mr. William will direct Benjamin Britten's *Albert Herring*. Mario Bernardi is music director for both operas.

Oscar Shumsky, music director of the Stratford Festival, is planning a special series of eight Sunday afternoon and six Saturday morning chamber music programmes, again featuring the resident National Festival Orchestra with outstanding guest artists.

Production of *The Government Inspector*, was made possible by a grant from the Centennial Commission as part of the Festival Canada programme on the occasion of Canada's centennial celebrations.

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FRESHWATER JELLY-FISH

Semi-transparent, pulsating organisms found recently in Lake Wauquimagog near Loring, Ontario, have been identified as a freshwater form of jelly-fish. The animals, which are circular, half an inch in diameter, and fringed with hair-like tentacles, propel themselves by contracting and relaxing their parachute-shaped bodies.

Jelly-fish have been previously identified in Ontario, but they are rarely seen, and little is known about this particular form. A report published by the Royal Ontario Museum in 1957 states they were observed in Georgian Bay at Parry Sound in 1952, and in a lake near Kingston and in Lake Nipissing in the summer of 1955. "The latter summer, like 1966, was hot, so perhaps the presence of these creatures becomes apparent only in hot, sunny years," comments John Macfie, senior conservation officer at the Parry Sound district headquarters of the Department of Lands and Forests.

Jelly-fish feed on microscopic animal life (plankton) in the water. They usually occur on the lake bottom, adhering to submerged objects, but occasionally rise to suspend themselves from the surface film.