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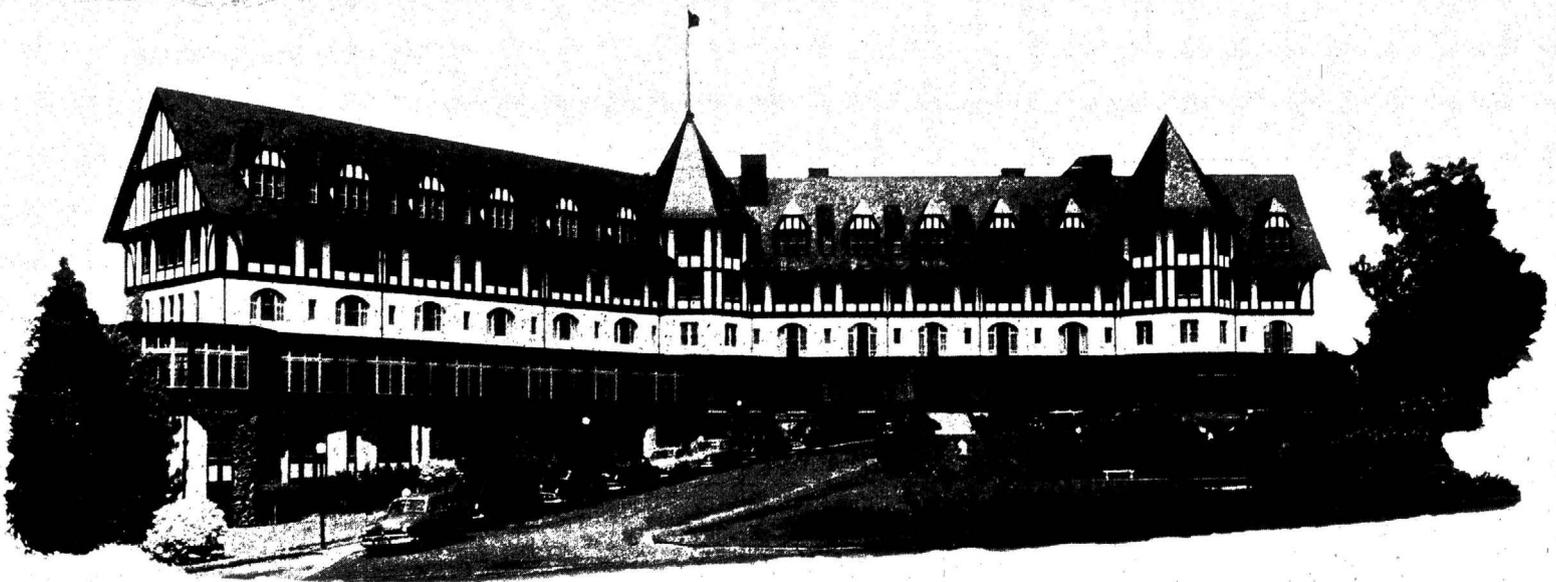
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# Significant Canadian Economic Developments

In reporting on the developments over the past 12 months I shall confine my remarks to a brief summary of what I consider



John R. Hughes

to have been some of the more significant developments in our economy that have important implications for the future. We are all more or less inclined to consider ourselves amateur economists and I must confess that in preparing my remarks I found it somewhat difficult to restrain myself from elaborating at much greater length upon certain issues upon which I hold rather definite views. However, in deference to you and to our distinguished guest speakers, from whom I know you are most anxious to hear, I have placed a self-imposed 15 minute limit upon my remarks.

In the industry in which we are engaged, the level of general business activity is always a matter of the greatest importance. Few, if any, lines of industry are as sensitive as ours to the changes in the tempo of activity. Indicative of this, the securities markets have long been considered as barometers, providing those skilled in interpreting their movements with some insight into the nature of things to come.

At the time of our last annual meeting it was reasonably certain that, following a year and a half of moderate recession, the trend was again definitely upward. We met in an atmosphere of optimism, yet I venture to say there were few among us who really anticipated the full extent of the astonishingly rapid and strong recovery in Canadian business activity in the latter half of the

year. Briefly reviewing the developments, conditions began to improve only in April, yet by mid-year prosperity was again quite generally in evidence and by late November our monetary authorities had turned to a policy of considerable tightness from a policy of definite monetary ease, which had been encouraged in 1954 and the early months of 1955. I think that perhaps even the Minister of Finance, Mr. Harris, was surprised at the extent of the upswing in the last half of the year. I trust that the Minister will not feel that I am in any way attempting to question his ability in the realm of forecasting if I refer to the estimates of gross national product which he gave us at our last annual meeting. As I recall it, he suggested that our gross national product in 1955 might reach \$25½ billion and that by the end of the year it might be running at an annual rate of about \$26 billion. Many, at the time, considered he was extremely optimistic, but events proved his estimates were on the conservative side. Actually, the upsurge in the last half of the year carried our gross product to \$26.6 billion and by the end of the year it was running at an annual rate of \$27.4

\*An address by Mr. Hughes at the 40th Annual Convention of the Investment Dealers' Association of Canada, St. Andrews By-the-Sea, N. B., June 14, 1956.

By J. R. HUGHES\*  
 Royal Securities Corporation Limited  
 President, Investment Dealers' Association of Canada

Looking forward to the future with confidence, Mr. Hughes predicts an extremely bright Canadian investment outlook, warns of possible temporary economic growth interruptions, and reports 1956-1957 estimates of very substantial near-term capital requirements which may not be entirely fulfilled because of some strains accompanying current almost fully employed economy. Believes: (1) predictions that the 20th Century would belong to Canada will be fulfilled if fully supported by Canadian willingness to investment and work; (2) it would be preferable to have some Canadian share ownership in foreign wholly-owned Canadian subsidiaries; (3) soundly administered monetary controls can help contain the business cycle; and (4) inflation stops the vitally important savings flow.

billion, establishing a new record. With final product prices in 1955 relatively stable, the increase in gross national product reflected almost entirely an expansion in the volume of production.

**Vigorous Recovery and Some Strains**  
 Since the turn of the year the business scene in Canada has presented a picture of an almost fully employed economy making strenuous efforts to expand its output. Activity in the major industries of forestry and mining has been well ahead of that a year ago. The service trades have continued to grow and for the majority of manufacturing industries production and shipments for the first half of this year have been well ahead of 1955, with the notable exceptions of companies manufacturing automobiles and farm equipment.

The vigorous revival has quite naturally produced some signs of strain in our economy. The more notable examples of these are the marked increase in our imports and the increasing demand for credit. The upward movement of our wholesale price index over the past year, while of modest proportions, provides further evi-

dence that strains are beginning to appear. These visible signs of strain have been undoubtedly the principal factors that have brought about the shift in policy on the part of our monetary authorities from one of "easy money" to one of considerable "tightness."

The greater reliance now being placed upon monetary controls in the more important countries of the Western world, than was in

the case of the immediate post-war years, must be considered a further and important step towards re-establishing the economics of those countries on a free enterprise basis.

Operating in a free enterprise economy a central bank, may, and often does, influence the supply and price of credit. However, from the longer range point of view the cost of money is determined by the broader forces of supply and demand. The position and responsibilities of a central bank were set out in the preamble of the Bank of Canada Act of 1934:

"Whereas it is desirable to establish a central bank in Canada to regulate credit and currency in the best interests of the economic life of the nation, to control and protect the external value of the national monetary unit and to mitigate by its influence fluctuations in the general level of production, trade, prices and employment, generally to promote the economic and financial welfare of the Dominion."

**Money Market Sensitivity**

The greater dependence upon the interplay of economic forces suggests that we can expect our money markets in the future to

*Continued on page 29*

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# The Atomic Energy Program in Canada

By W. J. BENNETT\*  
President, Atomic Energy of Canada, Ltd.

The subject of atomic energy can be approached in a number of ways. The approach selected depends on one's viewpoint. The



Wm. J. Bennett

scientist will be intrigued with the many new possibilities which atomic energy presents for extending further the boundaries of knowledge. For example, the physicists are already speculating as to the possibility of a controlled thermo-nuclear reaction, and the chemist has found in radioisotopes a most useful tool for applied research in many fields. The engineer, whether he be engaged in design or fabrication, will be concerned with the problems which must be solved if atomic energy is to become an economic source of electric energy. The economist will calculate the contribution which this new energy source will make to rising energy demands in particular countries and in the world at large. The statesman will be conscious at all times that atomic energy is both an instrument of war and a guarantee of peace and, as such, has become a dominant factor in international relations.

I assume that this audience, while sharing in some degree all of these viewpoints, has a special interest in the opportunities for investment which atomic energy may provide. While I shall have that interest very much in mind in my description of the Canadian program in atomic energy, I should make it clear at the outset of my remarks that it is quite impossible to provide the kind of information which an investment house normally requires for a prospectus, simply because the

\*An address by Mr. Bennett before the 40th Annual Convention of the Investment Dealers' Association of Canada, St. Andrews By-the-Sea, N. B., June 15, 1956.

Canadian atomic head reports "we are now able to predict that nuclear power can and will be used" and, though the program is at too early a development stage to supply the data required in a prospectus, forecasts based upon the relationship of future power requirements, costs of conventional power sources, costs of generating nuclear power, and other assumptions, indicate nuclear energy: (1) will be in modest supply until 1970 when it should become increasingly important; (2) offers interesting possibilities for space heating and for production of process heat; (3) requires continuing the uranium industry as a going concern after the 1962 government contract termination date; and (4) will permit uranium production to attain the highest dollar value of metals produced in Canada.

program is at too early a stage in its development. What I shall try to do is give you the kind of background information which will help you to evaluate the numerous and sometimes conflicting predictions which are being made about nuclear power and its implications for our economy.

#### Fuel and Capital Costs Compared

Let us start with one or two basic facts about nuclear energy. When nuclear fission takes place in a reactor, large amounts of energy in the form of heat are produced. A ton of natural uranium has a heat potential of 20 billion kilowatt hours — which is roughly equivalent to the heat potential of 2,600,000 tons of coal. The present known reserves of economically recoverable uranium have an energy content many times that of the known reserves of oil, gas and coal. While, as I shall point out later, we cannot hope to utilize all of this energy content, we are confident that we can achieve a degree of utilization which will make atomic energy a very large source of heat. We are likewise confident that this heat can be used to produce steam to drive a turbine in a power plant. It can also be used for space heating or for producing process heat.

My remarks today will be concerned mainly with the first use. The production of economic power from a nuclear station depends on the solution of a wide range of technical problems. These problems may be grouped under the general heading of capital costs. The great advantage of nuclear power as compared with conventional thermal power is the low fuel cost. Fuel costs in 100-megawatt conventional thermal stations on this continent now average from 3 to 4 mills per kilowatt hour. Using present technology, it should be possible to achieve a fuel cost of not more than 2.5 mills per kilowatt hour in a 100-megawatt nuclear station operating at a load factor of 70%. With improvements in technology — and it is reasonable to expect such improvements — this cost might be reduced to as low as one mill per kilowatt hour. On the other hand, the capital cost of nuclear stations will be higher than the capital cost of conventional thermal stations. The capital cost of conventional thermal stations of 100 megawatt capacity ranges from \$120 to \$160 per kilowatt. The capital cost of the first generation of nuclear power stations — that is, the stations which will come into operation over the next two or three years — will

range from \$500 to \$600 per kilowatt. This cost must be reduced to something like \$250 per kilowatt, if the advantage of lower fuel costs in a nuclear station is not to be lost by reason of higher capital charges.

Before I tell you what we are doing to achieve this goal, let us ask ourselves whether the effort (and it is an expensive one) is worthwhile. Or, to put it another way, is there a need for nuclear power in Canada?

#### Does Canada Need Nuclear Power?

The role of the forecaster is always a hazardous one, and this is especially so when he speaks to an audience which can claim special competence in the business of forecasting. A forecast as to the future role of nuclear power must be predicated, first, on an acceptable estimate of the future power growth rate in Canada; second, on the conventional power resources, either hydro or fossil fuels, which will be available to meet the new demand; and, third, on the minimum cost at which it will be possible to generate nuclear power. There are several methods of

forecasting power growth rates. One method is to project the future growth rate on the basis of past experience. For example, we know that the power growth has been at the rate of about 5½% per annum over the past 25 years. It is also possible to establish in that period a relationship between the rate of power demand and such basic factors in the economy as the rate of increase in population and the rate of increase in the value of the Gross National Product. If it is assumed that the rate of increase in the population and the rate of increase in the value of the Gross National Product will continue at the present rates of 2% and 4½% respectively, and if it is also assumed that the past relationship between these factors and power demand will likewise continue, it is possible to estimate a future rate of power growth as high as 7%.

A second method is to forecast future power requirements by analyzing the requirements of particular industries, since we know that two or three industries now account for over half of the total consumption of electric energy in this country. In using this method, account must be taken of the future requirements of these particular industries, and some allowance must be made for the possibility that the pattern of industrial development may change. Such an analysis may indicate that the immediate rate of growth will be as high as 7% per annum but that the growth rate may level off at somewhere around 6% per annum. I have selected a growth rate of 6% for the period of the next 25 years because I believe this is a conservative estimate. On this basis, we will have a total installed capacity in 1965 of 28 million kilowatts and a total installed capacity in 1980 of 67 million kilowatts, as compared to the

Continued on page 10

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# Central and Investment Banking in Canada

During the past two years there have been developments of considerable interest in the fields of both central banking and invest-



J. E. Coyne

ment banking, and in the relationship between the two. These developments have continued a process which began 21 years ago with the establishment of a central bank in Canada, and which has been going forward ever

since, both in peace and in war. Certainly the investment banking business has acquired increased importance in Canada over this period, has come to fulfill an increasingly important function in the financial structure of our economy. That structure as a whole is in consequence stronger, better integrated, more flexible and of more value to the nation through the assistance it provides to economic growth and development, to the increasing maturity and diversity of our economic life.

By way of background to some further comments on investment banking in Canada today, I should like to refer to changes in the monetary situation over the past year, and to the way in which the monetary operations of the central bank and the credit-granting operations of the chartered banks interact with the operations of investment dealers in the distribution of re-distribution of securities and other investments.

It is sometime said, inaccurately and with misplaced dramatic emphasis, that monetary policy is now restrictive, where a year or more ago it was expansive, and that credit has been or is being restricted. These phrases imply that there is less money available, less credit available, today than at some time in the recent past. This idea is sometimes coupled

\*An address by Mr. Coyne at the 40th Annual Convention of the Investment Dealers' Association of Canada, St. Andrews By-the-Sea, N. B., June 14, 1956.

**In explaining the extent to which the opposite to monetary restrictionism is the case, Governor Coyne states "economic growth this year will be the biggest in our history," that financial expansion has been held to what is possible in the physical sense, and that central bank action did not cause interest rate rise. Points out that the \$950 million difference between deposits and loans and investments was met principally by banks reducing government securities by \$925 million; praises investment dealers for their help in accommodating the huge distribution adjustment, and for encouraging, mobilizing and directing savings flow, and suggests challenge of improved short-term money market and residential secondary mortgage market be met.**

with the statement, also inaccurate, that the raising of the bank rate by the central bank was intended to bring about monetary restriction and did so.

