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Satellites suggested for surveillance of Canada's sovereignty

A report prepared by a Federal Government task force, released by Energy, Mines and Resources Minister Alastair Gillespie last month, deals with the prospects of launching in the 1980s a satellite equipped with a new microwave radar system to meet Canada's surveillance needs until the year 2000.

The extension of Canada's offshore limits to 200 miles, together with increasing oil and gas exploration and tanker traffic in the Arctic and off the east and west coasts, led the Government to consider the use of radar-equipped satellites to cover large areas with accuracy, timeliness and reliability. (Radar is necessary because it is able to penetrate cloud and darkness.)

According to the report, *Satellites and Sovereignty*, "surveillance" includes monitoring environmental conditions — sea state, ice, fog, surface winds, temperature and oil pollution, in addition to the move-

ment of ships, oil-drill rigs and exploration activities. Satellites, however, unlike aircraft and ships, cannot investigate unknown features in detail.

The task force study discusses five options for a Canadian surveillance satellite: an all-Canadian satellite without international participation; a Canadian satellite with international participation; other nations' satellite program, influenced to meet Canadian needs; purchase of surveillance satellite data from the United States; and no surveillance satellite activity.

Participation with NASA

The National Aeronautics and Space Administration (NASA) in the United States plans to launch a "proof-of-concept" satellite, called SEASAT-A, in May 1978, which will have newly developed microwave sensors that are expected to be able to obtain previously unavailable data.

As a first step in a surveillance program

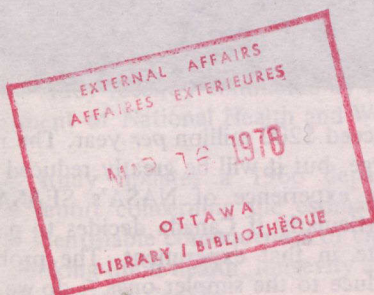
The SEASAT-A satellite will carry four microwave sensors which can "see through" darkness and clouds:

• The *synthetic aperture radar* produces very detailed radar pictures of the earth enabling the interpreter to detect ships, icebergs, floating ice, wave patterns, oil rigs and even navigation buoys which have radar reflectors. It is expected that oil slicks will be visible because of the smoothing effect oil has on small wavelets. These radar pictures will outline geological structures in great detail and can also be used to assess the full extent of floods as they are happening. In combination with the LANDSAT visible-band pictures, the radar pictures will also help in carrying out the world wheat crop inventory.

• By measuring reflections from the small wavelets on the sea surface, the *microwave scatterometer* is expected to provide daily information on the strength and direction of the surface winds on all oceans.

• The *scanning multi-frequency passive microwave radiometer* will produce data which will, when interpreted, yield sea-surface temperatures, amount of moisture in the air near the sea, and distribution of floating sea ice. The instrument is expected to enable scientists to estimate snow depth and soil moisture. This knowledge is important for agriculture and flood predictions.

• A *radar altimeter* will measure to within eight inches the distance between the 400-mile-high satellite and the earth's surface. It can therefore be used to measure the heights of waves and the storminess of the world's oceans. This information would be useful for routing ships around bad storms and for warning offshore drill rigs of oncoming heavy seas. The instrument will also be used to monitor changes in the height of the polar ice caps, yielding useful data for the study of world-wide climate changes.



This week in 1841, on February 10, the provinces of Upper and Lower Canada were united to form the province of Canada, the capital of which was Kingston.

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and as a result of the task force's work, the Canadian Government is negotiating with NASA to participate in the SEASAT program.

The Canada Centre for Remote Sensing, a branch of the Department of Energy, Mines and Resources, is organizing Canadian participation in the SEASAT program. Other departments involved are: Communications, Defence, Fisheries and the Environment, Indian and Northern Affairs, the National Research Council, Science and Technology, Supply and Services, and Transport.

If agreement is reached with NASA, Canada will spend about \$6 million in the next two years assessing the usefulness of satellite surveillance. Most of this money will be spent on contracts with Canadian companies.

Half the money will be for receiving, processing and interpreting the SEASAT data. For example, the satellite information receiving station at Shoe Cove, Newfoundland, is being modified to receive and process the data.

