CANADA

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## NUCLEAR POWER IN CANADA

Addressing the First Canadian Conference on Uranium and Atomic Energy in Toronto on January 11, J. Lorne Gray, President of Atomic Energy of Canada Limited, discussed in broad outline the state of nuclear research throughout the world. AECL's knowledge of the atomic programmes of France and the United Kingdom, he said, was "quite up to date, as various staff members visit these areas regularly." "We also have frequent visits of senior representatives of the United Kingdom Atomic Energy Authority and the French Commissariat," Mr. Gray went on. "We are quite familiar with the programme in the United States, as our relations with the United States Atomic Energy Commission are continuous and extremely good. We have co-operative programmes with the United Kingdom, the United States and France, and we are just starting a joint programme with the Euratom countries. Our first-hand knowledge of the programmes in other countries around the world varies, but in general we are well informed."

Mr. Gray then proceeded to discuss briefly the nuclear programmes of what he termed the "lesser 'nuclear-developed' nations" (the Euratom group, Japan, India, Spain, Sweden and Australia) and the chief nuclear powers (the U.S.S.R., France, the U.K., the United States and Canada). Concerning the Canadian programme, he said:

"...The Canadian nuclear power projects are quite definite and fairly easy to explain. They have evolved primarily from the basic work done at Chalk River where the major pioneer work in the heavy-water moderation system has been performed.

"Chalk River is undoubtedly the foundation of any Canadian programme - not only for the physics of reactor systems but for the applied engineering and metallurgical problems of both the reactor parts and more particularly the fuel.

### FUEL DEVELOPMENT

"Millions of dollars have been spent and are being spent each year in the fuel development programme alone. The fuelling of the NRX reactor, which has been operating since 1947, is still subject to continual development - the NRU reactor even more so. It is extremely fortunate that the fuel for Canada's first power reactors is in a much better state of development than was the fuel for either NRX or NRU before start-up. The joint programme carried out at Chalk River with the United States Atomic Energy Commission for uranium oxide (enriched or natural) for their pressurized water systems has been extensive and fruitful. It is the magnitude and success of this work, coupled with many years of operating large-scale heavy-water research reactors, that gives the AECL designers the confidence they have in low fuel costs for the natural uranium heavy water systems.

"The nuclear power projects sponsored by Atomic Energy of Canada Limited, and under way, are four in number - with a total final

(Over)

cost of perhaps 120 millions. These are supported by studies of other systems not considered to have advanced to the 'proper stage . The first project is the Nuclear Power Demonstration plant (NPD-2), a 20 megawatt unit under construction near Rolphton, Ontario. The second is the 200 megawatt CANDU reactor for the Douglas Point Station on the eastern shore of Lake Huron. Both of these stations use reactors of the heavy-water moderated and cooled pressure-tube type and both will be fuelled with natural uranium. The third project is a design study with associated development work on an organic cooled heavy-water moderated reactor. The fourth project is a study of the application of the small size pressurized-water or boiling-water enriched-fuel reactor systems to Canadian conditions, particularly remote northern sites.

"These four projects are designed to meet the needs of the very large power systems where units of 200 megawatts and upwards may be installed; the medium-size systems where say 50 to 150 megawatt sizes are needed; and the very small remote dual-load, heat and electricity sites.

### NPD AND CANDU

"The first two projects may be coupled together, as they really form a prototype and a full-scale unit of basically the same design that is particularly applicable in the larger sizes. NPD is progressing very well; it is virtually on schedule and the costs are following estimates as predicted. This plant should be near completion at the end of this year and we can see no reason why it should not be operating by mid-1961. It is being designed and built by Canadian General Electric Company Limited for operation by Ontario Hydro as a joint undertaking with AECL. This project is not a commercially economic unit. It is a demonstration unit. It will demonstrate the practicability of some of the basic parts of the system and will demonstrate the real economics of fuelling a reactor of this type.