### No Monetary Restriction

The facts are that the total money supply (currency and bank deposits) has not been reduced, but has continued to grow, and that credit has not been restricted but has continued to expand. Savings are continuing to rise, both in bank deposits and in other forms, long-term investors have more money available for new investment this year than ever before; economic growth this year will be the biggest in our history. Bank loans have increased every month so far during the period of so-called restriction, although it seems probable that the rise in total bank loans will slow down before very long; some categories of loans may decline while others go on increasing.

It is always possible, indeed it is normal, for bankers and investors to take different views from time to time of various kinds of loans and investments. In particular, at a time when the demand for money, the desire to borrow money, exceeds the supply that may prudently be made available, it is inevitable that some potential borrowers will be disappointed, some financing will have to be postponed, some loans will fail to meet the higher standards of credit-worthiness adopted by lenders in such circumstances.

By J. E. COYNE\*  
Governor of the Bank of Canada, Ottawa

able rate of physical growth of the economy, but may hamper such growth, in addition to bringing all the other evils of inflation in its train.

### Interest Rate Rise

Except at a time of marked underemployment of the economy as a whole, any strong demand for money, any rapid increase in the total demand, will cause a rise in interest rates. This rise is caused by the interaction of supply and demand, not by the action of the central bank, except in the sense that the central bank could prevent the rise in interest rates by providing an unlimited increase in the money supply. Normally the rising demand makes itself known through a rise in bank loans and bank deposits, and a fall in the prices of securities as sellers seeking to raise cash exceed those wishing to buy securities at existing levels. Banks too will have to sell securities to accommodate the increase in loans, unless the central bank increases their cash reserves, which would be a consequence of the purchase of securities in the market by the central bank. In fact, at a time of rising demand for money, a central bank will usually buy some securities and so add somewhat to the money supply, but not at a fixed level of interest rates or of security prices.

One effect of the normal reaction of a central bank to an increase in the demand for money

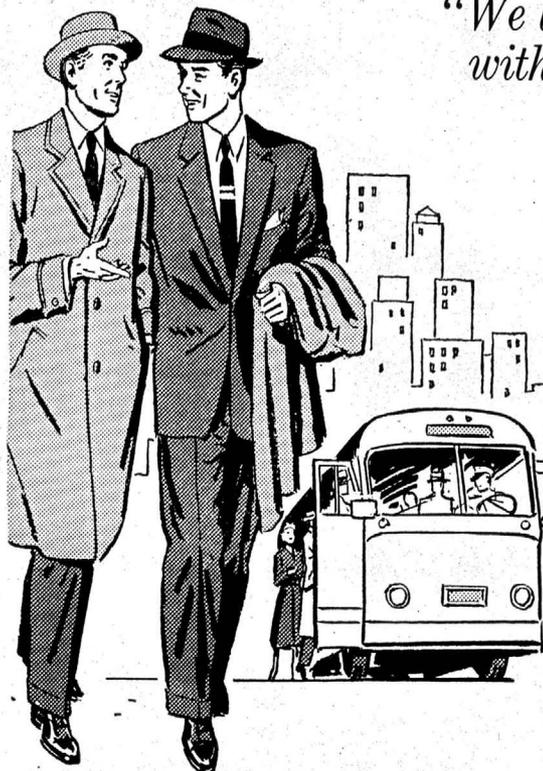
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This is what has been happening in the credit field, both long term and short term, in recent months. On the supply side there has been no overall reduction but rather continued growth. But demand has grown even more, and the projects for which funds are required have given every indication of being more, in total, than the physical potential of the economy. This has been true both of Canada itself, and of North America as a whole, and indeed of the greater part of the world. To permit the supply of money to become excessive, to expand to the full extent of the demand at the pre-existing level of interest rates, would in such circumstances be clearly inflationary, it is the duty of central banks not

to give way to the demand for such an excessive financial expansion. I am speaking of overall totals, monetary policy as such does not deal with the allocation of financial resources to particular persons or enterprises or regions.

Limiting the rate of financial expansion under such circumstances does not limit or attempt to limit the total amount of physical expansion, whatever amount may be physically possible, but simply seeks to ensure that financial expansion does not exceed or encourage futile efforts to exceed what is possible in the physical sense. Too much money chasing the available production of goods and services will not help to achieve the maximum sustain-

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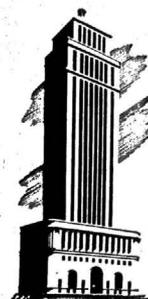
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# Long-Range Planning for Canadian Oil

By W. M. V. ASH\*  
President, Shell Oil Company of Canada, Ltd.



W. M. V. Ash

To increase our retail gasoline trade we have to produce the equivalent amount of petroleum in an oil well, in itself one of the more important operations in the mining-engineering field. Then it must be transported by pipeline, barge or ship, and remember that in terms of ships alone 30% of the world's shipping industry is represented by tankers. Next is the refining process—a chemical operation bigger in itself than what you usually think of as the chemical industry. Then transportation comes in again by ship, pipeline, rail car or truck — and figure for yourself how many of the trucks you see on our highways are oil transports. Finally, our gallon reaches you through this service station—the greatest single retail merchandising system in North America. The oil industry in fact is several — at least four—major industries rolled into one.

I mention all this not to boast of the size of our industry, but to lay a background of bigness in terms of long range planning. The need for bigness in Canadian planning will be my major theme.

\*An address by Mr. Ash before the 85th Annual General Meeting of the Canadian Manufacturers Association, Toronto, Ont., June 7, 1956.

Shell Oil President believes oil industry has passed the stage where it thinks of profits first and planning afterwards, and analyzes the following principal factors governing and requiring long range planning in economically and strategically important oil: (1) world energy requirements are such that 700 million ton oil production of 1955 will have to more than double to 1,600 tons in 1975, and will, at this rate, increase four-fold at the end of the century; (2) bigness in oil is inevitable; (3) Canadian reliance upon oil and natural gas production rose from 23% in 1946 to 42% in 1954, of total Canadian energy, and increasing reliance on petroleum is certain in spite of known future atomic developments; and (4) effect of monetary depreciation upon oil industry's heavy capital requirements, which in the next decade is expected to add \$8 billion to new investment in today's dollars. Deplores efforts to prevent foreign investments, free trade, and liberalized tax legislation.

In an industry made up of several major industries long range planning is essential if only to coordinate its many components. More than that—the oil industry is an essential factor in the nation's long range energy picture, actually the predominant factor.

I saw a provocative article recently in which the author suggested the first job of any company was to make profits and that only thereafter could it indulge in long range planning. Leading from strength as it were. This is a plausible view but I think it is a small one. It is the first point in this talk at which I would like to stress bigness in planning. I believe the oil industry today has

passed the stage where it thinks of profits first and planning afterwards. Of necessity it must lay its plans as a member of the national energy team, indeed a member of the world energy team.

#### Energy Consumption Pace

Reflecting world-wide economic advance, the free world's effective consumption of energy has increased by 135% since 1920, and since 1938 alone it has increased by 80%. But the consumption of petroleum and natural gas has increased faster still, raising their joint contribution to the total effective consumption of all forms of energy from about one-seventh in 1920 to more than half last year. Meanwhile the contribution of coal has fallen from about five-sixths in 1920 to less than half today. Over the same period hydro-electricity has raised its share from 3% to 7%. The big growth of energy requirements expected over the next 20 years or so will have to be met primarily by petroleum. Coal is losing ground and although nuclear power is undoubtedly the world's main future source of energy, its contribution over the next two decades is likely to be only small in relation to that of the present established sources.

Assuming as a minimum that the free world's production of all

commercial forms of energy together increases during the next 20 years at an average rate of 3% (compound) a year, it will be necessary to considerably more than double oil production from last year's level of some 700 million tons to reach 1,600 million tons in 1975. In the last quarter of this century, if the world's production of energy continues to grow at a rate of 3% a year after 1975, total energy output by 2000 would be almost four times the present level. Even a very rapid increase in the production of nuclear power from 1975 onwards such as would raise its contribution to total energy supplies to one-third by 2000, would still imply the necessity under these assumptions for a fourfold increase in oil production over today's level by the end of the century.

#### Inevitable Bigness Growth

It is a feature of the oil industry that while there are numerous small and medium-sized concerns, the forces which really count in terms of world oil supplies are a relatively small group of large international companies, each of which has its own integrated operations in every main phase of the oil business. Many factors relating specifically to oil have made this development inevitable; but bigness is a feature also of

companies in many other industries. It is indeed a notable achievement of our age. We are in the midst of the greatest and most sustained expansion in human activities ever recorded, and the units which handle the work must themselves grow in proportion, some inevitably growing faster than others. Both the needs of rising populations, and the demands for higher living standards have to be met. In meeting them the technique of mass production and mass distribution have provided the most effective means. For certain industries bigness is inevitable. The oil industry is one.

A characteristic feature of the oil industry from the consumer's point of view is its smooth and even pace. There are no violent price fluctuations, and petroleum products are always available when and where required. The flow of crude oil production, refining capacity, tanker tonnage, pipeline building and distribution facilities all keep closely in step. Yet no great system of coordination exists. This smooth functioning and balance is possible because each major company, mindful of its own operations, works out very carefully what is required to maintain each phase of its business. While most of these companies feel the urge to improve their position, they realize that they must plan with deliberation and prudence.

Turning to Canada our economic progress is the growth in the real wealth per capita. Canadian experience in common with general experience shows that a higher standard of living involves a greater per capita consumption of energy.

#### Canada Needs More Energy

The fulfillment of Canada's great economic potential depends on a flourishing energy industry. The demand for energy in Canada has increased by 32% between 1946 and 1954. Future economic progress will require growing energy supplies. Petroleum is easily the most important form of Canadian energy supply. Oil and natural gas in 1954 counted for 42% of total Canadian energy as compared with 23% in 1946 allowing

*Continued on page 21*

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# Canadian Telecommunications Today, Tomorrow

I am keenly aware of the honor you have paid me in asking me to address you. And I would be grateful if you would visualize

me — while making this statement of thanks — as a man wearing several hats. First, I am speaking personally — on my own behalf. Secondly, for The Bell Telephone Company of Canada. And, thirdly, as a spokesman, a trifle self-appointed I must admit, for the Canadian telephone industry.



Thomas W. Eadie

I would assume it is this third character you chiefly wish to hear from. My reminiscences—entitled perhaps Telephone Customers I Have Known or Thirty Years in Darkest Telephonia—do not seem wholly appropriate. And I am continually made aware that my own company is just a segment of a vast enterprise, national—even continental—in its implications. Also, the fact that you have yourselves assembled here from all over Canada makes the more desirable a national presentation.

Let me then begin by sketching—in broad outlines—the scope and organization of the telephone industry in Canada, which is, I might add, the most telephone-minded country in the world. We Canadians make considerably more telephone calls per person than any other people. Is the climate responsible for this? Or are we unusually sociable? Or do we have a very high national percentage of teenagers? Or are we just plain talkative folk? I must confess that I don't know the exact reason. I can only present the facts to you and leave you to draw your own conclusions.

\*An address by Mr. Eadie at the 40th Annual Convention of the Investment Dealers' Association of Canada, St. Andrews By-the-Sea, N.B., June 15, 1956.

**Canadian telephone industry spokesman projects an estimated \$3 billion plant and equipment investment need in the next 25 years and sees no reason why the major part should not be obtainable from Canadian sources. Mr. Eadie reviews the scope and growth of "the most telephone-minded country in the world," and, in illustrating the high-gear development, cites such major projects as: (1) coast-to-coast microwave traffic relay system, scheduled for operation by the end of 1958; (2) continent-wide automatic switching of long distance traffic, making Canada and the United States one vast telephone exchange; (3) Mid-Canada early warning line; and (4) pure research and practical technology efforts which include the transistor and the Bell solar battery.**

There are over 4,000,000 telephones in Canada and they are operated by some 2,800 separate systems. Hundreds of these are small cooperatives, owned by farmers or municipalities. Among the larger organizations are both shareholder-owned companies, like my own, and systems controlled by provincial governments as in the case of the three Prairie provinces. Yet we form a closely integrated network, and we work in mutual assistance towards a common goal of good, nationwide telecommunications service.

**Barometer of Development**

The telephone industry is one of the best barometers of development—whether national or local. The prosperity of a city, the growth of its industry and settlement are reflected, usually magnified, in the demand for telephone service. The extension of service into remote areas—nowadays often by radio—is an indication of successful pioneering. Through the increase in long distance calling you can measure the expansion of trade. In the ten years since the end of the Second World War the national total of telephones and the daily average of calls, both local and long distance, have all more than doubled. As a measure of the special intensity

of telephone growth, I would relate those increases of more than 100% to the 29% rise in population and the 38% rise in the volume of gross national product during the same period.

We are therefore in a period of high-gear development, which presents the industry with many challenges to its ingenuity and energy. The quantities of equipment needed to handle the vast telephone traffic have had to be bought at high cost-levels, and they must be maintained in a state of very vigorous productivity if our plant investment is to justify itself economically.

So far as local service is concerned, expansion has not involved any great novelty of either method or machinery. We have added many million dollars' worth of dial switching equipment, we have built hundreds of new exchanges, and put into operation a tremendous mileage of wire and cable. Extended Area Service has been developed to provide the most suitable pattern of service for neighboring communities and for metropolitan areas. All this has been—it is—a very large undertaking, but not an especially spectacular one.

For our equivalent to the 3-D technicolor jobs I would refer you rather to the expansion of

long distance service. Canadians are presently making nearly 1/2 million long distance calls every day, more than twice as many as ten years ago. There may be little slackening in this rate of growth in the decade immediately ahead. Good and rapid long distance communications are essential to the national development, and they have been a priority charge for the telephone industry.

**Microwave Transmission and Continent-Wide Switching**

There are two aspects to all telephone development—transmission and switching. That is, carrying your call with clarity, and delivering it to the correct distant telephone. Progress in each direction must be carefully related. Masterly automatic switching is of little value if the long distance lines are always busy or the conversations over them are incoherent. Radio channels capable of simultaneously carrying hundreds of conversations will do little good unless

the calls they carry are switched rapidly and efficiently. So we are now engaged on two major projects—the construction of a coast-to-coast microwave radio relay system and the organization of automatic switching of long distance traffic on a continent-wide scale.

First, here is the microwave radio relay picture. The members of the Trans Canada Telephone System are building a microwave radio relay network from Sydney to Vancouver. Part of it is operating now, and it will be completed by stages. The entire network is scheduled to be in operation by the end of 1958. The Trans Canada Telephone System, as you are probably aware, is an association of the seven major Canadian telephone organizations formed to develop long distance service on a national basis. Each member is responsible for the construction and maintenance of installations in its own territory. At present a microwave system operates in our Bell of Canada territory between Toronto, Ottawa, Montreal and Quebec City and in but a few months to Winnipeg. It will form an integral part of the national network. And this network will also carry television programs across Canada, serving in all some 28 Canadian cities.