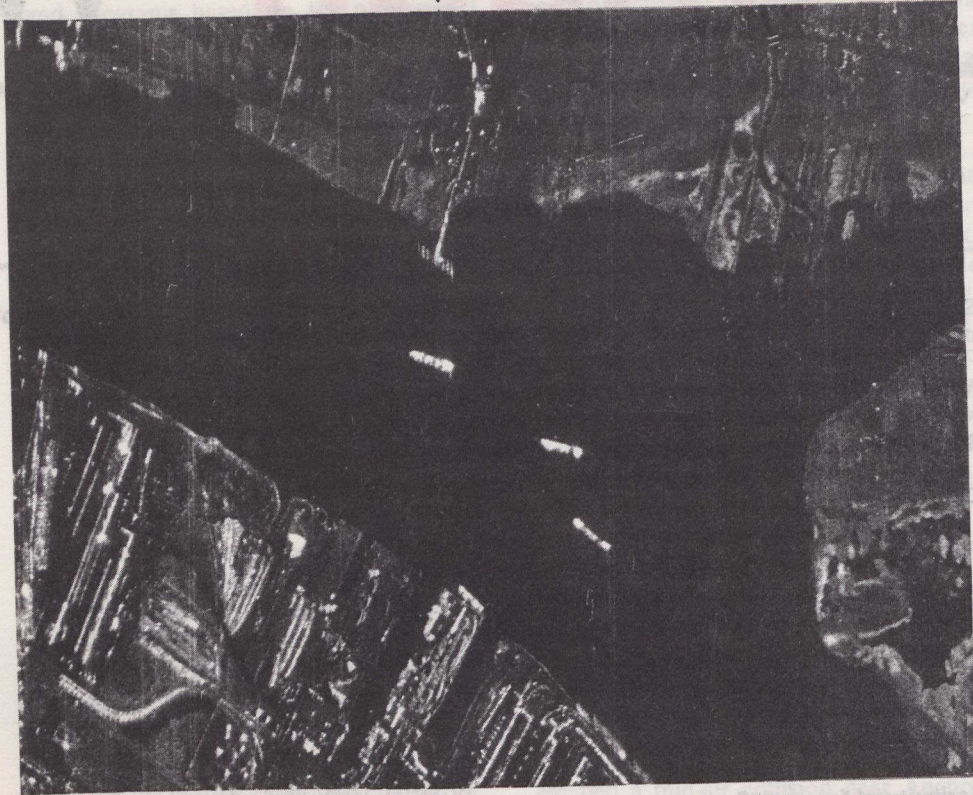
The rest of the funds will be spent on acquiring and interpreting "surface-truth" data. A long-range *Convair 580* aircraft belonging to the Canada Centre for Remote Sensing fitted with sensors similar to those in the satellite will fly under the satellite to evaluate the usefulness of the new sensors over a wide variety of situations.

Dr. L.W. Morley, Director-General of the Canada Centre for Remote Sensing, says in the foreword of the task force report that "potential benefits to Canada could exceed \$200 million *per year*".

Dr. Morley compares LANDSAT, an earlier satellite, with SEASAT and endorses the report of the task force as follows:

"New technology is generally oversold by its enthusiasts and underestimated or discounted by its critics. That was, and still is true, of LANDSAT, the picture-transmitting satellite, the first version of which (ERTS) was launched in July 1972. It was surprising how close the resolution of the LANDSAT pictures (80 metres) actually was to the predictions made by the scientists directly concerned. (The ability of the sensor in the satellite to discern small objects on the ground is called its "resolution" or "resolving power".)

"As a surveillance satellite, however, LANDSAT neither has the necessary resolution to detect many man-made objects nor can it penetrate cloud and fog whose occurrence off the east coast and in the

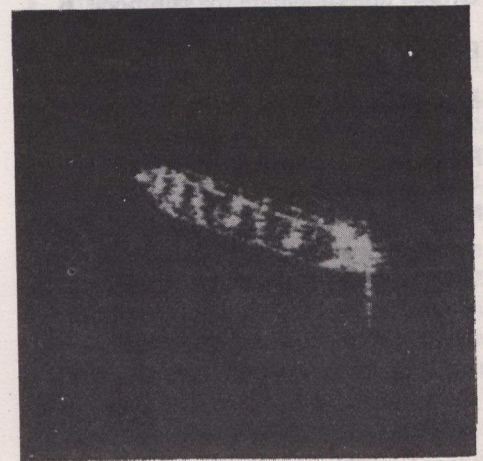


Airborne synthetic aperture radar image of ships in the Detroit River, processed to a three-metre resolution. (Below) photographic enlargement of part of first image.

Arctic averages about five days out of seven. LANDSAT, because of these known limitations, never was intended as a surveillance satellite. In July 1972, at the time of ERTS launch, satellites which could penetrate cloud and fog were not considered because of the complexity and greater power requirements of radar sensors.

"With the advances in the use of "synthetic aperture radar", which requires only a fraction of the power needed by conventional radars and whose resolution is independent of range, it is theoretically possible from orbital altitudes to discern objects on the earth's surface whose maximum dimensions are a few metres. Such a satellite would not be recommended at present because of the enormous cost of handling so much data. There must be a trade-off between resolution and cost of data handling.