"The 200 megawatt Douglas Point Project is going ahead without waiting for all the results that NPD is expected to produce. This decision to proceed was based partly upon the confidence of the design staff due to the success of the CGE design work and to the results of the fuel-development programme at Chalk River, and partly upon the realization that full-scale plants must be built and operated before real costs will be known.

"The third project, which may result in the construction of an organic cooled heavy-water experimental reactor (OCDRE), is a contract with the Canadian General Electric Company Limited to continue the development of a reactor system they proposed. Due to the nature of the organic materials proposed for cooling, lower capital costs per kilowatt are expected and higher efficiencies due to higher temperatures are predicted, as compared to the heavy-water cooled systems. On the other hand, fuelling costs will be somewhat higher. This reactor system, if successful, should be particularly applicable to the medium sizes, 50 to 150 megawatts. In sizes of 200 megawatts and upwards, the neutron economy of the heavy-water cooled reactors seems to have advantages that outweigh those of the organic materials. A very active design and development programme is under way at Canadian General Electric, coupled very closely with development work at Chalk River on organic materials. A decision to proceed with the final design and construction of a reactor of this type will be considered within the next year. The USAEC and Euratom are taking an active part in this programme, with interchange of staff and information and attendance at periodic joint meetings.

"The fourth project is primarily the compilation of information generated in the U.S. and made freely available to Canada by the USAEC. Canadian Westinghouse Company Limited have contracted to review all the pertinent information on the small so-called package reactors which have been developed for possible application at remote sites. This type of plant, which utilizes fairly high enrichment, has been considered in detail, assuming the conditions of typical Canadian sites. The project is nearing completion and should be of specific interest to those concerned with the development and defence of the north.

### STEAM-COOLING

"Study projects of varying complexity and advancement are common in the Reactor Research and Development Division of AECL. Such systems as gas-cooled reactors have been studied and this line has led to the possibility of steam cooling a heavy-water moderated reactor. This type of system looks very promising but it is some years away and, even if pursued jointly with the U.K., it is unlikely that an experimental reactor would be proposed in less than two or three years. If everything went well, this would be followed with a prototype and then a full-scale plant. This type of system would be best in the very large sizes and, although it could operate on natural uranium, some fuel enrichment might prove more economic.

"...In Canada the economic incentives for nuclear power, with one notable exception, are very much like those in the U.S. Some areas still have undeveloped hydraulic resources and these, where they are reasonably close to load centres, will be installed in preference to nuclear power. A large part of the country has abundant supplies of fossil fuels that allow lower-cost power production than can be met with any nuclear plant that may be developed in the near future. Southern Ontario is the one area where atomic power seems immediately

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## CUBAN ENVOY INSTALLED

On January 27, His Excellency Luis A. Baralt presented to the Governor General his Letters of Credence as Ambassador Extraordinary and Plenipotentiary of Cuba to Canada. The ceremony took place at Government House.

The Chief of Protocol, Mr. H.F. Feaver, presented the Ambassador to the Governor General. The Under-Secretary of State for External Affairs, Mr. N.A. Robertson, and Mr. Esmond Butler, Secretary to the Governor General, were in attendance on the Governor General on this occasion. The Ambassador was accompanied by Miss J. Hortensia Rodriguez, Attaché of the Embassy.

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## NEW SEWAGE-DISPOSAL METHOD

Royalty-free access to new scientific methods of sewage disposal was recently offered to Canadian municipalities by Resources Minister Hamilton. The new technique was developed and patented by the Pulp and Paper Research Institute of Canada. In making the announcement of a royalty-free offer to government agencies of all levels, the Minister was joined by Chairman F.L. Allen of the Institute.

"For many years now", Mr. Hamilton stated, "Canada's pulp and paper industry, McGill University and the Government of Canada have carried on valuable research through the Institute in order to support the world competitive position of Canada's prime industry. I am grateful that the directors of the Institute should have unanimously agreed that any government in Canada - be it municipal, provincial or federal - should receive the royalty-free use of this new technique for sewage disposal in recognition of the Federal Government's practical support of research in the Institute."