Those are the transmission facilities we are developing for long-haul telephone traffic. What are our plans for switching? The ultimate aim might be described as the transformation of the whole of Canada and the United States into one vast telephone exchange. There are, I might mention, about 60 million telephones now in service in the two countries, and in recent years they have been in-

*Continued on page 26*



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Continued on page 30

# Keeping Canada's Air Transport in Forefront

From the beginning, aviation and Canadians have seemed meant for each other. Canada's vast distances demand the kind of transport that aviation supplies.



J. E. Nickson

I believe that air transport is indispensable to this country. The first and salient and overwhelming fact about the scheduled air transport system today is that it is indispensable to the public. It does not exist

for itself. It exists because people need it. As useful as air transport is today, we are only on the first page of the book of tomorrow's endless possibilities.

In looking into the future and attempting to prognosticate what might develop, I think we have to take a quick backward glance at what has happened.

In 1945, according to Canadian aviation statistics, domestic and international operations by Canadian and foreign carriers involved the flying of 153 million passenger miles. At the same time, according to Canadian railway statistics, the railways provided 6 billion 350 million passenger miles.

\*An address by Mr. Nickson before the 85th Annual General Meeting of Canadian Manufacturers' Association, Toronto, June 8, 1956.

By J. E. NICKSON\*  
General Sales Manager, Trans-Canada Air Lines

Commercial impact, economic growth results, and coming developments in Canadian aviation are depicted by Trans-Canada Sales Manager. Finds the future exceedingly bright in Northern, Mainline and International types of operation. Mr. Nickson observes: (1) it will be a problem to put commercial-paying aircraft through sound barrier speeds; (2) little prospect for atomic civil aircraft in next 15 years; (3) rapidly rising investment in planes of advanced technological and design progress constitutes a financing problem; (4) consumer air rates to decline in next 10 years, providing decreasing cost per seat or ton mile is not offset by expected rising labor costs; and (5) many improvements will have to be made to accommodate tomorrow's endless air possibilities.

### Air Versus Rail Mileage

In 1955, based on actual and estimated figures for the first seven months of that year, the various air carriers flew 1,500,000,000 miles—an increase from 1945 of 880%. The railways provided 2,808,000,000 passenger miles—a decrease of 55%.

These figures give you some idea of the growth, since the end of the war, of civil aviation in Canada.

Now—looking to the future, what do we see? It seems to me that just about our starting point is to refer to the Gordon Commission briefs concerning the growth of this country. You will recollect that prognostications have been made that the population

will increase by 22% to over 19,000,000 in the next 10 years, and then continue to climb to 28,000,000 by 1980.

Further, it is the prediction that the Gross National Product will increase by 38% to \$36 billion in the next 10 years and continue upward to reach \$70 billion in 1980.

I have been asked to speak on the subject "Keeping Canada's Air Transport in the Forefront." I presume this means forecasting future developments for civil air transportation in Canada. In making forecasts, I find it at this time extremely difficult to look beyond 10 years ahead, that is, up to 1965. In our company we are actually planning operations, or I

should say, have planned operations through that year.

We are trying to work on a 10-year basis, as a minimum. One of the reasons why it is so difficult to talk beyond a period of 10 years must be perfectly obvious to any who wish to consider this question.

Basically, the problem is "What is the outlook beyond 10 years for aircraft development," that is, the means by which people and goods are actually moved.

### Jet Aircraft Age

You have no doubt heard or read about the recent purchases by many of the major airlines of the world of jet aircraft. This is a most significant development.

It anticipates the elimination—gradually, I will admit—of the standard piston-engine aircraft on firstly, the long-haul or international routes, and subsequently the shorter-haul routes.

With respect to the shorter-haul routes, we are today operating turbine powered aircraft with geared propellers, and it is possible to foresee within the next 10 years the replacement of this type of aircraft, by some of the carriers with small jets.

The jet age is a new development in history of civil aviation. I don't know if many of you are aware of the fact the aircraft which have been ordered, will cruise in the neighborhood of MACH 8-5. In other words, their maximum cruising speed will be nearing the speed of sound, MACH 1, and in actual miles per hour should be around 550.

At the present time, the major carriers of the world using multi-engine aircraft, have these aircraft cruising in the neighborhood of 300 to 330 miles an hour.

Entirely apart from the particular airline problems of introducing a completely new aircraft with a new power system, the impact, commercially, on the nation and on other nations of moving the cruising speeds from, say, 300 to 550 miles an hour, is very extensive.

Therefore, we feel we can look

*Continued on page 23*

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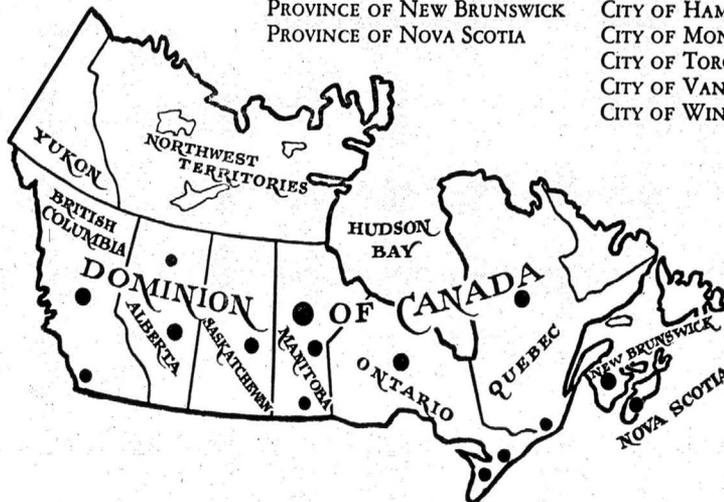
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Continued from page 4

## The Atomic Energy Program In Canada

present installed capacity of 16 million kilowatts.

Where is this power to come from?

### Future Nuclear Power Forecasts

A substantial part of it will come from hydro sources which are so located that they can deliver power to existing systems at costs less than the cost of producing thermal power. However, all of our hydro resources are not in this category. In some cases transmission costs will impose a prohibitive penalty. A conservative estimate shows that of the total installed capacity of 28 million kilowatts in 1965, 24½ million kilowatts will be supplied from hydro stations and the balance, or 3½ million kilowatts, will be supplied by thermal stations. Of

the total installed capacity of 67 million kilowatts in 1980, 46 million kilowatts will be supplied from hydro stations and the balance, or 21 million kilowatts, will be supplied by thermal stations. The substantial increase in 1980 in the percentage of thermal power as related to the total installed capacity reflects the exhaustion of economic hydro sources. In those regions where cheap fossil fuels are available, thermal stations will be of the conventional type—that is, they will burn coal, oil or natural gas. In those regions which do not have indigenous supplies of fossil fuels, transportation costs at some point may impose a heavy penalty, since fuel costs are the major factor in the total costs of power generated in thermal stations. Such regions

—and Southern Ontario is one of them—will face an inevitable increase in power costs, whether the choice lies between high-cost thermal power due to transportation expense or high-cost hydro power due to transmission expense, unless some alternative source of cheap energy can be found. Nuclear power is such a source.

On the basis of present information about power reactor technology, it is a reasonable expectation that nuclear power can be generated by 1965 at a cost of not more than 6 mills. This 6-mill cost is roughly equivalent to the cost of producing power in a conventional thermal station using coal at \$8 per ton. If we accept this cost target, the following estimate can be made as to the respective roles of conventional thermal stations and nuclear stations in meeting the requirements for thermal power in 1965: of the total installed thermal capacity of 3½ million kilowatts, somewhere between 200,000 kilowatts and 400,000 kilowatts will be nuclear. Beyond 1965 we would expect

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some reduction in nuclear power costs as the result of improvements in technology.

However, for the purpose of this forecast I have assumed a cost of 6 mills, although I think this is a conservative estimate. On this basis, of the 21 million kilowatts of thermal capacity in 1980, something like 7 million kilowatts will be nuclear. To the extent that nuclear power costs can be reduced below 6 mills, the contribution of nuclear power to the total installed capacity in 1980 will be greater. It may be of interest to point out that in its submission to the Gordon Commission, Ontario Hydro has forecast a nuclear installation of 400,000 kilowatts in 1965 and between 6 million and 7½ million kilowatts in 1980.

My forecast indicates that the part played by nuclear energy in supplying Canada's power requirements will be a modest one up until 1970. After that period we would expect that the role of nuclear power would become increasingly important and that by 1980 nuclear power plants would account for over 10% of the country's total generating capacity. Be-

yond that period the percentage will increase sharply.

I think it will be evident that the accuracy of the forecast depends on our success in developing economic power reactors.

What are we doing about this?

**Fundamental Research**

We are doing three things. First, we are carrying on fundamental research in physics, chemistry, biology, physical metallurgy, and associated sciences. Second, we are testing fuel systems, materials and components in the NRX reactor. Third, we are undertaking design and feasibility studies with supporting engineering development for power reactors. I should point out at once that, while I have described these three activities separately, they are in fact very closely related. Although sufficient scientific data are now available to permit a beginning in the applied field, the boundaries of scientific knowledge have by no means been pushed to their limit. If Canada is regarded today as one of the leading countries in this new science, it is simply because of the emphasis we have

placed on fundamental research. This emphasis must continue if we are to maintain our position.

The research scientist has a dual role. He must provide the data for the design of the future and possibly the ideal power reactor, and he must also provide expert advice in connection with current reactor projects. The testing of materials and components is an essential part of power reactor development. This can only be done in reactors like the NRX reactor at Chalk River where it is possible to stimulate the conditions, such as irradiation and temperature, which will prevail in a power reactor. I should remind you that the NRX reactor at Chalk River provides facilities for this type of work which are not found elsewhere in the free world, and this will explain why it has been used so extensively in the United States and United Kingdom atomic energy programs, as well as in our own program.

I might mention a project of current interest. The selection of specific fuels for the large demonstration power reactor known as the PWR which is now being built

in the United States was made as the result of experimental work carried out in the NRX reactor. Our new reactor, the NRU, which will come into operation late this year, will have even better facilities for experiment and testing. The General Electric Corporation, which is heavily involved in the United States power reactor development program, is now dis-

cussing with us the use of the NRU reactor for loop experiments.

**Design and Feasibility Studies**

Design and feasibility studies, with engineering development, are necessary if the results of research and experiment are to be given a useful application. Or, to put it another way, at some stage in

*Continued on page 12*

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Continued from page 11

## The Atomic Energy Program In Canada

every research and development and operating a power reactor. program it becomes necessary to demonstrate feasibility. In the research and development program for power reactors, this can only be done by designing, building

and operating a power reactor. Our first design and feasibility study began early in 1954. From it came the outline specification for the demonstration power reactor known as the NPD (Nuclear

Power Demonstration) which we are now building in association with Ontario Hydro. The design of this reactor, which is expected to come into operation in 1958, is based on the technology which we have pioneered at Chalk River. It will have an electric output of 20,000 kilowatts. Its primary purpose will be to demonstrate that a nuclear station can be operated as a reliable source of power.

The NPD will not produce power at competitive costs nor will it produce all the information which is required for the design of a large central power station. Consequently, we also have under way a preliminary design study with supporting development programs for a large power reactor—in the range of 100-200 megawatts. In addition, we are considering design studies for other types of reactors which we believe may have a useful place in the Canadian economy—for example, a dual-purpose reactor which will provide power and process heat for the pulp and paper industry, and a small reactor which will supply power and space heating

in remote areas of Northern Canada where the cost of conventional thermal fuels is excessive.

At the present time the annual cost of energy for all purposes in this country, before distribution cost, is something like a billion and one-half dollars. Hydro energy accounts for about 10% of this cost: fossil fuels account for the balance. A substantial part of the fossil fuel requirements is now imported at an approximate annual cost of half a billion dollars. The annual growth rate of energy requirements for all purposes is approximately 4% per annum. I offer these statistics in support of my opinion that the use of nuclear energy for space heating and for the production of process heat has very interesting possibilities.

### Partnership With Utilities and Manufacturers

From the inception of the power development program we have recognized two basic principles—first, that nuclear power plants will be operated by those who are now in the business of producing

power—the utilities—and, second, that these plants and their components will be designed and built by manufacturers. These principles have determined the manner in which we are carrying out the program.

The participation of the utilities takes two forms. First, we have an Advisory Committee on Atomic Power on which the utilities are represented, and, second, we have established at Chalk River a Nuclear Power Branch, the personnel of which has been recruited from the utilities. The Advisory Committee on Atomic Power serves a dual purpose. First, it permits the utilities to evaluate the economic importance of nuclear power in terms of their respective power needs and, second, it enables us to give our program the shape and direction which is best suited to those needs. The Nuclear Power Branch is responsible for carrying out the design and feasibility studies on various types of reactors—which I have already made reference—and works in close contact with the scientific and engineer-

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ing staff at Chalk River. Under this arrangement we are providing for the maximum inter-play of ideas as between those who must operate power plants and those who are responsible for their design.

The participation of the manufacturer can involve two stages. First, he must obtain the kind of information about power reactor development which will enable him to determine what part, if any, his company can play in that development. Second, he can undertake the design and fabrication of power reactors and their components, with supporting engineering development programs. At the information stage we are supplying technical literature on power reactor development and we are also arranging frequent conferences at Chalk River, both for individual companies and associations. For example, recently a two-day conference was ar-

ranged for the Pulp and Paper Research Institute.

Participation in engineering development, design and fabrication is obviously the most important side of our partnership with industry. This participation began in a major way on the NRU project. More than 100 Canadian companies have been engaged on the fabrication of parts for this reactor, involving special designs outside of normal manufacturing experience. The contract for the detailed design and construction of the NPD reactor has been placed with a manufacturer. Contracts have also been placed for the design of a research reactor of the swimming-pool type and for the design and manufacture of a loop system for the NRU reactor. Proposals have been invited for the supply of fuel elements for the NRU reactor and for the components of the reactor of the NRX type which we are

building in India under the Colombo Plan.

These are only a few of the highlights of a large and expanding program of industrial participation, but I believe they serve to clarify the respective areas of responsibility. Atomic Energy of Canada Limited must accept the responsibility for supplying the data necessary for the design of nuclear plants, whether they be used to generate electric energy, for space heating, the production of process heat, or for all three, since the nature of the research and development program and its expense are undoubtedly beyond the abilities of the Canadian manufacturer.

The manufacturer, if he is to be in a position to supply the domestic and foreign requirements for power reactors and their components, must be prepared to give effective application to the data which are supplied by Chalk

River. This will not be an easy task, since power reactors and their components do not lie within the normal design and fabricating experience of the Canadian manufacturer. Lest we become too discouraged on this score, I might point out that a similar situation exists in other countries. Working as partners, I believe we can create a prosperous industry.