"And so, the real possibility now exists of having radar surveillance satellites with ground resolutions of about 20 metres produce radar pictures showing the location of ships, the distribution of sea ice, the sea state and the temperature of the ocean surface — all through cloud, fog and darkness. The studies indicate that potential benefits to Canada could



exceed \$200 million *per year*. The risk is large, but it will be greatly reduced after the experience of NASA's SEASAT-A, particularly if Canada decides to participate in that experiment. The problems reduce to the simpler ones — do we need satellites and are they worth it? The opinion of the task force is "yes" to both these questions.

* * * *

"It is with great pleasure and satisfaction that I endorse and recommend this report for submission to Cabinet in response to its instructions."

New Cabinet minister

The Prime Minister recently announced the appointment of J. Gilles Lamontagne as Minister without Portfolio.



J. Gilles Lamontagne

Mr. Lamontagne, mayor of Quebec City for many years, was also president of the Union des municipalités du Québec, vice-president of the Fédération canadienne des municipalités and a member of the Economic Council of Canada.

In 1977, Mr. Lamontagne was elected Member of Parliament for the federal constituency of Langelier in a byelection. In October he was appointed Parliamentary Secretary to the Minister of Energy, Mines and Resources.

Smoking — a costly habit

Cigarette smoking cost Canadians an estimated \$506 million in 1971, according to a study recently conducted by the Department of National Health and Welfare.

The study updates a 1966 departmental report concerning the estimated cost of identifiable consequences of cigarette smoking upon health, longevity and property losses in Canada.

Results of the study indicate that in 1971 the economic cost associated with lung cancer, arising from physicians' services, hospital costs and income lost after death, was \$76.9 million; coronary heart disease accounted for \$212.2 million, chronic bronchitis, \$15.6 million, and emphysema, \$16.7 million. The total

health care cost attributed to smoking-related diseases in 1971 was \$56.1 million. Lost income from smoking-related illness amounted to \$164.5 million.

Comparison of 1966 and 1971 figures shows a 20 percent increase in the economic costs of consequences attributed to cigarette smoking (\$422 million in 1966 compared with \$506.3 million in 1971). Hospital care costs and physicians' services fees increased significantly during this period.

The study also reports that 9.2 per cent of all fires of known cause in 1971 were attributed to smoking, resulting in property damage and lost income of approximately \$20.4 million. A total of 112 persons died in fires caused by smoking, accounting for 29 per cent of deaths in fires of known cause.

Fewer smokers in 1975

A more optimistic report, released by the Department during this year's National Education Week on Smoking, shows a continuing decline in the percentage of Canadians who smoke cigarettes regularly. Approximately 37.3 per cent of the population 15 years of age and over were daily cigarette smokers in 1975, compared with 38.3 per cent in 1974. Substantial decreases in regular smoking by adult males during the past ten years have been largely responsible for this decline.

According to the survey, the percentage of female smokers 15 years of age and over remained relatively unchanged between 1974 and 1975; approximately 31 per cent reported regular smoking.

The percentage of regular smokers in the teenage population declined 1.6 per cent between 1974 and 1975 to 28.5 per cent. In 1975, 29.5 per cent of teenage boys and 27.4 per cent of teenage girls reported smoking regularly.

The survey reveals considerable differences in the regional distribution of regular cigarette smokers. As in previous years, Quebec was found to have the highest percentage of both male and female smokers 15 years of age and over. About 50 per cent of the Quebec male population indicated they smoked regularly, followed in order by the Atlantic provinces (44.5 per cent), Ontario (40.6 per cent), prairie provinces (39.5 per cent) and British Columbia (39.2 per cent). Regional distribution of the female smoking population was: Quebec, 34.6 per cent; Atlantic, 30.3 per cent; British Columbia, 30.3 per cent; Ontario, 30.1 per cent; and the

prairie provinces, 29.9 per cent.

It is encouraging to note that as of 1975, almost 12 per cent of the Canadian adult population have successfully quit "the habit".

CAE builds in West Germany

CAE Industries Ltd.'s subsidiary, CAE Electronics GmbH, in Stolberg/Aachen, West Germany, will build a new \$3-million facility in Stolberg to accommodate growing European business.

The German company maintains, repairs and overhauls aircraft flight simulators built by CAE Electronics Ltd., Montreal, another CAE subsidiary, and by other manufacturers for the German defence forces; and designs, manufactures and markets a line of peripheral telecommunications equipment sold throughout Europe.