The Atomized Suspension Technique process was invented by Dr. Willian H. Gauvin, head of the Institute's Chemical Engineering Division, in the course of research into the recovery of sulphur and other chemicals from the spent liquors of pulp-mills. When the possibility of applying AST to the disposal of sanitary wastes became evident, the Institute directed its efforts to a successful community-scale domonstration. The nearby town of Beaconsfield, Quebec, provided the site, the associated sewer collecting system, the settling tanks and auxiliaries. The National Welding Company, Limited, of Montreal, designed, erected and installed the first AST unit, costs to be borne by the community if the test was successful. It was declared successful on December 1, 1959.

The small plant takes the sludge from the settling tanks and injects it through atomizing nozzles at the top of a small 20-foot steel column. The extreme heat within the column calcines the solids. A day's sewage sludge from the community of 12,000 would become a few bags of harmless ash. Chlorination of the liquid overflow from settling tanks may be necessary before it is discharged into rivers or lakes.

The Minister's announcement points out that government agencies desiring to avail themselves of the royalty-free offer must apply to the Pulp and Paper Research Institute of Canada, 3420 University Street, Montreal 2.

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## STRATFORD CASTS MADE PUBLIC

Christopher Plummer, the Canadian actor who has shot to fame in a succession of Broadway television and movie successes, will return to the Stratford Shakespearean Festival in the summer of 1960, Michael Langham, Festival artistic director, announced recently.

On the same platform-stage where, in other years, he played Hamlet, Henry V, Sir Andrew Aguecheek and the love-struck Benedick, Mr. Plummer will be seen as Mercutio in "Romeo and Juliet" and as Philip the Bastard, in "King John." This will be his first appearance at the Stratford since 1958, when he played leading roles in the first part of "Henry IV," "The Winter's Tale" and "Much Ado About Nothing."

At Stratford, Mr. Plummer will re-join an acting companion of long standing -- Julie Harris, with whom he appeared on Broadway in "The Lark" and in such television productions as "Little Moon of Alban," "Johnny Belinda" and the recent "Doll's House." Miss Harris is to play Juliet in "Romeo and Juliet" and Blanch of Spain in "King John."

Mr. Langham also announced that the Festival had signed Jake Dengel, one of the "finds" of the 1959 season, for the role of Puck in "A Midsummer Night's Dream." Mr. Dengel, small and wiry, who appeared in both "Othello" and "As You Like It" during the 1959 season, will also be seen as the Apothecary in "Romeo and Juliet."

Ann Casson will appear for the first time on the Festival Theatre stage as Lady Montague in "Romeo and Juliet" and as Constance in "King John." Miss Casson (Mrs. Douglas Campbell in private life, and the daughter of Sir Lewis Casson and Dame Sybil Thorndike) has appeared previously only during the music season of 1958, when she played one of the principal roles in "The Beggar's Opera" in the Avon theatre.

Sydney Sturgess has been signed for the role of Elinor in "King John." Miss Sturgess was previously seen at the Stratford Festival in "The Winter's Tale" in 1958.

Hayward Morse (son of Barry Morse and Sydney Sturgess), will play the tragic Prince Arthur in "King John." Twelve-year-old Hayward, one of the leading child actors of Canada, recently rose to international prominence when he co-starred with Ingrid Bergman in the television production of "Turn of the Screw."

## VITAL STATISTICS, 1959

A record 486,000 babies were born in Canada in 1959, according to preliminary estimates based on registrations filed in provincial offices and published in the December issue of the Dominion Bureau of Statistics' monthly report "Vital Statistics". On the other hand, the number of marriages (and the rate per 1,000 population), which have been declining each year since 1957, declined by 4,500 from the previous year to 127,000, the lowest since 1951. The death-rate, which stood at 8.2 per 1,000 population in each year from 1954 to 1957, moved downward to 7.9 in 1958 but is expected to show a rise to 8.1 in 1959 when final returns are received. The report briefly summarizes key vital statistics rates since 1947.