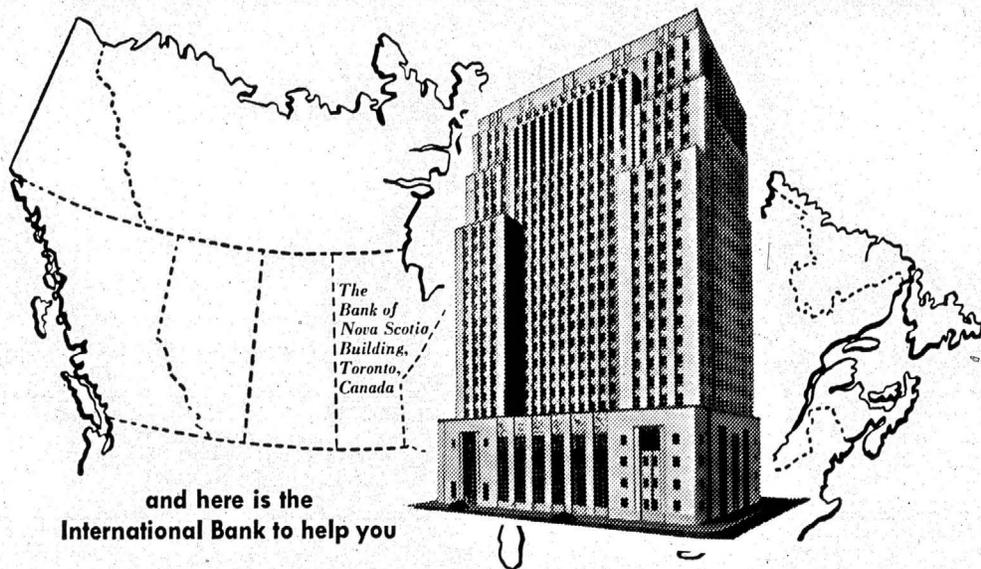
**Uranium Production and Purchasing Policy**

The development of economic power reactors is one part of the

Canadian program in atomic energy. The production of uranium, the raw material for atomic energy is another part—and one in which we happen to have a very large stake. Canada began to produce uranium for the atomic energy program during the war years and this policy was continued in the postwar years. While the main objective of the program in the immediate postwar years was, and still is, the supply of uranium to the United States for military projects, we have been conscious

*Continued on page 14*

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Continued from page 13

## The Atomic Energy Program In Canada

throughout the program that we were developing a resource which would have an important bearing on the peaceful uses of atomic energy.

I am sure you are familiar with the current policy covering the

purchase of uranium. Briefly stated, the position is as follows. The policy of encouraging uranium production by private companies was first announced in March 1948. Those of us who had some part in establishing that policy were

convinced that the mining industry and our investment houses would be prepared to risk investment in uranium production if a decent incentive were provided. This incentive has taken two forms—first, a guarantee that Eldorado will purchase all uranium which is offered under a published price schedule and, second, a guarantee that Eldorado will purchase uranium under a special price formula. In the latter case, the guarantee is subject to certain conditions—namely, that applications for special price contracts shall have been submitted on or before March 31, 1956, and, second, assurance that production will commence not later than Sept. 30, 1957. As it happens, all purchases made to date have been made under the special price formula and on the basis of our present information this situation is likely to continue.

The results of the purchasing policy have been quite remarkable, when one considers the short period that it has been in effect. At the present time special price contracts have been written for

a total value of approximately \$700,000,000. Our expectation is that this amount will be in excess of a billion and one-quarter dollars when the negotiation of contracts now in process has been completed. This means that the gross value of our uranium sales, when all of the mines including Eldorado's mines are in full production, will be at the rate of approximately \$300,000,000 per annum, ranking uranium in first place in the annual dollar value of metals produced in Canada. Since this income will be derived in large part from export sales, uranium production will have a significant effect on our trade balance.

It is estimated that capital expenditures for plant, equipment and machinery, housing, power lines, roads, etc., will be approximately \$270,000,000. Preproduction expenditures—that is, expenditures on diamond drilling, shaft sinking and mine preparation—will account for an additional \$57,000,000. Operating expenditures, during the production period of the contracts, for wages

and salaries, supplies and services, will total approximately \$863,000,000, of which roughly half will be for wages and salaries. This new and important industry will provide direct employment for about 13,000 people and employment for many others in the various industries which support a mining operation.

Certain of the member companies of your Association have played an important part in the financing of this development. Approximately \$100,000,000 of the capital required has been furnished by investment houses, and the major part of this has come from Canadian investment houses. We estimate that an additional \$190,000,000 will be required to finance the companies which now have contract applications in process. I hope that a substantial part of this financing would also be supplied by Canadian investment houses.

The statistics I have given you suggest at once the importance of maintaining the uranium industry as a going concern in the period after March 31, 1962, the present

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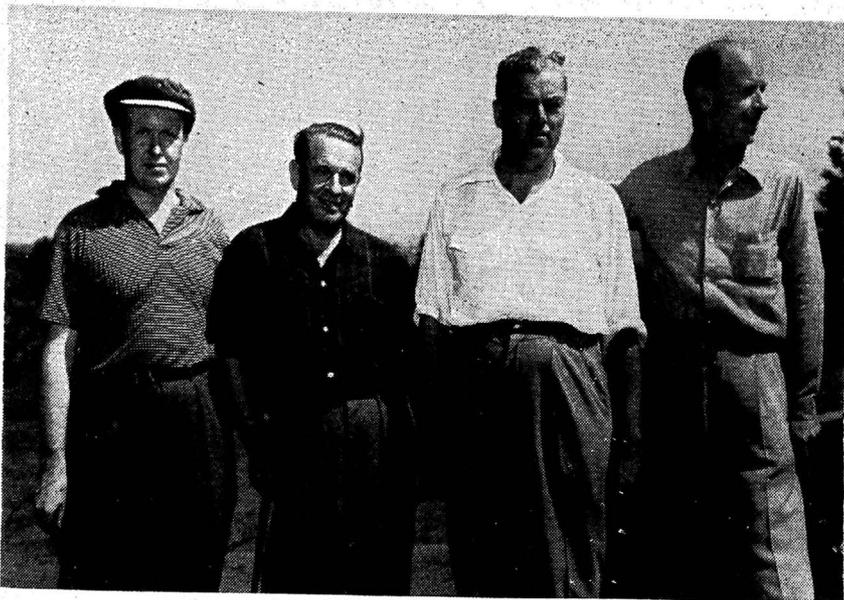
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termination date for deliveries under both purchasing arrangements.

What do we know about the probable markets beyond the March 31, 1962, date?

**Future Military and Civil Uranium Market**

I pointed out a moment ago that the main objective of our uranium program was the supply of uranium for military projects. There is no information available at this time as to what the level of demand for military purposes will be after March 31, 1962. The use of atomic energy for tactical warheads and for the propulsion of various types of naval vessels is a new development which may have some effect on the military requirements for uranium beyond 1962. There may also be some significance in the fact that the United States Atomic Energy Commission has extended its domestic buying program to the end of 1966. While the primary purpose of this extension is to develop new ore reserves to replace present reserves, it also in-

dicates that the United States foresees a substantial demand for uranium beyond 1962. What part of this demand will be for military uses and what part will be for civil uses I do not know, nor do I know whether the demand will be such as to require heavy imports of uranium beyond 1962.

Obviously it is very much in the interest of the producer who now has a contract or who may receive a contract that he should obtain this information as soon as possible, but it is likewise obvious that it is difficult to forecast both military and civil requirements beyond a certain date. Each of the special price contracts contains an option clause which permits the buyer to extend the contract at a negotiated price. It may be anticipated that the situation with respect to the exercise of these options will be clarified well in advance of the expiry date of the present contracts.

What do we know about the probable demand for uranium for civil purposes—that is, for power programs?

From my previous remarks it

will be clear that we are now able to predict that nuclear power can and will be used. The extent to which it will be used and the areas in which it will be used will depend, first, on future power requirements and the conventional sources of energy, and their cost, which will be available to meet those future requirements, and second, on the cost of generating power in a nuclear power plant. I think I have also made it clear that there is a close relationship between these two factors.

For example, if we assume that nuclear power can be generated at competitive costs not later than 1965, it is not too difficult to predict in what regions of the world nuclear power will be used in that year. However, even if we were able to arrive at a reasonably accurate estimate of the amount of nuclear power which will be generated in a given region by 1965, we would still be unable to forecast the amount of the uranium requirements for this power, since this will depend on the type of power reactor and the fuel system which are used. Power

reactors differ in many ways but they differ particularly in the amount of energy which they can extract from a ton of uranium, or what is commonly called the difference in the burn-up factor. I think it may be helpful at this point if I attempt to give you a brief description of what is meant by the burn-up factor, since this is necessary to a proper understanding of the economics of nuclear power.

**Burn-Up Factor Described**

If it were possible to utilize all of the heat potential of a ton of natural uranium, the requirements of uranium for a nuclear power program would be very small. As it happens, there are physical limitations and cost limitations which stand in the way of the full utilization of the heat potential of a ton of uranium. The

*Continued on page 16*

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Continued from page 15

## The Atomic Energy Program In Canada

combustible, or to be more exact, the fissionable part of uranium is its U-235 content. Natural uranium consists of one part of Uranium 235 and 139 parts of Uranium 238—that is, the content of Uranium 235 in natural uranium is about 0.7%. When uranium is burned in a reactor, several things happen.

First, some part of the U-235 is consumed.

Second, some atoms of the U-238 are converted into plutonium, which is itself fissionable and can, therefore, be used as a reactor fuel.

Third, certain new elements known as fission products are created. These fission products interfere with, or poison, the nuclear reaction. The effect of this poisoning is crudely analogous to the effect on combustion of the waste products which are formed when coal is burned. This fission product poisoning plus our inability thus far to find materials for sheathing the uranium fuel which will stand long periods of irradiation at high temperatures, without capturing too many neutrons, make it necessary to remove the uranium fuel from the reactor when only a small fraction of its heat potential has been extracted.

While we expect that metallurgical research will bring about some increase in the life of the

initial fuel charge, even under the optimum conditions which we can now visualize this improvement is not likely to increase substantially the amount of the burn-up. Consequently, if we are to obtain a much higher percentage of burn-up, we must find a way of using the unburned or depleted uranium and the plutonium in the spent fuel element. This can be done by extracting from the spent fuel element in a chemical process the unburned or depleted uranium and the plutonium, and by re-entering these to the fuel system of the reactor. This is called recycling. Theoretically, it is possible to continue this recycling until all of the heat potential of the original fuel has been utilized.

However, the cost of chemical processing places some limit on the number of recycles which may be economic—or, to put it another way, at a certain point it may be cheaper to buy new fuel. There are a number of possible approaches to reactor design, as the design affects the percentage of burn-up. These range from what is called a single-pass reactor—that is, one in which no recycling is done—to the fast breeder reactor, which produces more fissionable material in the form of plutonium than it consumes. No one can say at this time which

type of reactor, or which combination of reactor types, will produce the lowest cost per kilowatt hour—the decisive factor in the choice of reactor designs for a nuclear power program.

From what I have said up to this point, I think it will be evident that three factors must be used in assessing the probable requirements of uranium for nuclear power programs—first, the future power demand and the conventional sources of power which will be available to meet that demand; second, the cost of generating nuclear power; and, third, the type of power reactor which will be used. These three factors have been applied in forecasts of the range of uranium requirements for nuclear power programs in Canada, the United Kingdom and the United States over the period of the next 20 years.

The United Kingdom forecast is contained in a paper which was presented at the Geneva Conference by Sir John Cockcroft. The United States forecast is set out in the report of the McKinney Panel on the Impact of the Peaceful Uses of Atomic Energy, which was submitted to the Joint Congressional Committee on Atomic Energy on Jan. 31 last. The Canadian forecast is contained in a paper delivered at the Geneva Conference by Dr. John Davis of the Department of Trade and Commerce, who is Economic Consultant to Atomic Energy of Canada Limited, and Dr. W. B. Lewis, our Vice-President in Charge of Research and Development at Chalk River.

In a recent address to the Prospectors and Developers Association I gave an analysis of the findings of these several documents as they affect the requirements of uranium for power programs. Time does not permit me to give you this analysis, but I would like to repeat the conclusions which I drew from it.

### Previous Conclusions Repeated

First, it is impossible at this stage in the development of power reactor technology to establish firm estimates of uranium requirements for power programs. These requirements will depend on the extent to which nuclear power is used—which, in turn, will depend on how soon we are able to demonstrate that power reactors can be operated as a reliable and cheap source of electric energy.

Second, an abundant supply of cheap uranium will be an important factor in determining the choice of reactor types and reactor fueling systems. There will be an incentive to go after higher burn-ups as the cost of natural uranium increases.

Third, even if we accept the most optimistic forecast for the installation of nuclear power stations as shown in the three surveys which I have mentioned, the rate of uranium production which we are now able to project for the early 60's will be greatly in excess of the quantities required for immediate use in power programs in the United States, the United Kingdom and Canada in that period. This condition is likely to prevail until at least 1965, and possibly until 1970.

No reliable forecast is available for uranium requirements for power programs in other countries, but here we should keep in mind that these programs are at a relatively early stage in their development. It does not appear likely that the uranium requirements of those countries which have embarked on nuclear power programs, such as the countries of Western Europe, will reach substantial proportions until well into the 60s.

Fourth, the requirements of uranium for a Canadian nuclear power program—again accepting the optimistic forecast as to the rate of the installation of nuclear power plants—will only take up

a small part of our uranium production over the period of the next 20 years. The requirement in 1966 could be met very readily by the production from one of our smaller mines, and the requirement in 1976 could be supplied by one of our larger uranium mines. This means that we will be dependent on export markets after 1962, as we are at present.

The uncertainty as to the extent of the military demand beyond 1962 suggests that we should anticipate a situation where uranium will be sold under highly competitive conditions. Price will undoubtedly be an important factor in our ability to obtain markets. Even if the military demand continues, this is likely to be the case. I find support for this view in the recent announcement of the United States Atomic Energy Commission, in which it has established a price of \$8 per pound for a high-grade uranium concentrate for the period 1962 to 1966. So far as I am aware, none of the uranium now being produced in the free world is being sold at a price as low as \$8.

Our policy of permitting a full write-off of preproduction and capital expense in our uranium contracts should put the Canadian producer in a strong competitive position. We also believe that we can make a major contribution to cost reduction by improving ore extraction methods. Extraction costs now account for about 50% of the total operating costs for our uranium mines, as compared with costs of 20%-25% for the extraction of other base metals. Eldorado Mining and Refining Limited, in cooperation with the Mines Branch of the Department of Mines and Technical Surveys, has a major program under way in this field.