It is also engaged in the development and manufacturing of a variety of maintenance training aids and other training devices for the German defence forces, and conducts depot level electronic equipment and instrument repair, overhaul and calibration services for the military.

CAE Electronics GmbH maintains Germany's F-104G fighter aircraft simulators, and UH-1D and CH-53 helicopter simulators, built in Montreal, and F-4 Phantom simulators constructed for Germany by another manufacturer.

It will also maintain *Sea King* helicopter, *Alpha Jet* trainer and MRCA (Multi-Role Combat Aircraft) *Tornado* simulators for the German defence forces when these simulators, now under development by CAE in Montreal, are delivered.

The new structure will include a large stores area, repair and overhaul shops, engineering offices, a security area and general administration offices.

CAE Industries Ltd., a Canadian company with 16 operating divisions, is engaged in manufacturing high-technology electronic, aerospace and metal products for international markets, and in the distribution of machine tools, industrial equipment and forestry and construction equipment and machinery across Canada.

The new facility in West Germany is the second major expansion announced by CAE in recent weeks. In Vancouver, British Columbia, CAE Machinery Ltd. is embarking upon a five-year redevelopment program that will double its production.

Records of Bernier's icy voyage

During a recent voyage to the Arctic, crew members of the Canadian Coast Guard icebreaker *D'Iberville* found several historical documents about one of the exploration voyages made in the area by Captain Joseph E. Bernier.

Bernier, who was born in 1852 in l'Islet, Quebec, commanded numerous expeditions in the Arctic between 1904 and 1925, when he took possession of several islands and established surveillance posts, strengthening Canada's sovereignty in the North.

Captain Henri Saint-Pierre and other members of the Coast Guard found, among other items discovered on Melville Island, a clipping from the *Daily Telegraph*, dated June 13, 1908, announcing Captain Bernier's departure for the Arctic. Later, at Point Fife, they found a document which deals with Bernier's claiming some Arctic islands in the name of Canada on July 9, 1909. Finally, a document discovered at Point Hearnen, dated July 14, 1909, gives information about and describes ice conditions at Winter Harbour, in the Northwest Territories.

The remarkably well-preserved documents illustrate the important role played by Captain Bernier in the early exploration of Canada's Arctic waters. Even though Captain Bernier never sailed through the Northwest Passage himself, he looked forward to the day when more powerful icebreakers would succeed where he had failed.

Canada owes him a debt of gratitude for his accomplishments, especially in view of the circumstances and weather conditions he had to face on his journeys.

In order to preserve Captain Bernier's records, the Public Archives will provide acid-free folders for the rare documents.

Old documents are now dipped in chemicals and dried or laminated. However, the process is so expensive (costing approximately \$200 for each book, whose pages must be treated one at a time), that the Archives and U.S. scientist Dr. Richard Smith are testing a method of treating from 12 to 20 books at a time in a specially-constructed chamber. The method, if successful, should save time, money and allow the chemicals to be re-cycled.

QUEBEC, SATURDAY JUNE 13 1908

LAST EDITION

ANOTHER NORTHERN CRUISE FOR CAPTAIN BERNIER



Captain Bernier and crew at Winter Harbour on Melville Island, N.W.T., July 1, 1909.

One old boat was seen on the beach but too old for repairs. There is a good deal of barrels of stores and clothing but no inventory was taken 3 barrels was open containing Boots and gummey Boots where partly destroyed but the gummey where good some where taken by the boat crew, whiled away to take soundings at Birdport and where only seen when outlooking at the launch. The bread tank where not open. Some runs east where empty.

P.S. The Steamer Arctic J.E. Bernier is now at Winter Harbour Commander ready to sail as soon as the ice will permit all well. We intend to reach Pondreinet about 1st September. Our records are at Winter Harbour on Parry rock. J.E. Bernier Commander

Nuclear agreement with Japan

Secretary of State for External Affairs Don Jamieson has announced the successful conclusion of the negotiation of a nuclear co-operation agreement between Canada and Japan. The Protocol, which amends the agreement of 1959, was initialled in Tokyo by the negotiators in the presence of Japanese Foreign Minister Sonoda and Mr. Jamieson.

The principal features of the Agreement between Canada and Japan for Co-operation in the Peaceful Uses of Atomic Energy are:

(1) Material subject to the agreement as amended may not be used for the manufacture of any nuclear weapon or for the furtherance of any other military purpose, or for the manufacture of any other nuclear explosive device.

(2) This undertaking and other provisions of the agreement will be verified in Canada by the International Atomic Energy Agency (IAEA) and in Japan by the Government of Japan and the IAEA.