The birth-rate per 1,000 population moved upward from 27.6 in 1958 to 27.9 in 1959. During the period of national vital statistics, the birth-rate has ranged from a high of 29.3 in 1921 to a low of 20.1 in 1937. Rates of approximately 20 were recorded in the four years previous to the Second World War, but since the War have exceeded 27.

Marriages are estimated at 127,000 in 1959 compared with 131,525 in 1958, and the rate declined to 7.3 per 1,000 population in 1959 from 7.7 the previous year. The marriage-rate has been declining gradually from the record 10.9 in 1946 and the current estimate will result in the lowest rate in twenty years. One of the key factors in the present situation results from the low birth-rate of the thirties being now reflected in a similarly low proportion of Canadian-born people reaching marriageable age.

Deaths numbered an estimated 141,000 in 1959 compared with 135,201 in 1958, a year that recorded the lowest rate in Canada's history. Since the beginning of national vital statistics in 1921, Canada's crude death-rate, per 1,000 population, has been reduced from 11.6 to around 8.

Provincial registrars had processed the registrations of 488,984 births up to the end of December 1959 compared with 473,854 in 1958, 130,312 marriages against 134,813, and 139,338 deaths against 133,700. December birth registrations numbered 38,633 compared to 35,787 in the like month of 1958, marriages 10,311 versus 9,757 and deaths 12,477 against 11,740.

As has been the case since 1953 more babies were born in Ontario in 1959 than in any other province, followed by Quebec, British Columbia and Alberta in that order. Birth registrations filed in 1959 were higher than in 1958 in all provinces. Provincial totals were: Newfoundland, 15,092 (14,573); Prince Edward Island, 2,722 (2,558); Nova Scotia, 19,254 (18,839); New Brunswick, 16,874, (16,651); Quebec, 147,883 (144,459); Ontario, 160,881 (153,801); Manitoba, 23,240 (21,995); Saskatchewan, 24,437 (24,011); Alberta, 38,776 (37,207); and British Columbia, 39,825 (39,760).

Fewer marriage records were filed in 1959 than in the previous year in Ontario, Quebec, British Columbia and Saskatchewan. Totals were: Newfoundland, 3,123 (3,022); Prince Edward Island, 635 (616); Nova Scotia, 5,331 (5,220); New Brunswick, 4,265 (4,178); Quebec, 34,476 (37,810); Ontario, 46,972 (48,195); Manitoba, 6,661 (6,432); Saskatchewan, 6,407 (6,464); Alberta, 10,450 (10,353); and British Columbia, 11,992 (12,523).

Of the ten provinces, only Newfoundland reported fewer deaths in 1959 than 1958. Totals: Newfoundland, 2,987 (3,043); Prince Edward Island, 1,019 (936); Nova Scotia, 6,410 (6,127); New Brunswick, 4,860 (4,573); Quebec, 35,060 (33,912); Ontario, 51,528 (49,146); Manitoba, 7,548 (7,141); Saskatchewan, 6,922 (6,557); Alberta, 8,720 (8,422); and British Columbia, 14,284 (13,843).

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## AFRICAN ECONOMISTS IN OTTAWA

A group of fourteen government economists from Africa spent four days in Ottawa recently in study and discussion with Canadian officials of the various Government Departments, the Bank of Canada and the Civil Service Commission.

The Ottawa visit was arranged jointly by the Canadian Government and the United Nations Headquarters in New York, as part of a six-month programme under the auspices of the United Nations Technical Assistance Administration. The group had already spent some time in the United States, attending lectures and group discussions on all phases of public administration and economic development. They spent two days in Montreal visiting the office of the Secretary of Mayors and Municipalities, the Foundation Engineering Company of Canada, and the Aluminum Company of Canada. Some of the group left Ottawa on January 28 to return to Montreal. The others proceeded to Lévis, Quebec, to observe credit unions and co-operatives in the area.

This was the third intensive training programme arranged by United Nations Headquarters for African officials. Similar courses were held in 1957-58 and 1958-59.