The uncertainty as to the future military demand also suggests that we should be giving serious thought to the development of new markets. We have recently taken a first step in this direction. Negotiations are under way

whereby the United Kingdom will obtain from Canada a substantial part of the uranium requirements for its nuclear power program. It has also been announced that we will consider arrangements for supplying small quantities of uranium to other countries for research and development purposes. The establishment of an export policy which would permit large-scale exports to other countries is complicated by the fact that uranium can be used for military as well as for peaceful purposes. Our government has taken the position that, if possible, such an export policy should be established within an acceptable international framework. This could be an agency with universal membership such as the proposed International Agency for Atomic Energy, or it could be a regional organization such as EURATOM or the Organization for European Economic Cooperation. In either case, there would be adequate safeguards against the diversion of uranium for military uses.

I hope that there will have emerged from this admittedly sketchy description of the Canadian atomic energy program some appreciation of its nature, its scope, its objectives, and its importance for our future.

The benefits to be derived from the raw materials program can be readily estimated. While there may be disagreement as to how soon we will derive any benefits from the research and development program, there can be no doubt that there will be a need for a new source of energy in this country, if energy costs are not to rise sharply. Nuclear energy will supply this need and, because it can be made available in almost unlimited quantities, it establishes a ceiling for future energy costs. A cheap and abundant supply of energy has been a condition of our remarkable progress during the past 25 years, and it will undoubtedly be a condition of our future progress.

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Continued from page 5

## Central and Investment Banking In Canada

is therefore to meet part of the demand and to that extent damp the rise in interest rates. Central bank action does not usually cause changes in interest rates, but restrains them, moderates them. But since only part of the demand is filled by an increase in the total supply of money, interest rates do rise until there is some abatement of demand, and/or there is a change in the distribution of the existing supply of money, some existing holders being found who will put their money at the disposal of some at least of those who are seeking to borrow. There is thus an increase in the rate of use of the existing money supply, a shift from the inactive deposits to active, as it were.

It is important to recognize that this potentiality always exists to

a greater or less degree, and can at times work against central bank policy. It is particularly important that the process of activation of inactive money should commence before inflationary developments gain too much strength, rather than that expansion of the total supply should continue without limit until it is found necessary to restrict the supply under conditions where very drastic action might be necessary, because the restriction would then have to be sufficient to offset the belated process of activation of previously inactive holdings on a very large scale. The change in interest rates when it finally occurred would then be violent rather than gradual, and failure to moderate earlier the expansion

of credit would lead to a severe contraction.

Perhaps all this sounds rather theoretical, but it is in fact a very practical matter in central bank operations and was very much in our minds in connection with the developments of the past 12 months.

### Bank Rate Role

Returning to what happens when the demand for money continues to rise after a condition of generally full employment has been reached, the rise of interest rates in the market may continue to the point where another method of increasing the total money supply may be involved, namely recourse by the chartered banks and by money market dealers to the central bank for short-term loans or purchase and re-sale arrangements. To meet emergency situations and for the smooth functioning of the money market the central bank occupies the position of a lender of last resort. It must always be ready to act in that capacity, for a price, and the price is represented by the rate of interest which the central bank

charges on its advances, in this row on day-to-day loans in the long as money can be obtained elsewhere at a better rate, no one tries to borrow from the central bank, but if other interest rates rise to a point where it is more expensive for a chartered bank to call its day-to-day loans or sell Treasury Bills, or more expensive for a money market dealer to borrow on day-to-day loans in the existing level of bank rate, then there is a natural tendency to turn to the central bank with its cheaper rate.

We are speaking of a situation in which the central bank has

Continued on page 18

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Continued from page 17

## Central and Investment Banking In Canada

been conducting its open market operations from day to day according to its best judgment of what is appropriate in the circumstances. If it is not prepared to increase the overall money supply without limit by purchasing all the securities offered to it at a given level of security prices, it would be frustrating its own objectives to do so by making loans on a large scale. It must, in such circumstances, raise its lending rate, the bank rate.

In theory the bank rate could be changed every day in very small fractional amounts, but it is usually considered more convenient to do it in rounder amounts at intervals. The Bank of Canada Act requires that the rate shall at all times be made public.

I will not take time on this occasion to relate the history of de-

velopments in the use and significance of bank rate and of the short-term money market in Canada. This was covered in some detail in our annual reports for 1955 and 1954. There have been changes in other countries too. Before the first world war a central bank's discount rate was chiefly significant in terms of movements of foreign exchange and the maintenance of the gold standard; for awhile in later years changes in central banks' discount rates, though recognized as instruments of domestic policy, tended to be rather infrequent and to occur only when it was desired to emphasize a major change in the economic outlook. In recent years much more frequent and

more flexible use of bank rate has been noticeable, particularly since 1951 in the United States, and by February, 1955 the development of our own money market had reached the point where bank rate could be put into commission as an operating factor rather than merely as a symbol.

The question of timing remains of importance. Unless the central bank is going to tie its rate to some fixed relationship with other rates, Treasury Bill rates, for example, the time a change in bank rate may seem on occasion to lag behind, or alternatively to lead the market. A change in the bank rate in either direction may be followed by further market change in the same direction, though not invariably so. Upward movements are more likely to synchronize closely with market changes than downward ones, and an upward change retains some symbolic significance, arising out of the circumstances which give rise to it, for it indicates that the central bank feels that the increase in the

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demand for money at current levels of interest rates is excessive.

**Bank Deposits, Loans and Investments, and Sale of Governments**

A description of the movement of bank deposits over the past 12 months will provide a good illustration of several points made above and will lead me into a discussion of the part played by investment dealers in the adjustment of demand and supply in the financial field. Total Canadian deposits of the chartered banks (adjusted for changes in "float") rose by \$550 million in the 12 months ending May 30, 1956. This was more than accounted for by a rise of \$310 million in personal savings accounts and of \$325 million in Government of Canada balances. All other deposits (adjusted for changes in total float), i.e., the bulk of the "commercial money," fell by \$80 million for the period as a whole, despite the great rise in bank loans, in general economic activity, and in spending of all kinds.

In the 12 months, bank loans and non-government investments rose by \$1,500 million, or 29%.

During the early part of this period there was in consequence some expansion of total bank assets (and therefore of deposits) but to an increasing extent the expansion of the chartered banks' loans and non-government investments had to be financed by the liquidation of their holdings of government securities. The one has been fully matched by the other for the past six months, and for the 12 months as a whole the reduction in chartered bank holdings of government securities amounted to \$925 million. This was the net result of an increase of \$325 million in Treasury Bill holdings and a decrease of \$1,250 million in holdings of government bonds.

Accommodating such a huge adjustment in the distribution of government securities (in addition to the large sale of Canada Savings Bonds) was quite a challenge for our financial machinery, and those who worked together to make it possible, and particularly the investment dealers, can take a considerable measure of satisfaction from the manner in which the challenge was met.

**Distribution of Governments**

You may be interested in the figures, on the basis of preliminary estimates for the end of May. It appears that, a part from Canada Savings Bonds, \$400 million in government securities was taken by the general public, another \$400 million by government investment accounts (using money which originated with the general public), and about \$40 million was accounted for by net reduction in the outstanding amount of direct and guaranteed marketable securities of the Government of Canada. Only \$80 million was added to the holdings of the central bank; this was approximately equal to the increase in active note circulation.

The \$440 million taken in one form or another by the government and government accounts was not provided by running down government cash balances; on the contrary these rose by about \$300 million. Notionally, you might say that the increase in Canada Savings Bonds bought by the general public to the net amount of \$340 million (net of redemptions during the period)

provided most of the funds used in the acquisition of securities by government accounts; an alternative way of looking at it would be to match off the net increase in Canada Savings Bonds with

the increase in the government's bank balances. On this view, the funds used to purchase market securities for government accounts were provided by the gen-

*Continued on page 20*

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Continued from page 19

## Central and Investment Banking In Canada

central public in a different form, namely, in part by an excess of government revenues over expenditures, in part by public purchase of government annuities, in part by funds accruing to the Superannuation Fund, and in part by other capital receipts of the government.

While the net increase in total holdings of government securities by the Bank of Canada was not large, there was a big change in the character of our holdings, chiefly as a result of the retirement of our holding of \$675 million in 6-month Treasury Notes. The government effected this retirement by increasing the Treasury Bill issue at intervals during the period, by a total amount of \$700 million, of which the Bank of Canada took \$190 million, the chartered banks \$330 million, and the general public \$180 million. In the category of government bonds, as distinct from Treasury Bills and Treasury Notes, the Bank of Canada added \$565 million to its holdings, so that its total portfolio, as already stated, rose by about \$80 million.

### Comments Investment Dealers

Having in mind the effect of the sale of the new series of Can-

ada Savings Bonds in absorbing a substantial amount of personal savings, the achievement of investment dealers in the redistribution of marketable government securities was very notable. This was also a period in which life insurance companies were further reducing their holdings of government bonds in order to increase their mortgage loans and other investments — i.e., for the same general purpose as the chartered banks. Non-resident on the whole were also selling government bonds in Canada. Finally, outside the field of Government of Canada securities, it is no news to yourselves that Canadian investment dealers probably raised more money in the period in question than in any other 12 months, on behalf of Canadian provinces, municipalities and corporations. The job of encouraging and mobilizing the savings of the Canadian people, and of directing them into useful investment, and of facilitating the most efficient use of money already in existence, was, I think, carried out with great success.

### Short-Term Money Market

After having paid you all these compliments, I had better go on to

say there is still much to be done, bigger challenges to be faced in the future, greater achievements to be sought. The short-term money market has made remarkable progress in the last two or three years, but should be expected to expand and improve substantially in the years ahead. Here, as in the other areas of investment banking, there is need of more capital, for one thing, for the carrying of larger positions, and of improved facilities for arbitrating one maturity against another. Again, the sale of equity-participation in Canadian enterprise to Canadian investors, although you come up against the stonewall of the life insurance companies, will offer an increasing field of activity for a long time to come. Progress was very noticeable last year, particularly in the case of "blue-chip" stocks of long standing. In the case of both new issues of common and preferred stocks and of re-distribution of holdings up for liquidation, I know that the members of the Investment Dealers' Association of Canada are as keen as anyone to maintain and increase the Canadian share. This is a field in which several of the chartered banks have on occasion given a lead and played a prominent role by aiding with temporary financing, and I am sure they will be responsive to further opportunities of the same sort.

### Secondary Mortgage Market

Another field in which the public interest would be served by an expansion of the activities of investment dealers is the development of a secondary market for mortgages on residential properties. In relation to securities, dealers have long recognized their responsibility to develop and improve secondary markets, the after-issue or between-issues market, in the interest of borrowers and lenders alike. Only in this way can investments be rendered liquid, that is, provided with a market in which sellers can find buyers at any time without too great a change in value resulting from the activity of any one buyer or seller.

The more active and progressive investment dealers, the real architects of our capital market, are now considering ways and means of filling what has become a very noticeable gap in our market apparatus. We do not yet have in Canada broad smoothly-functioning secondary market in mortgages. The entry of the chartered banks into the field of making and servicing insured residential mortgages under the National Housing Act offers the possibility of a large and fairly continuous supply of such mortgages for resale to other investors. The banks, with their widespread branch system, can initiate and service a much larger volume of mortgage loans than they themselves would normally wish or be able to add to their portfolios. They can put together a representative bundle of mortgages — on properties located in any area or throughout the whole country — with good spread of risk, or what small risk is left after the 98% insurance feature is taken into account.

With a supply of merchandise available, it is up to the investment bankers to make a market for buyers and sellers alike. Some large parcels of insured mortgages have already been sold direct by the original lenders to investors such as pension funds, but there is an obvious need for comprehensive facilities to promote broader distribution. The fact that the servicing function, in the case of insured mortgages, can be separated from the investment function is a great help in finding a broader market—an investor need not confine himself to his own area.

On the technical side, there is need for more study of the costs involved and of the relationship between them — costs of acquisi-

tion, of transfer, of servicing the mortgage, cost of money, and cost of servicing the investor. This is familiar ground for investment dealers. I will only make one suggestion. I believe there is a place for intermediate corporations issuing their own debentures secured by mortgages—conventional as well as N.I.A. mortgages—debentures which could be closely held or broadly distributed according to circumstances. Investors who fear, rather unnecessarily I think, that some opprobrium or loss of goodwill might result from occasional foreclosure action might be interested in a mortgage corporation with only a few owners or debenture holders, thus combining impersonal ownership with very small costs of operation.

Among the advantages which would accrue from the development of a broad secondary market would be not only a marked improvement in the investment quality of mortgages because of the increased liquidity, but also a closer integration of mortgage interest rates within the general market pattern because of the greater ease of trading from one kind of investment to another, consequent upon the elimination or lowering of barriers which now deny access to the mortgage market to various classes of investors.

Incidentally, this is a field in which, once any technical problems are overcome, it should be possible for the smaller investment houses to operate as successfully as the larger ones.

I have talked about several specific matters in which the central bank is interested, including a number which are of direct concern to investment dealers, and I have tried to bring out to some degree the relationship between the central banking function and the investment banking function. The interest of the central bank in all these matters affecting investment banking might be summed up by saying that the central bank believes that its own operations will be the more successful if carried on through a well-established, smoothly functioning financial structure designed to do the best possible job of bringing together saving and investment at the high-

est level that the Canadian economy can sustain.

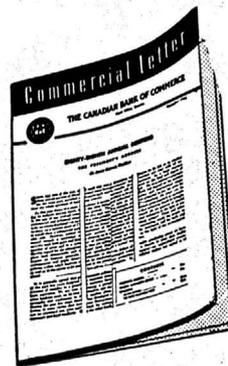
### Central Bank Policy and Limitations

It is the objective of any central bank today, and it is written into the preamble of the Bank of Canada Act, though I am not using the exact words of that preamble, that monetary policy should use its influence to encourage the full employment of productive resources without inflation of the price level, and to assist in the processes of economic growth on the highest sustainable level, which means, if at all possible, stable growth solidly based.

No one recognizes more clearly than a central banker that there are limits to the effectiveness of monetary policy. It is by no means the only factor influencing economic activity. The non-monetary fields of domestic policy, including fiscal policy and the various economic activities of all levels of government, are of the highest importance and may have more effect on the overall situation than monetary policy under certain conditions. I have said nothing today about international influences although we all know that events entirely beyond our control, developments in large countries abroad, can have a very great impact on Canadian production, employment and prices, and produce fluctuations which domestic policy could at best mitigate, not entirely overcome. And finally there are numerous decisions taken in the economic sphere by producers and consumers alike for reasons which are sometimes wholly beyond the influence of overall monetary factors.

There is one other point I should like to make in relation to monetary policy in its proper sphere of action. That is that by its nature it must be general rather than specific in its effects, national rather than regional in its application, and that its economic impact is of necessity indirect, through its influence on money and credit and the total financial environment, rather than acting directly upon any particular kind of economic activity. It is the object of monetary policy to exert

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its influence gradually and in the most flexible manner, preferably by continuous small adjustments, rather than abrupt drastic changes; it must be ready at all times to adapt to actual conditions rather than adhere to preconceived ideas.