(3) The safeguards provided for in the agreement will cover:

- all equipment and materials obtained pursuant to the agreement for the life of these items;
- all nuclear material (uranium, thorium,

plutonium and heavy water) derived from items; and

• all technology obtained pursuant to the agreement including information relating to enrichment, reprocessing and heavy water production and information relating to CANDU reactors.

(4) Nuclear material subject to the agreement shall not be enriched beyond 20 per cent; reprocessed and plutonium and highly enriched uranium shall not be stored without the prior written consent of the supplying country.

(5) Items supplied under the agreement shall not be transferred beyond Japan or Canada without the prior consent of the other country.

(6) Appropriate measures of physical protection will be applied to ensure against diversion of nuclear material.

(7) Provisions for fallback safeguards are agreed upon by the two countries in case IAEA safeguards are not being applied.

Japan is notifying the U.S.A. so that material of Canadian origin enriched in the U.S.A. can be tracked, resolving administrative problems resulting from the accumulation of controls.

At the time of initialling, Mr. Jamieson announced the immediate resumption of uranium shipments to Japan.

Canada/Cuba sports events

Five groups of Canadian athletes will attend special sports events in Cuba over the next six months as a system of sport exchanges with that country takes effect.

Iona Campagnolo, Minister of State, Fitness and Amateur Sport, who recently signed the agreements with the Cuban Government in Havana, has announced that 50 athletes on track and field, equestrian, fencing, gymnastics and wrestling teams will travel to Cuba.

Eleven Cuban teams or sport study groups will participate in Canadian events over the next few months. Among the first exchanges:

A Cuban wrestling team will train and compete in Alberta and Ontario cities March 12-21; the Cuban water polo team will visit Edmonton March 20-27; Cuban synchronized swimmers will visit Canada April 16-23 and Cuban swimmers will be in Winnipeg May 7-14.

Canadian wrestlers will travel to Cuba for competitions February 10-20; Canadian fencers and a junior equestrian team will visit Cuba March 2-12 and March 20-27 respectively; Canadians will take part in the annual Barrientos Memorial Track and Field Meet in Santiago de Cuba, May 15-22; and Canadian gymnasts will visit Cuba, June 20-27.

Mrs. Campagnolo said the exchange agreements were a stimulus for Canadian athletes, and would provide excellent training opportunities during the colder months. She added that an exchange of ideas on sport programs for the disabled in both countries would be of particular value.

Department of Communications gets new deputy head

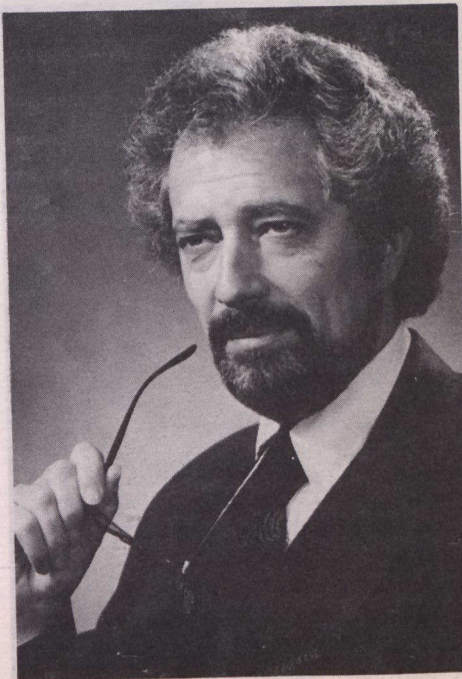
Bernard Ostry (right) has been appointed Deputy Minister of Communications, effective February 1, replacing Max Yalden who became Commissioner of Official Languages last year.

Mr. Ostry has had considerable experience in communications as a moderator of a popular Canadian Broadcasting Corporation public affairs television series, as a supervisor of the CBC's Department of Public Affairs for Radio and Television in Ottawa, and later as chief consultant to the Canadian Radio and Television Commission.

Following his work with the CBC and the CRTC, he was appointed in 1968 as Commissioner of the Prime Minister's Task Force on Government Information.

In 1970, he was appointed as Assistant Under-Secretary of State.

In December 1973, Mr. Ostry was appointed Secretary-General and Chief Executive Officer of the National Museums Corporation.



Mineral production in 1977 is expected to exceed a record value of \$18.1 billion, estimates Statistics Canada. Of this amount metals accounted for \$5.6 billion while non-metals amounted to almost \$1.4 billion. The largest value was provided by fuels — at \$10.0 billion. Structural materials, at \$1.2 billion, accounted for the remainder. The leading mineral commodities with corresponding values were: crude petroleum, \$4,917 million; natural gas, \$3,443 million; iron ore, \$1,360 million; nickel, \$1,197 million; copper, \$1,196 million; natural gas by-products, \$982 million; and zinc, \$814 million.