The members of the group in Ottawa were: Mr. Assefa Habtu and Mr. Ketema Desta of Ethiopia; Mr. Samuel Egyir Grant of Ghana; Mr. Alpha Bakar Barry and Mr. Momory Camara of Guinea; Mr. Nathaniel Kevin and Mr. Alfred Thompson of Liberia; Mr. Naquib Mohammed Shibani of Libya; Mr. Hirei Gassim and Mr. Ali Mohamed Alane of Somalia; Mr. Mahmoud Abdi Arraleh of Somaliland; Mr. Paulin Eklou of Togoland; Mr. Brahim Turki of Tunisia; and Mr. Abdel Hady Abdel Asiz El-Taraneesy of the United Arab Republic.

## SECURITIES SALES AND PURCHASES

Canada imported $19.8 million of foreign capital through the net sale to non-residents of outstanding Canadian securities in October, larger than the preceding month's $14.7 million but lower than in July and August. Trade in outstanding foreign issues led to a capital export or purchase balance of $1.2 million as compared with a sales balance of $5.7 million in September. The net capital import of both Canadian and foreign outstanding securities in October was $18.6 million. The balance with the United States amounted to $2.8 million. The balance with the United Kingdom was $2.4 million; and with other overseas countries, $13.4 million.

In the first ten months of 1959, new sales of outstanding Canadian securities to non-residents amounted to $195 million, up sharply from the preceding year's total of $56 million, while net purchases of outstanding foreign securities amounted to $15 million as compared with a sales balance of $32 million a year earlier. The ten-month net sales balance in both Canadian and foreign outstanding securities amounted to $180 million versus $88 million a year earlier.

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## WORLD CABLE

Canada's position in the round-the-world telephone cable system, which will eventually prove such a vital link in Commonwealth communications with the network of world circuits, was made known on January 3 in the House of Commons by Mr. George Hees, Minister of Transport.

Mr. Hees announced ratification by the Federal Cabinet of Canada's share in the trans-Pacific section of the global cable project the Commonwealth has been studying since completion of the first successful trans-Atlantic repeatered cable in 1956. Ratification is, of course, subject to the negotiation of satisfactory arrangements. The round-the-world cable system will require about 24,000 nautical miles of cable, will take about 10 years to finish, and will cost approximately $275,000,000. The Pacific cable will cost about $75,000,000, of which Canada's share will be some $25,000,000.

Canada will own the part of the cable from Vancouver to a point about 2,700 miles distant; and the section from that point to Sydney will be owned jointly by Australia, New Zealand and the United Kingdom. A tentative target date for completion of the trans-Pacific cable is early 1964.

Douglas F. Bowie, President and General Manager of Canadian Overseas Telecommunication Corporation, responsible for Canada's external communications, and R.G. Griffith, Vice-President and Chief Engineer of the Corporation, recently returned from Sydney, Australia. Accompanying them from the Department of Transport were W.E. Connelly, Superintendent of Telecommunications, and D.S. Robertson, Superintendent of Domestic Carrier Services. With other Commonwealth cable experts, they virtually completed plans for the long trans-Pacific link. This cable, the second leg of the round-the-world system, will be laid between Vancouver, New Zealand and Australia, providing 80 voice channels, some of which will be engineered to be broken down into telegraph and Telex circuits.

The new global system will include the new trans-Atlantic repeatered cable at present being laid by Canada and the United Kingdom, which is expected to be ready in 1961; the micro-wave system across Canada; the cable now being planned from British Columbia to Australia and New Zealand *via* the Fanning and Fiji Islands; and cables from Australia to the United Kingdom *via* principal Commonwealth territories in the Indian Ocean and in Continental Africa.

"When the Commonwealth Trade and Economic Conference convened in Montreal in September, 1958, the Honourable Donald Fleming advised the Conference that Canada had accepted the Commonwealth Telecommunications scheme in principle," Mr. Hees reported. "Canadians have cause to be proud of the prominent part taken by Canada in the preliminary planning for this global telecommunications system."

Mr. Hees stated that the new cable will give to the world a system of communication unmatched for quality, speed, accuracy, security, and flexibility to provide diversity of services.