One factor which I need hardly emphasize in talking to investment dealers is that effective monetary policy in a free economy would be completely incompatible with rigidity of interest rates. Variations in interest rates, especially those applying on marketable securities, are evidence of changing conditions in the supply of and demand for money and credit, and a necessary and desirable consequence of such changes. Fluctuations in the price of money are to be preferred to fluctuations in the price of goods, that is to say, in the cost of living and the costs of production of our economy, and can be an important influence in minimizing unemployment and facilitating healthy growth of the economy as a whole.

Monetary policy as such operates indirectly without specific direct controls. Direct controls, whether of fields of credit or of production and distribution, may under some circumstances appear temporarily necessary in the public interest, but monetary policy in the strict sense of the term is within the limits of its effectiveness, the alternative to direct controls. It is an essential instrument of freedom in the economic sphere. Indeed, the whole of our financial structure in this country as it has developed and as it is further developing today is an instrument for the buttressing of economic freedom and the encouragement and development of the highest possible degree of economic and social welfare. All those who are concerned in the overall financial process, all of you here today, are contributing to this objective and share the responsibility for the degree of progress that may be from time to time achieved.

Continued from page 6

## Long Range Planning for Canadian Oil

for relative efficiency. An increasing reliance of the Canadian economy on petroleum is certain.

Canada occupies an important position in the free world's oil picture. She has great reserves capable of development and this in a situation on which the Western Hemisphere is becoming increasingly dependent on the Eastern Hemisphere for its petroleum supplies. Canadian petroleum therefore has particular strategic significance. The capital requirements to assure Canada's potential petroleum growth are so enormous that she must take advantage of every money source available to her, domestic or foreign. This again calls for bigness in planning. And I will have more to say about it.

### Monetary Depreciation of Income

One of the oil's serious problems, which it shares with industry generally (but feels more acutely than most because of its diversification) is the depreciation of our income.

Depreciation of money has far-reaching repercussions on the pace of economic progress. It is particularly important to oil companies which typically have continuing high capital requirements. Inflation, as well as gnawing into profits and thus diminishing the principal source of new capital funds, simultaneously reduces the real value of past accumulations, intended to cover the renewal of assets. Tax allowances, and corresponding provisions for amortization during the life of capital equipment, pay no regard to the declining value of money. It thus becomes necessary to supplement these with additional provisions from taxed profits. These provisions also, however, are subject to a steady decline in their real purchasing power. So-called profits must therefore make good the loss in money values in respect of past investment, as well as providing capital for modernization and expansion.

Consider the gravity of this in relation to the total bill we have to face. It is generally estimated the total bill facing the oil industry in Canada over the next decade is some \$8 billion (eight thousand million) of new investment in today's dollars. The construction content of this bill is presently inflating at the rate of one-half of one percent per month. Think of that in terms of long range planning. It brings

me to the main and concluding part of my remarks.

With a task of this size facing us surely it is the height of folly

to consider any restraint on the free flow of capital from any source? Surely the important thing is the greatest possible use of capital from all sources to create the greatest possible growth in real wealth per capita. We have seen that this means parallel maximum energy consumption. It also means maxi-

Continued on page 22

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Continued from page 21

## Long Range Planning for Canadian Oil

maximum jobs for Canadians—maximum employment and maximum management.

### Shortage of Skilled Help

In looking at a total bill of \$8 billion for the oil industry in 10 years and the fields of endeavor in which it will provide opportunities for Canadians, one sees the following picture. A classic division of capital investment by the oil industry is:

Exploration & Production	75 %
Refining and Chemical	10.6
Pipe Lines and Marine	6.6
Marketing	6.2
Other	1.6

You will see from the foregoing what a preponderant share of the oil industry's activities is carried by men and women trained in the applied sciences. And once again we find a sphere where Canada is not planning big enough. The things I have advocated — maxi-

mum employment and maximum management for Canadians — are impossible unless Canada produces the necessary numbers of professional personnel—especially people qualified in the applied sciences. At the moment there is reason to fear she may not do so. In this, government, industry and our educational institutions face a serious responsibility for bigness in long range planning.

I believe government, industry and education will realize the danger before it is too late. I believe that young Canadians—with the proper guidance from these three—will realize the great opportunities in a career in the applied sciences which they all too far from realize today. If we succeed in this—and surely this must be our aim—how can we limit those opportunities by restricting the flow of capital into our country?

### Should Welcome Foreign Capital

Nothing in my view could be more serious for Canada than smallness in planning in this matter of foreign capital. I have tried to show you the magnitude of the energy task facing our nation. But the very magnitude of the vista makes it difficult to see it totally. One tends to concentrate on details of the landscape. And that is just the danger. I feel so strongly about this subject that when I talk about it I want to use terms which will shock my hearers into sitting up and paying more attention than I usually am lucky enough to get. I want to say something like this—that talk of restricting foreign capital is to my mind not merely smallness in planning, but literally "small town."

### Improve Our Tax Laws

Instead of crying about foreign investment in the oil business (and let's face it—foreign investment has been willing to take risks in the past which we Canadians were reluctant to take) we should first put our own house in order. I appeal for no restraint on the investment dollar available to us, no matter where it comes from. But I appeal also to our government to remove restraints on our own Canadian investment dollar. It is only recently that a many-years-old tax deterrent against forming subsidiaries with more than 5% Canadian capital has been recognized by government and seems likely to be removed. Every oilman knows a domestic Canadian company drilling for oil is at a serious disadvantage taxwise against a United States company charging

its Canadian drilling operations to its United States income. This is because the United States tax treatment of oilfield depletion is substantially more realistic than that prevailing in Canada. And because a far-sighted government in the United States allows the cost of foreign exploration for oil to be treated taxwise as though it had occurred at home. That is bigness in tax planning. A simple step by which the Canadian Government can put the Canadian oil company on a par with the United States oil company, and consequently the Canadian investor in oil on a par with the United States investor, is by placing the Canadian tax treatment of depletion on a par with the United States. That would be bigness in planning.

Time does not permit me to go into these tax questions in detail. I did go into detail at your annual meeting two years ago. I mention it in general today only to explain how thinking Canadian oilmen, who are trying to plan long range, approach this matter of foreign capital. The positive approach is to remove the deterrents on Canadian capital. The negative one—which unfortunately has all too tempting an appeal to prejudice—is to shut the other fellow out.

### Oilmen Are Free Traders

So I am one Canadian (one of many I know) who says—"Welcome!" to the dollar that offers to help us develop our country, no matter where that dollar comes from. Rather than say to the foreign investor — "We don't want you," I would say this. I would say—"Come in and help us develop our country. Then go to your own country and help us sell our goods to your fellow-countrymen. As an investor in us

you are vitally interested in our country's healthy trade." As an oilman, I would say to the foreign investor — "Oilmen are by nature free traders. We put no tariff on your oil coming into our country. In your country work for the removal of the tariff against our oil which you need and in which you are investing."

### Threshold of Industrial Development

Canada stands today, I believe, on a threshold of industrial development similar to that of the United States some 50 years ago. Much of that great growth which the United States experienced, certainly in the first half of that era, was financed by foreign, and especially British, capital. I lived as a Britisher in the United States for many years. I never heard that this foreign investment ever led to any foreign domination of the United States. Indeed I never heard that any American ever feared such domination as a result of foreign capital. He was delighted to accept it and to use it in the development of his country. If we will accept capital from all sources to help us develop our country over the great half century that I am sure lies ahead of us, I predict we will be a predominant exporter of capital to other countries by the year 2000. The shoe in fact will be on the other foot. Already we have invested in countries outside Canada about half of the total foreign investment in Canada now. And as our foreign investment increases — as increase it will — I trust that those foreign countries in which we invest will not exhibit the same small town mentality which some of my fellow-Canadians today exhibit towards others who pay us the compliment of investing in us.

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Continued from page 9

## Keeping Canada's Air Transport In Forefront

only 10 years ahead and be practical about it, at this time.

### Speed of Sound Commercial Problem

We believe, and I think a great many in the industry feel the same way, that it is going to be a technically difficult problem to push a civil aircraft through MACH 1, the speed of sound.

The technical complications are very serious. I should mention that it is only recently that military aircraft in normal level flight have gone through MACH 1 into the higher speed ranges, and it would seem to us that it is infinitely more complicated to put a commercial vehicle through the sound barrier, without disturbance to passengers, and at the same time, at an economic cost

insofar as the carrier is concerned. We also have to consider, in looking beyond 10 years—I am trying to indicate to you the problems of forecasting beyond that period—the field of atomic-powered aircraft.

Here we have another problem. It is not inconceivable to look forward to atomic-powered aircraft, but in prophesying atomic power for aircraft we must not overlook the possible effect of complete destruction on the ground or in the air of such an aircraft.

The consequent release of radioactivity would not differ substantially from that following the detonation of a small atomic bomb, and might make the surrounding area untenable for some lengthy period.

While it is entirely possible this

problem will be overcome, I think it can be said that it seems reasonable to forecast that atomic power for civil aircraft will not be in service in the next 15 years.

### Air Investment Outlay

Another difficulty in looking beyond 10 years is the financial aspect of the overall situation. For example, in 1949 my particular company had in operation a single type of aircraft, the Lockheed 14.

Exclusive of spares and ground equipment, this aircraft cost us \$105,000. Since 1945 my company has purchased DC-3s, North Stars, Super-Constellations and the Viscounts, for the specific advantages each type offered. We now have placed orders for long-range jets.

All these aircraft have cost more per seat mile than the earliest type. The latest aircraft we have ordered, the Douglas DC-8, exclusive of spares, will cost us in the neighborhood of \$5½ million each.

I think you can therefore see the quandary in which we, as well as other carriers, incidentally, find ourselves in financing the tremendous increase in price which is due, in the most part, to technological progress and basically, to advances in design.

In fact, I recently overheard one of the most prominent senior airline executives say he would give his eye teeth if engineers and designers would only take a holiday, as financing the new projects is the major concern to his particular company, and it is just as difficult to find the money—if not more so—as it is to obtain the new types of aircraft.

In view of what I have said, then, I think I should confine further remarks about the future of Canada's air transport to the next 10 years.

In discussing the future, I think we have to do so in three distinct areas of operation. They are as follows:

- Northern operations.
- Mainline operations.
- International operations.

### Air Activities in Its Northern Operations

In the first area, namely, Northern operations, I would classify such items as

- Charter flying.
- Special airlifts—the DEW-Line and Mid-Canada lifts.
- Aerial spraying—in the timber areas of New Brunswick.
- Aerial surveys—for the industry and for the nation.

Development of new mining ventures and projects—Labrador mining development.

And many other similar types of operation.

As you all know, the vast dis-

tinues in Canada demand the kind of transport that aviation supplies in our Northern areas. I think it is very safe to say that Canadian developments in these areas, insofar as aviation is concerned, are the direct result of geography.

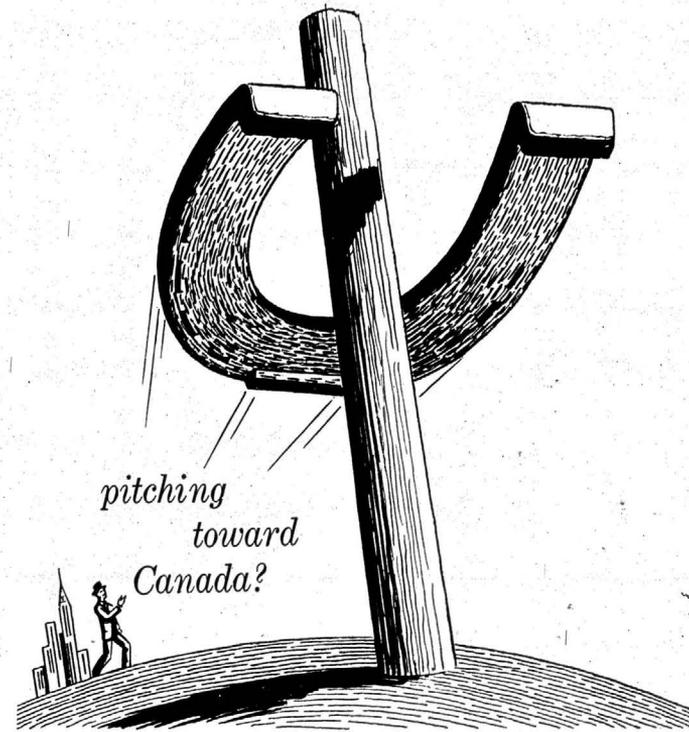
Looking at civil aviation in this field, it appears reasonable to say there is little doubt that the future was never brighter.

In the helicopter field, the demand in the Northern areas for this type of service increases each

year and, in fact, there are now over 60 civil aircraft registered in this service. The rotary-winged aircraft are playing an increasingly important role in the development of our natural resources, and many consider them indispensable to civil and government use.

Aerial surveying in Canada is experiencing a phenomenal growth and this country now leads the world in the development of airborne geological survey equipment

Continued on page 24



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Continued from page 23

## Keeping Canada's Air Transport In Forefront

and techniques. It is reasonable to forecast that due to these advances the geo-physical industry in Canada will double in the next two years. To emphasize this point, since 1952 approximately three million square miles of Can-

ada have been surveyed by air, plus an additional 1½ million line miles flown on mineral and oil Canadian registered aircraft are operating on aerial survey work in countries all over the world.

Of course, we have all read about the DEW and Mid-Canada Air lifts. These now absorb the attention of many civil carriers and probably will continue to do so for years to come.

As of January 1956, upwards of 42,000 tons had been moved by air on the DEW-line alone. The wealth of experience gained in the operation and maintenance of multi-engined aircraft under severe Arctic conditions has been of inestimable value to our civil carriers and to this country.

I can see nothing but an extremely bright future for the development of civil aviation on our Northern areas.

### Mainline Activities

In discussing *mainline* developments, it is a little easier to define the future.

Here we have a record of what has happened, which is statistically sound, and we have forecasts of the next 10 years of what we think will happen.

Taking Toronto as an example and dealing only with our own company statistics for the moment:

At that point, in 1956 we believe we will process approximately 800,000 passengers — and by "process," I mean emplane and deplane. In 1965, we anticipate that 1,700,000 passengers will be processed—a growth of about 112%. These figures do not include "through" passengers.

I think you will recognize that the future offers quite a challenge in the planned development of air transportation in Canada.

At the risk of bringing to your attention things that *might* happen on mainline services in Canada, I would like to make the following observations:

### Improvements Will Have to Be Made

New runways will have to be built, and at some airports, present runways will have to be increased in size. In some cases at the larger airports, existing runways will need considerable strengthening to bear the weight of the new and heavier aircraft types and, in other cases, new airports will have to be built in their entirety.

The problem of congestion at airports is becoming increasingly acute. Measures must be taken for the creation of satellite fields which will permit the segregation of military and lighter aircraft in the growing volume of civil aviation operations.

New and larger terminal facilities must be provided at the majority of Canadian airports. These should include adequate accommodation for the handling of passengers, mail and cargo as well as for ground transportation.