Agricultural forecast

Realized net farm income in Canada is expected to be \$3.3 billion for 1977, an 11 per cent drop from the 1976 figure. A further decline to \$3.1 billion is forecast for 1978.

Statistics Canada forecasts that national farm cash receipts for 1977 will be slightly lower than those of 1976 at \$9.96 billion. Total operating expenses and depreciation charges are expected to reach a new record of \$7.8 billion. Although farm cash receipts will probably improve in 1978, farm costs will also rise, resulting in a lower realized net farm income for the third consecutive year.

Agriculture Canada economists say there could be some improvement in prices for top grade bread wheat during the coming months, but there will probably be pressure on prices for lower grades. Both world stocks and Canadian supplies should be lower to start the new crop year. Wheat prices in 1978-79 are expected to be a little higher, but not substantially above current levels. World feed grain prices will probably be lower on average in 1977-78 than they were last

year, but there could be slight price improvement through the winter months.

World oilseed prices may stay at their current depressed levels for the remainder of the 1977-78 crop year and Canadian rapeseed prices might decline below \$240 per tonne. Some increase in Canadian wheat plantings this spring appears likely and the oilseed-cereal price ratio will keep oilseed crops relatively attractive this year.

Recovery in the beef industry appears to be under way and should continue through 1978. Fed-cattle slaughter may be down by as much as 5 per cent this year and prices should be above the 1977 levels. Hog slaughter in 1978 is expected to be 10 per cent or more above last year's level. Pork prices will drop, owing to the higher supply, but this trend will be partly offset by the lower level of beef supplies.

Fluid milk sales could rise by 1 or 2 per cent this year, but the market for industrial milk and cream could be smaller than in 1977. Increases are expected in cheddar cheese, yoghurt, ice cream, cottage cheese and other cheese production. However, less butter will be needed in 1978.

UIC and industry co-operate

Employment and Immigration Minister Bud Cullen recently announced the signing of two agreements under the work-sharing provisions of unemployment insurance legislation passed last autumn by Parliament.

Employees of Atlantic Sleep Products Ltd. of Scoudouc and Moncton, New Brunswick and of the Brampton and Hawkesbury, Ontario plants of IKO Industries Ltd., have agreed with their employers to work for less than the normal work week and to accept a portion of their lost wages from the Unemployment Insurance Commission. Both firms will now be able to avoid having to "lay off" workers during a temporary period of reduced production.

The agreements with Atlantic Sleep and IKO Industries, representing 90 and 250 workers, are the second and third pilot projects signed under the work-sharing provisions of the unemployment insurance legislation. An agreement with Brunswick Mining and Smelting, of Bathurst, New Brunswick, was signed in early December.

Ottawa nun candidate for sainthood

Mother Elisabeth Bruyere, mother general of the Grey Nuns of Ottawa for 31 years and founder of the Ottawa General and St. Vincent hospitals, has been named a



Mother Elisabeth Bruyere

candidate for canonization.

Mother Bruyere's charitable work began in 1845 when, at the age of 27, she opened a five-bed hospital. Two years later, in preparation for a typhus epidemic, she used her own money to open a second hospital. Of the 619 patients treated during the next year, only 167 died.

Before she died in 1876 Mother Bruyere helped establish a boarding school that eventually became the Rideau Street Convent, an orphanage and a home for the elderly.

Hundreds of documents and letters attesting to Mother Bruyere's saintliness have been forwarded to the Vatican for consideration. Rev. Angelo Mitri of Rome will present her case to the Pope, who will decide if a full investigation into her candidacy is warranted.

Bone disease — new simple test

There was a time when nothing could be done for a person suffering from kidney failure. Now, thanks to hemodialysis, victims of chronic kidney disease can lead relatively normal lives. By mechanically removing poisonous substances, dialysis performs the most important task of the non-functioning kidney. However, there are other lesser problems associated with kidney failure which dialysis cannot correct. One of these is the potential for the development of bone disease.

Doctors have long recognized that there is a link between renal (kidney) failure and bone disease. Though it is not a major consideration in the early stages of the disease, it can eventually become a serious problem. Bones are more easily broken, calcium can be deposited in abnormal places and some patients develop extremely unpleasant bone pain. It is important, therefore, that doctors can monitor the state of the bones of their patients to catch and treat any abnormalities at an early stage.