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## ADMINISTRATIVE EXPERT IN GHANA

The Department of External Affairs announced on January 29 that Mr. Donald D. Tansley, had accepted an assignment in Ghana under the Commonwealth Technical Assistance Programme. Mr. Tansley arrived in Accra on January 29, on a visit of eight weeks.

Mr. Tansley, who is Director of the Provincial Budget Bureau of Saskatchewan, is acting as Special Advisor to the Government of Ghana. He will take part in setting up and organizing the Institute of Public Administration, which is to be moved to Accra from Kumasi, where it was formerly part of Kumasi College. He will also advise on the drawing up of the Institute's curriculum.

Mr. Tansley joined the Civil Service of Saskatchewan in 1950. Before assuming his present position in 1957, he was Director of the Administrative Management Division of the Budget Bureau, and served for one year as Deputy Provincial Treasurer.

Besides being an active member of many committees and boards dealing with government and university administration, Mr. Tansley has for two years been Vice-President for Saskatchewan of the Institute of Public Administration of Canada.

## DWELLING UNITS IN NOVEMBER

Starts on the construction of new dwelling units in Canadian centres of 5,000 population and over declined last November to 11,707 units from 12,026 in November 1958, dropping the January-November total to 98,988 units from 113,283 a year ago, according to advance figures from the Dominion Bureau of Statistics. The month's completions declined slightly to 12,493 units from 12,764, while the 11-month total was larger than last year, at 98,168 units against 97,664. Units in various stages of construction at the end of November numbered 62,791 units, a decline of 3.8 per cent from last year's like total of 65,272.

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## NUCLEAR POWER IN CANADA

*(Continued from P. 2)*

attractive. The Ontario Hydro system is a public utility; it is large and can accept large units of power; it has developed practically all of its hydraulic resources; it has no indigenous fossil fuels and must now rely on imported U.S. coal for additional thermal power; and last - but certainly not least - the province has one of the world's largest and best sources of uranium. There is no doubt that the first full-scale power reactor in Canada is directed towards the requirement of Southern Ontario - it is the only location in Canada where a nuclear plant has any hope of economic operation within the next five or six years.

"Finally, let me sum up by saying that it must be obvious to you that today no country and no person knows with any certainty what type of nuclear power plant will ultimately prove to be most attractive economically for any specific purpose or in any geographic locality.

"The conclusion upon which we can all agree is that the answer can be found only after years of operating experience with different types under a variety of circumstances.

"In Canada in 1960, considering our experience and natural resources, all the officials and directors of AECL are firmly convinced that our best prospect is to investigate thoroughly by demonstration and full-scale plants the economic and technological advantage of heavy water reactors.

"It may be that in 10 years' time we shall find some modifications or combination of the various types being demonstrated that are more attractive; but, let me repeat, at the moment we are most optimistic about our Canadian plans and we are sure our programme is the wisest and most prudent one for Canada. In this view our expert friends in other experienced countries such as French, the U.K. and the U.S. concur."

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## CANADIAN FILM HANDBOOK

A "Handbook for Canadian Film Societies", edited by Jean Beauvais and Guy-L. Coté and published by the Canadian Federation of Film Societies, has just been issued. The 116-page volume sells for $1.00.

The editors, in their introduction, say: "In sponsoring the publication of this book, the Federation hopes to help the film appreciation movement in Canada by giving much-needed information and advice to Societies already in existence, and by promoting the formation of new Film Societies."

The Handbook is divided into two sections: Film Societies and The Canadian Federation of Film Societies. Nine chapters in Section I deal with how film societies started, the nature of film societies, organizing a film society, a specimen constitution, finances, programming, booking, technical facilities, and the showing. Five chapters in the second section consider film societies in Canada, the aims of the Federation, information and other services, and the Canadian Film Institute, which is the parent body of the Federation. The appendices provide information on Le Centre catholique du Cinéma, other federations in English-speaking countries, the International Federation of Film Societies, samples of film society programmes and a select bibliography.

The Handbook is available from the Canadian Federation of Film Societies, 1762 Carling Avenue, Ottawa 3.

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