The past ten years have shown

a rapid development in the technical aids to navigation over land, sea and in the vicinity of airports. It is expected this trend will continue, and it would seem that advantage will have to be taken of these technological improvements which translate themselves into improved regularities, safety, and further freedom from dependence upon the weather.

It can be forecast that the current program of replacement of the existing Canadian system of medium-frequency radio ranges will be carried to its logical conclusions, and that installations of navigational aids in the vicinity of airports will be greatly improved and augmented.

Automatic approach aids should make it possible for civil aircraft to operate safely under far worse conditions of cloud ceiling and visibility than is now possible. The effect of this development on flight regularity naturally should be marked.

Airborne radar will continue its spectacular development with respect to storm surveillance and navigational systems, as well as flight control of the aircraft itself.

As in the past, it can be expected that the most dramatic

progress in technological improvements will be made in aircraft design and construction. We are already seeing these improvements, at least on paper.

From the inception of aviation until April 1, 1955, all civil aircraft on this continent were powered by one form or another of the piston-gasoline engine. On that date, the turbo propeller-powered aircraft came into scheduled use in North America. It is safe to predict this type of power will rapidly replace the piston-type engine over many routes during the next 10 years.

### Full Jet by 1965

As I mentioned previously, it is safe to forecast that the full jet engine will come into extensive use on the longer national routes during the next 10 years.

The use of rotary-winged aircraft in *mainline operations* is difficult to predict at the present time. Although important advances have been made in helicopter design, an aircraft capable of operating economically and with an adequate margin of safety for civil use, has not emerged.

Serious consideration also must be given to the development of an

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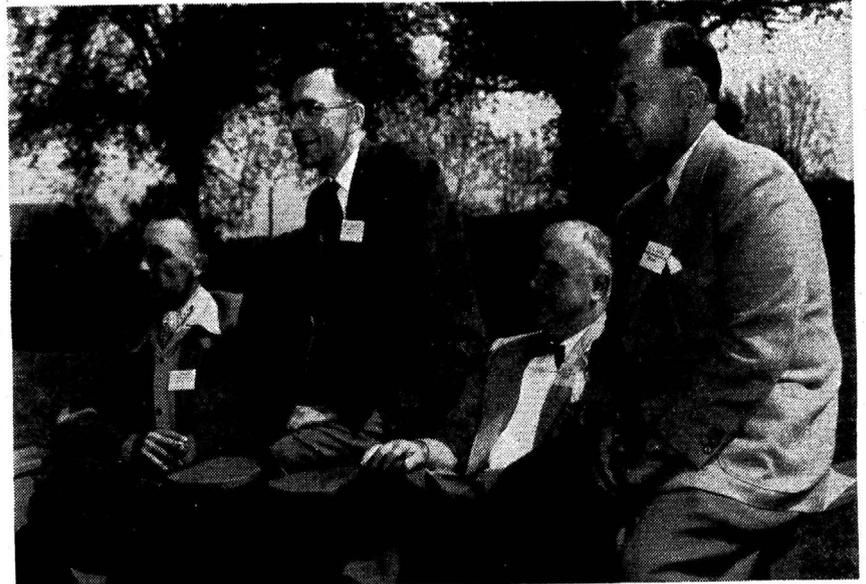
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entirely new type of vertical-thrust aircraft, and recently those of you who read "Time" magazine, will have noticed some discussion of this matter.

The nature of aircraft which will transport freight in the future is also a matter of intensive study. Whether cargo and mail are more economically carried as part of the payload on a passenger aircraft, or in aircraft either designed or modified for that specific purpose, depends upon the

relationship of the volume of cargo traffic and passenger traffic on any specific route.

At the present time, with a few exceptions all-cargo aircraft in current use are adaptations of basic passenger aircraft, and it is not unlikely this condition will continue for some time to come.

**Consumer Rate, Labor and Total Unit Costs**

With respect to the cost of air transportation—a very important

item to all those present — we anticipate the price of labor will continue to rise.

On the other hand, it is hoped and expected that other costs will decrease.

We are aware of the fact that capital outlay per installed aircraft seat will rise, but it would be reasonable, from what we know of the future, to expect the cost per seat mile or per available ton-mile, to decrease slightly as aircraft speeds increase, providing the rise in labor costs does not offset the effect of the increased speed.

Weighing the factors which would seem to affect future cost trends, it would seem reasonable to forecast a downward tendency in both the direct and indirect cost per unit of air transportation provided. This being so, it would also be reasonable to forecast that the cost to the consumer of air services should decrease over the next 10 years.

**International Operations**

In briefly mentioning international operations, Canadian carriers now serve South America, Mexico, West Indies, Bermuda, the United Kingdom, France, Germany and Holland.

As well, a Canadian carrier serves Australia, New Zealand, Honolulu, and in addition, Hong Kong and Japan.

In the next 10 years, it seems to me there will be further expansion of Canadian international services, but, of course extension depends to a great extent on arrangements made between governments.

International air routes require what is called a "bilateral" agreement to be negotiated between governments, and these are usually settled on a *quid pro quo* basis.

Insofar as international negotiations are concerned, Canada is particularly well situated, geographically speaking. By flying the polar, or sub-polar routes, the foreign carrier is able to shorten distances between points in different countries—but agreement is required if these aircraft fly over Canada and land, for other than refuelling purposes.

Today, a fair number of carriers are considering such a route, or routes. My point is: if this trend continues—and there is reason to believe it will—this nation will be, and in fact is now, in a sound bargaining position insofar as international routes are concerned.

In passing, I would like to make reference to the International Air Transport Association, of which most of you will have heard.

This is a very wide-spread organization with headquarters, incidentally, in Montreal, and is an association of all the major international carriers.

As a result of the activities of this association, and with the cooperation of the airlines, it is now possible to ship by air between all the principal cities of the world, and to transport passengers

by air between the principal cities of the world, on a standard way-bill or ticket at rates using easily determined combinations of fares.

The association is not a rate-making group, however—it is a rate-agreeing group, but all governments of the member carriers must approve resolutions agreed at any general meeting of IATA prior to their becoming effective.

At the present time, there is quite a substantial move afoot to

*Continued on page 26*

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Continued from page 25

## Keeping Canada's Air Transport In Forefront

introduce a third type or class of carriage of persons on the North Atlantic Services, which will undoubtedly—if approved—be provided on other international routes.

The way things are shaping up makes it seem that within the next few years we can look forward to a three-class type of service:

- First-class
- Second-class
- Tourist-class

I would forecast that the rates for Tourist-class service on the North Atlantic segments will be competitive, as far as initial dollar outlay is concerned, with Tourist rates provided by shipping companies.

This, if it comes about, means

a large expansion of the market for air transportation on the international routes, such as I have mentioned.

It means that possibly for anything from \$175 to \$250 one-way, a passenger will be transported by air to Europe in a matter of 10 to 12 hours, and probably a good deal faster than that in the years 1960 to 1965.

On the basis of the topic assigned me, I have attempted to give you some idea of the outlook in the next 10 years, sketchy as it may seem.

### Impact Upon Canadian Commerce

But what does all this mean to Canadian commerce? How are we and our business affected? How does it concern our planning for the future?

I don't think any of us should sit idly by and not take into consideration the progress which will be made in air transportation in Canada in the next 10 years, not to speak of the international routes.

Can we, as businessmen, neglect the following estimates, for instance, with respect to the speed of the movement of people and goods between the cities named, which I feel are practical and foreseeable by the years 1960 to 1965:

For example, we forecast the elapsed flying time between—  
Toronto and London, England will be 6 hours 45 minutes by 1961;

Toronto and Halifax will be 2 hours 5 minutes by 1962;  
Winnipeg and Toronto will be 2 hours 10 minutes;  
Toronto to Vancouver will be 4 hours 50 minutes; and  
Vancouver to Newfoundland will be 7 hours 45 minutes, allow-1 hour for connections.

As an example of what this means, it would seem quite within reason to forecast (dependent on actual schedules) that an Eastern businessman could go to the West Coast, do a few hours' business and return to Toronto, say, to sleep in his own bed that same night.

It is quite within reason to expect that, providing the means of communication are available to his shop and that warehousing, shipping arrangements, etc., are geared accordingly, a customer in a shop in Vancouver could receive his order from an Eastern manufacturer within 12 hours of having placed it.

Truly, the development of the jet age which is now upon us will play a most important part in the future development of this country.

Some people say "Why do we need to go any faster than we do today? Why is it necessary, or desirable, to go (say) from Toronto to Vancouver in 4½ hours?"

When we think of the impact of closer communication between the various parts of this country, and the better understanding that results as a by-product of that closer communication — I think we can quite rightly say that the higher speeds forecast can have only a beneficial effect on the knitting together of this nation, and from the international viewpoint, the creation of a better understanding between all peoples.

Continued from page 7

## Canadian Telecommunications Today, Tomorrow

creasing by about 3 million annually. When the new switching arrangements are fully operational you will be able to dial your own long distance calls to practically any one of those telephones — whether in Vancouver or Seattle, Winnipeg or Chicago, just as you now dial them within your own city. However, any call which both begins and ends in Canada will travel entirely over the lines of Canadian telephone companies.

Of course this is no overnight job. The first stage is operator distance dialing, and that is already well advanced with close to half the long distance calls made in Canada now dialed direct by the operator. The first customer begin next month in Windsor, when telephone users will be able to dial their own calls to Detroit and a wide area of Southern

Michigan. It will be introduced on a more considerable scale in 1958 in Toronto, and the following year in Montreal, and from then on steady extension may be expected.

The machinery for such a project has two essential elements. First, installations in strategic locations which will direct any long distance call to its destination automatically and at high speed. Second, a network of alternate routes flexible enough to carry the call there without delay. We have opened automatic long distance switching centres in the past 12 months in both Toronto and Montreal. Similar centres are scheduled for Saint John, N.B. and Regina. The microwave radio relay system will form the main artery of the Canadian long distance network, and it will connect with the extensive network

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that is being developed in the United States.

These projects are far more than fascinating examples of technical progress. The fundamental fact is that only through high-speed automatic switching and microwave radio relay or its equivalent can we handle efficiently the rising volume of long distance calls.

They are the product of telephone operations on a national—indeed a continental—scale. Work of similar scope has been undertaken in the service of the national defense.

**Mid Canada Early Warning Line**

The Trans Canada Telephone System was appointed management contractor for the Mid Canada early warning line; our company is acting as the project agent. Stretching across the country westward from the Labrador coast, the Mid Canada line is part of the great network of radar stations and communications systems that has been developed jointly by Canada and the United States. Hundreds of telephone engineers and skilled craftsmen are presently employed on the undertaking in cooperation with representatives of other Canadian industries. They are working under rugged conditions—far from

roads and railheads — where all supplies must be delivered by plane and helicopter, or by landing craft on stony beaches, or by tractor trains driving across the frozen wastes. That we have been able to set up the vast technical and administrative organization required for this undertaking without disruption of our regular service commitments, is, I think, an important commentary on the resources and abilities of the Canadian telephone industry.

There are a number of different ways of viewing telephone development. I have mentioned some of them—the increase in customers and calls, the addition of equipment to meet demand for service, the geographical expansion of our activities both through work in national defense and by the provision of communications for distant mining settlements or farming areas. I would like now to tell you something about what I might call development through diversity. It follows from our awareness of the very many types of information that telephone facilities are designed to transmit. Microwave radio relay carries television programs. Printed messages are sent by teletype over Canada-wide networks. Many of you will be familiar with this service in your own offices. Other

special services include the transmission of news photographs and radio programs, information and instructions needed to control electric power grids and oil pipelines, blueprints and diagrams, coded data for processing by electronic calculators. And radio telephone service is available in many parts of the country — both to vehicles and shipping. My own company, for example, operates mobile telephone service across the most populous and industrialized sector of Canada — from Windsor to Quebec City. The Northwest Telephone Company provides telephone service by radio up the B. C. coast to over 2,500 tugs and fishing boats.

**Mechanization**

These are some features of the 1956 telephone picture—as it appears to the public. I would ask you now to accompany me on a brief visit behind the scenes—to see what is being done technically in order to consolidate these advances and prepare for new ones. The first broad trend of development is ever-greater mechanization. The word “mechanization” is pretty controversial in many quarters, but it's an old standby in the telephone industry, in fact our long-trying aid in meeting greater demand for service.

Thirty years and more ago we began to mechanize local telephone service—that is, to convert it to dial—primarily because we couldn't provide enough service any other way. Today we are converting long distance service to dial — with Direct Distance Dialing. And we are of course still pursuing a vigorous program of local mechanization. Today over 70% of all Canadian telephones are dial-operated. One important development along these lines is the rapid spread of unattended dial offices. In small communities—and certain suburban areas—we are installing dial offices which operate without any permanent attendance. Plant men make scheduled visits for maintenance. Telephone calls requiring assistance are switched automatically to an operator at a centralized location. The service is efficient and economical to operate.

But it has one drawback — a drawback common to all processes of mechanization. It does lessen the occasions for personal contact, in this case between telephone employees and our customers. We have learned over the years how much people expect and appreciate friendly, helpful service from their telephone company. Such treatment is an important, even though an intangible part of the quality of service. We are doing all we can to maintain the tradition in changing circumstances.

And this calls above all for awareness that mechanization is an aid to better service and never an end in itself.

We have needed, as I mentioned, equipment of great complexity to provide efficient service. This has been created through a tremendous effort of scientific development. Not only of applied science but of what I might call research in depth.

It is not just a question of adapting known materials and proven scientific facts to our daily operations. The telephone scientists must hunt out materials and

scientific data to be useful not only in the immediate but in the quite distant future. Pure research and practical technology are both essential.

**Solid State Physics**

In the past decade solid state physics has provided our most profitable area of research. Telephone scientists began to seek knowledge here before the first world war, and their research yielded over the years a number of helpful devices. But their most recent discoveries constitute a

*Continued on page 28*

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Continued from page 27

## Canadian Telecommunications Today, Tomorrow

veritable treasure house; they include the transistor and the Bell solar battery. Developed primarily for the telephone industry, these devices have application wherever electricity is put to the service of man—from the most compact hearing aids to immense electronic calculators.

The transistor, discovered in 1948, was the breakthrough. Here is one of the latest varieties of transistor, and here is an enlarged model. Most transistors are made of germanium, a semi-conductor of electricity. While normally resistant to the flow of electricity, germanium can be made to conduct electric currents effectively when treated in a certain way. It is a by-product of lead and zinc refining, but has to go through an extremely detailed process of purification. With a measurable impurity of one part in ten bil-

lion, germanium has been described as "the purest substance ever achieved by man."

What will the transistor do? Regard it first in relation to the vacuum tube. A transistor will do most of the work done by a vacuum tube. Say a tube of this size. It will amplify electric power, control it as a valve would or act as an electronic switch. There are still, of course, new developments in the gas-tube field. For example, this compact vacuum tube which is the work horse of the microwave radio relay system. It will amplify up to 480 telephone conversations at the same time. But the latest transistor will amplify 2,500 conversations on a single telephone line.