Because of the work of two McGill University researchers, Dr. Michael Kaye and Dr. Leonard Rosenthal, a relatively simple diagnostic test for metabolic bone disease now exists. Dr. Kaye is director of the Division of Nephrology at the Montreal General Hospital (MGH) and Dr. Rosenthal is the director of the MGH's Division of Nuclear Medicine. For the past four years, they have been working

(Continued on P. 8)

News of the arts

Portrait of a scientist/musician

Father of electronic music in Canada; scientist, composer, inventor, painter; add to this teacher, lecturer, consultant, photographer, horticulturist and, last but not least, humanist — and a portrait of the late shy Hugh LeCaine emerges.

"He epitomized what research is all about," says Horace Aubrey of the National Research Council's Division of Electrical Engineering, where Dr. LeCaine spent his entire working life. Joining the Council in 1940, just when radar work for the war effort was getting under way, he started work on the first of his many inventions. "With the use of tin cans and a couple of potentiometers — the most hairy-looking thing you ever saw," says Aubrey, "LeCaine designed the first automatic pattern recorder, an instrument used to measure the directions in which an antenna propagates a radio signal." For years, the Council had the only one of its kind in the world.

At the end of the war, Canadian National used receiving equipment designed by LeCaine to plan radio links across the country. In the field of nuclear physics, he collaborated in building the forerunner of what is today the Van de Graaff nuclear accelerator used to generate a stream of high-speed sub-atomic particles. Such accelerators are used in medicine, chemistry and atomic energy as "super" microscopes or probes.

His interests vascillated between music and physics until the former became all consuming.

With his invention of the electronic Sackbut in 1945, Hugh LeCaine opened the era of electronic music. "My primary concern," Hugh once said, "was making an electronic instrument that was musically expressive." The problem, he felt, lay in the cold, mechanical sounds of available electronic instruments. LeCaine's answer was the construction of an extremely sensitive instrument which, unlike other keyboard instruments, could slur and slide from note to note, producing variable sounds, with an additional capacity for making constant tone, colour and pitch adjustments.

Genius appreciated

LeCaine also invented a multitrack tape recorder — a device primarily for replaying and retaping sounds. With it, 16 tapes can be played at the same time, and by

mixing them or combining certain sections, musical compositions can be created. "There are other tape devices," says colleague Dave Rocheleau, "but none has the flexibility of this one."

"Hugh and I discussed the kinds of head to be used in tape drives," continues Horace Aubrey. "At that time, no one knew much about these drives and unlike other tape recorders with one head, the multitrack had six! The head had to be strong enough to hold the tapes as they went through, but not of sufficient load to slow them down. For months, I worked on it and at last came up with something I thought was absolutely superb. I attached it to the multitrack, and left for the day. Well, you should have seen it next morning; Hugh had been in during the night (he preferred to work during these quiet hours) and taken a hacksaw to it! I was almost in tears — and then I saw the note: 'as soon as I looked at it, I realized you could improve it Horace, if you did this, and this, and this!' "Most people would have been frustrated," concludes Aubrey, "but we appreciated the genius of the man."

In demand as a lecturer, LeCaine was known to spend hundreds of hours preparing for one 30-minute talk. Although he had dozens of compositions to his credit, many of which have been heard on radio, television and in concerts, perhaps the best known is *Dripsody*, written in 1955. "The whole composition," wrote a

reviewer in *High Fidelity Magazine*, "is based upon the single sound produced by the fall of a drop of water. This is developed in all manner of ways — plain and fancy scales, played with a neat, pearly perfection any piano virtuoso might envy; bell tones of several kinds; long sustained pure tones; and mixtures of these several elements. The work is particularly useful as an introduction for the lay listener."

As a leading authority and one of the world's foremost designers of electronic musical instruments, Hugh LeCaine was called upon for advice in the setting up of Canada's first electronic music studios — at the University of Toronto (from which he received an honorary LL.D. in 1973) and at McGill University (D. Mus. 1971) — and at the Hebrew University in Jerusalem. His alma mater, Queen's University, awarded him an honorary LL.D. in 1974.

Hugh LeCaine, who died last year at the age of 63, was honoured posthumously at the opening of the Centre Georges Pompidou in Paris, when tapes, photographs and scores depicting his work formed part of the audio-visual exhibition on the history of electronic music.

And, at Queen's University, Kingston, the Harrison-LeCaine Hall stands in memory of the scientist-musician who introduced electronic music to Canada.

The foregoing article, by Joan Powers Rickerd, has been reprinted from Science Dimension, Vol. 9, No. 6, 1977.



Dr. Hugh LeCaine combines electronic theory with a "command performance" for the Duke of Edinburgh (right) on his visit to NRC in 1954.

Simple test (Continued from P. 6)

with compounds called technetium tin pyrophosphates. Named radiopharmaceuticals because they include a radioactive marker, these substances can be injected into a subject and after a certain time their position in the body can be detected by an external scanner. Prior to the work of Drs. Kaye and Rosenthal, little was known about the action of these substances.

If the scanner shows increased amounts of technetium in the bone, this indicates the presence of abnormal collagen. The test can be used to screen for this condition and to monitor the state of patients

Peregrine falcon stamp issue

A new 12-cent stamp, featuring the peregrine falcon, was issued last month as one of a series on endangered species.

According to the Postmaster General, Jean-Jacques Blais, "the widespread use of pesticides after the Second World War resulted in the disruption [of the falcons'] breeding patterns.... The gradual elimination of these pesticides has given the falcons a fighting chance in North America, but their continued existence is still very much in jeopardy and for this reason we must make Canadians aware of the need to foster programs to save the falcon."



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Ahnliche Ausgaben dieses Informationsblatts erscheinen auch in deutscher Sprache unter dem Titel Profil Kanada.

where one would expect the eventual development of abnormal collagen — e.g. those suffering from renal failure.

Prior to the studies done by Kaye and Rosenthal, the detection of bone disease involving abnormal collagen was a fairly complicated matter. Now the establishment of technetium's affinity for abnormal collagen has provided physicians with a relatively simple diagnostic test. Patients with kidney failure, for example, who have a tendency towards the development of abnormal collagen can be tested periodically with the administration of technetium. The compound can also be employed as a screening test for the detection of bone abnormalities.

News briefs

Finance Minister Jean Chrétien told a federal-provincial finance ministers' meeting on January 26 there would be no budget before April.

Panavia, the European consortium seeking to sell the *Tornado* fighter aircraft to the Canadian Armed Forces, has offered to place final assembly work and some sub-assembly work in Canada.

The Prime Minister announced on January 26, that legislation would be introduced soon to give the Royal Canadian Mounted Police the right to open private mail. Speaking at a news conference, Mr. Trudeau said the bill would give the RCMP this right only "in certain defined circumstances".

Hurricane-force winds and snow battered Ontario on January 26, stranding travellers, knocking out hydro in many areas and causing heavy property damage. Winds of up to 120 kilometres an hour whipped up snow that blocked highways, causing the London transit system to cancel all service in the morning, with 40 buses abandoned on the streets. Military personnel helped in rescue operations in Windsor, London, St. Thomas and Hamilton. Some Hamilton schools kept children overnight.

C.M. (Bud) Drury, former Cabinet minister and special adviser on the Northwest Territories, has been appointed chairman of the National Capital Commission. He replaces Pierre Juneau, who becomes Under-Secretary of State, reporting to Secretary of State John Roberts. Mr. Juneau takes over from André Fortier, who has been named pre-

sident of the Social Sciences and Humanities Research Council. All appointments take effect February 15.

Canada had a seasonally adjusted trade surplus of \$420 million in December, compared with a surplus of \$180 million in November, reports Statistics Canada. It was the third largest surplus in 1977, exceeded by one of \$544 million in October and \$514 million in March.

A 300-pound shark has been rescued from the frozen Saguenay River, about 32 km down-stream from Chicoutimi, Quebec. It was the third shark trapped in that region in the last few months. Rescuers used a snowmobile and a net to draw the shark out of the hole made in the ice.

Exports of light crude oil to the United States will be limited to 55,000 barrels a day in 1978, down from 137,000, the National Energy Board says.

Canada has given Jamaica a balance of payments support grant of \$11 million.

The Canadian St. Lawrence Seaway Authority and the Saint Lawrence Seaway Development Corporation of the United States, have reached agreement on a revised joint seaway tariff of tolls. Fifty per cent of the increased amounts will be applied at the start of the 1978 navigation season, 75 per cent at the start of the 1979 season and 100 per cent at the start of the 1980 season. Toll increases, necessary to meet increased costs in both countries, are expected to generate in 1978 approximately \$40 million in revenue for Canada from the tolls charged for transit of the Welland Canal and from its share of the tolls charged for transit of the Montreal-Lake Ontario section. The U.S. in turn expects to collect \$9 million as its share of revenues on the Montreal-Lake Ontario section.

Two-thirds of Canadian households now have colour television sets, the household item that has shown the greatest sales increase in recent years. In May 1977, 67.8 per cent of Canada's 7,022,000 households had at least one colour TV, while in May 1976, 60.6 per cent had this item.

An anti-corrosion code for automobiles that requires 1978 models to last for at least three years without serious rusting was announced recently by Consumer Affairs Minister Warren Allmand. The auto manufacturing industry is expected to comply voluntarily with the code, which has been approved by consumer affairs ministers of the provinces.