The small size, the compactness is one quality of the transistor immediately apparent. And other components of transistorized tele-

phone equipment can be similarly reduced in size, affording important savings in space and raw materials. This is a complete ten-stage transistor-oscillator assembly. Here is the piece of equipment it can replace.

Also the transistor is solid, and this makes it remarkably rugged. We expect it to have far longer life than the average vacuum tube. It needs no warmup period but goes to work almost instantaneously. You will recall it takes several seconds to warm up the tubes of a regular radio receiver.

Another advantage is the low power consumption — about one millionth of a vacuum tube's. This is another kind of transistor oscillator prepared for demonstration purposes. Plug in the power and it will sing for you even if only on a single note. A battery is needed, but the power supply required to operate the transistor is so minute that with just a coin and a scrap of damp paper we should be able to construct an adequate wet-cell battery. Perhaps I can test my credit at the same time; would you please lend me a quarter, sir. Now let's try it out. The slight chemical reaction between the wet paper and the metal coin produces our current. Now I'll connect the oscillator.

The transistor has made possible a telephone set you can carry around in your pocket—should you want to. I haven't got one in my pocket today and I hope that I never shall but I have here a related device—a complete radio transmitter, with microphone and antenna. I'm going to switch off the public address system and broadcast to you over transistor station VE9LU. This is a transistor-operated radio transmitter. It contains a power supply adequate for several months' round the clock broadcasting.

The transistor is already doing a number of telephone jobs. You will find hundreds of transistors in the heart of the equipment which switches long distance calls automatically across the continent. A transistor-operated telephone system is now being developed for rural lines. It should prove a considerable aid in limiting construction costs, for one line can be made to carry the load of five. Transistors are also used as amplifiers in telephone sets for the hard of hearing, and we are experimenting with sets in which musical tones operated by transistors take the place of the familiar bell—at a considerable saving in electric current. It takes much more electric current to ring your telephone bell than it does to carry the conversation.

### Bell Solar Battery

I mentioned other solid-state discoveries. Perhaps the one with the greatest appeal to the imagination is the Bell Solar Battery. It can convert energy from the sun directly and efficiently into usable amounts of electricity. The solar battery attains an 11% efficiency which compares favorably with steam or gasoline engines. It has no moving parts; nothing is either consumed or destroyed by its operation, and in theory it will last indefinitely.

However, I trust you will not get the impression that we have here the answer to the world's power problems. For in the communications industry we're interested above all in the availability and ready source of energy—rather than the amount. It requires only a fraction of a watt to energize a modern telephone, and a solar battery easily provides this. Now here is a solar battery. It consists of three small pieces of specially treated silicon. Each is about the size of a quarter. I will connect the solar battery with this telephone set; the telephone is also connected with the public address system. The solar battery is naturally sensitive to any kind of light. Even the light from a match. That was a rather

more explosive sound than you'd expect from striking a match.

I have a light on my lectern here. Let's see what effect it has on the solar battery. The noise you now hear is created by the 60-cycle alternating current that powers the light. To imitate the sun efficiently we must have a direct current light source, and so I'll put this battery-operated spotlight to work. The telephone over which I am now speaking is quite dead. But when I place the solar battery in the path of our substitute sun you should hear me quite distinctly. The Bell solar battery is converting the light into electrical energy which in turn is operating my telephone.

I remove the battery from the light—and I have to rely on my own unaided voice. Put it back, and I can talk to you over the telephone—powered by the solar battery. Last year saw the first practical application of the solar battery in the telephone industry. Down in Georgia a battery with 432 discs supplied power for amplifier stations in the transistor-using rural telephone system I spoke of earlier. And I would mention that the usefulness of the solar battery is not limited to the sunny south. It will function even when the sun is behind clouds, and the electricity it

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produces can be stored in batteries for night-time use.

And now, you may well ask, where do we go from here—in what we in the telephone industry, among others, rather loosely call the electronic era?

Well, in 1958 the Bell System is going to test its first electronic office. Even in the modern telephone exchange, switching is still an electro-mechanical operation, however rapid. With the use of transistors and the various other miniature devices for storing information and making connections, the completely electronic exchange begins to take shape. So little electric energy is required to transmit telephone communications that the tiny solid devices will be able to handle vast quantities of traffic.

There will be no mechanical movement, just the ultra-rapid journeying of electric current through thousands of tiny, fantastically sensitive components. We may have to wait quite a time before the electronic office becomes standard equipment, but I have no doubt it will be one day — and bring us significant savings in construction and operating costs.

**Capital Investment Required**

But, all of this, as you well know, requires a high level of capital investment. Growth must be financed principally from outside the business and for the larger part of the industry this means regular approaches to the Canadian investor. In the past decade we have been responsible for more than a quarter of the common stock financing in this country. From year to year this proportion has varied considerably—in two of these 10 postwar years our equity financing accounted for nearly 70% of all such financing in Canada. And I would like to emphasize how much the telephone companies have appreciated the helpfulness and goodwill manifested by your profession. But surely in return we have done something to expand in no small measure the volume of your operations. If that be true, I am sure you will welcome our calling upon your good offices frequently in the future.

The total investment in plant and equipment of the telephone industry is now in the order of \$1,500,000,000. Because of the vast distances that have to be traversed and our even more rapid postwar growth, investment per telephone is higher here than in the United States. At present the industry is spending some \$200,000,000 annually on new construction. In the brief that I was privileged to present to the Gordon Commission on behalf of the Trans-Canada Telephone System,

*Continued from page 3*

**Significant Canadian Economic Developments**

be more sensitive to changes in business conditions. In line with this and in the light of the responsibilities of the Bank of Canada, the harder money policy presently being followed should be viewed as a form of "brake" on our economy designed to prevent it from being over-accelerated.

In regard to the broader aspects of monetary policy, may I say that the experiences of the past half century have clearly demonstrated

expenditure over the next 25 years was estimated at over \$3,000,000,000. By 1980 the total investment will be about three times its present figure.

I see no reason why the major part of this vast sum should not be obtained from Canadian sources. This is surely a most worthwhile field for Canadian investment, as it is for Canadian endeavour. As Canada grows, expanded and improved telecommunications services are indispensable to meet the needs of business, of government and of individual Canadians.

I certainly do not need to talk to you about the desirability of spreading the ownership of industry as widely as possible among the people of this country. You are well aware of its economic, political and social advantages. Nor do I need to emphasize the support for this concept given by the shareholder-owned telephone companies. My own company, for example, is presently the property of over 125,000 shareowners, the largest number of any Canadian company. And we rank about 16th on the North American continent.

My talk today has dealt with the scope and growth of the telephone business in Canada, and the research which offers such great possibilities for further progress. There is but one single purpose inspiring all this activity. The solar battery would have no more value to us in the telephone industry than the common sand from which it evolves if it did not offer the opportunity to further improve telecommunication services. And that is true of every other scientific and technical advance in our industry. This thinking has inspired telephone development in Canada from the earliest days, and it will, I assure you, govern our efforts in the years of challenge which lie ahead.

the necessity of building into our free enterprise economies certain checks and balances in order that progress may be achieved in orderly fashion. The evils of both inflation and deflation are all too well known, at least to those of us who experienced the great depression of the 1930's which shook the entire world, swept away savings and employment, slowed economic progress to a snail's pace and fanned the flames of the ensuing terrible world conflagration. As I have said on several other occasions, I believe that soundly administered monetary controls will help to contain the business cycle within more narrow limits than in the past and reduce the tendency towards booms and recessions. Our experience in the application of checks and balances

has been actually rather limited—much is still to be learned. I believe it is sound that our monetary authorities should resist the forces of severe inflation for many reasons, not the least of which, is the fact that it discourages saving. Canada is a growing country requiring a vast amount of capital for its development. Much of this capital must come from the savings of the Canadian people and the conversion of these savings into capital is one of the principal functions of our industry.

**Volume of Financing**

Turning to the matter of the volume of financing, may I say that the year 1955 was an extremely active one, although the total volume of public bond financing for the year, aggregating \$2,670,000,000, was down sharply from the 1954 total of \$4,500,000,000. The smaller amount in 1955 was principally the result of lighter Government of Canada financing, which amounted to \$1,354,000,000 in 1955, compared to \$3,200,000,000 in 1954.

Total Canadian public bond financing during the first four months of the current year amounted to \$670,000,000 which compares \$560,000,000 in the same period of 1955. The increase this year was entirely due to a marked rise in volume of issues placed on the market by corporations. Corporate issues totalled \$422,000,000 in the first four months of the year compared to \$234,000,000 last year. Provincial financing dropped from \$196,000,000 to \$141,000,000 and municipal financing declined from \$130,000,000 to \$107,000,000.

Of the total volume of public bond financing the first four months (amounting to \$670 million) issues placed in Canada totalled \$458,000,000 and those placed in the United States to \$212,000,000. In the same period last year out of the somewhat smaller total (of \$560 million) sales in Canada amounted to \$495,000,000 and those in the United States to \$65 million.

At this point I should like to refer briefly to growth of our Treasury Bill Market. It is grati-

*Continued on page 30*

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Continued from page 29

## Significant Canadian Economic Developments

fyng indeed to note the growing interest on the part of the investing public in our relatively new Treasury Bill Market. Thinking in terms of the problems involved in establishing a new market of this type, the increase in the volume of Bills held by the public from \$22 million as at the end of January 1953 to over \$550 million at the end of April of this year is indeed proof of the broadening of the base of our money market and the growing popularity of Treasury Bills as a medium for the employment of temporarily idle funds. As was to be expected, experience has suggested adjustments and adaptations to meet Canadian conditions and I should like to say on behalf of the Investment Dealers of Canada that we appreciate very much the opportunities which have been given to us by the Treasury and the Bank of Canada to discuss the developments of this market in Canada.

Before concluding my remarks I should like to refer to the matter of foreign investment. In view of the prominence currently being given to this matter I feel that it is important that we, the Investment Dealers of Canada,

should make every effort to see to it that the real issues involved are clearly understood both at home and abroad.

### Understanding Foreign Investment

As I have said on several other occasions, almost every Canadian is well aware of the fact that foreign capital has played a most important role in the development of our country, and that without it, and the know-how that has so frequently accompanied it, our progress in all probability would have been much slower. It is also clearly recognized by all forward-looking Canadians that we must continue to depend heavily upon foreign sources, for many years to come, to meet the tremendous needs for risk capital if we are to develop Canada's vast potential on the scale presently foreseen.

I am sure that I voice the feelings of the vast majority of Canadians when I say that we, as Canadians, are proud of the fact that the amount of foreign private capital invested in Canada exceeds that invested in any other country and that we consider this a clear recognition by investors abroad of the economic possibilities that lie ahead and the sta-

bility of our political and financial institutions. *Continued from page 8*

Clearly the present discussion does not involve any question of the desirability of welcoming foreign capital to our shores, but rather it develops from the growing feeling among Canadians that they should have the opportunity of acquiring some measure of share ownership on the Canadian operations of subsidiaries that are wholly owned by United States or other foreign parent companies. This is a matter that warrants careful consideration by all concerned. We must bear in mind that capital comes here largely because of the opportunity for profit. However, it does seem unfortunate that our citizens have no opportunity to participate in the profits of some of our most important and most rapidly growing industries. There are, I believe, strong grounds for the suggestion that from the long range point of view it would be in the interests of many of these enterprises to have a Canadian interest in their share ownership.

There has also been some suggestion that in certain cases Canadian capital, under our present tax laws, is at a disadvantage vis-a-vis external capital. While it is important that we should see that Canadian capital does not labor under a disadvantage in any sphere of activity, we should strive to make it perfectly clear that foreign capital is welcome in Canada and that thinking in terms of our great destiny we look forward to working in even closer harmony with foreign capital in building the Canada of tomorrow.

### Looking to the Future

Looking to the future, while I have no crystal ball, I think that you will agree with me that there is abundant evidence that the prediction made by one of Canada's great statesmen near the turn of the century, that the Twentieth Century would belong to Canada, will be borne out. To quote only one figure, the fairly generally accepted view that our population may reach 25 million by 1975 suggests in itself a tremendous development. However, while we can undoubtedly look forward to the future with confidence, I think a few words of caution might not be out of place. History indicates that we may reasonably expect to encounter some disappointments and that there may be some temporary interruptions in the growth of our economy. I also feel that we should bear in mind that the actions which we, as individuals and as a nation, take now in meeting our immediate problems may profoundly affect the prospects and well-being of our next generation.

Again looking to the future, I think that I can safely predict that the outlook for the investment business in Canada is extremely bright, for a healthy private enterprise economy requires a plentiful and continuous supply of capital. From the shorter-range point of view, the current official estimates of private and public investment in Canada in 1956, and the more tentative estimates for 1957, suggest that even though it may not be possible to carry out these intentions in their entirety, because of limitations upon the availability of funds, labor and materials, we can nevertheless anticipate that near-term capital requirements will be of very substantial proportions.

In closing, may I suggest that while I am convinced that Canada's growth in the next half century will be certainly spectacular by past standards, our actual achievements over the next 50 years, will, to a considerable degree, depend upon the willingness of the Canadian people to invest in Canada's future and to place their shoulders to the wheel. This, in my opinion, presents a challenge to the Investment Dealers of Canada which I am sure they will accept.

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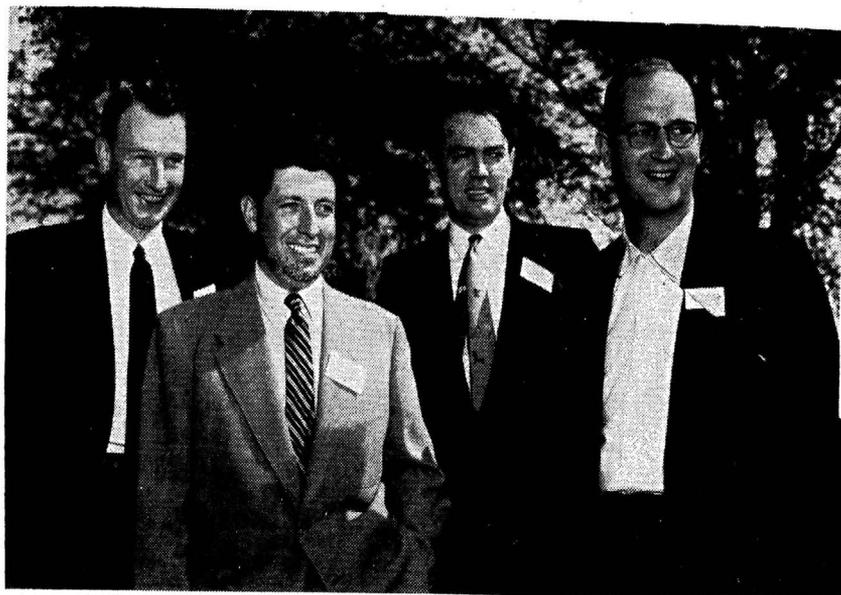
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