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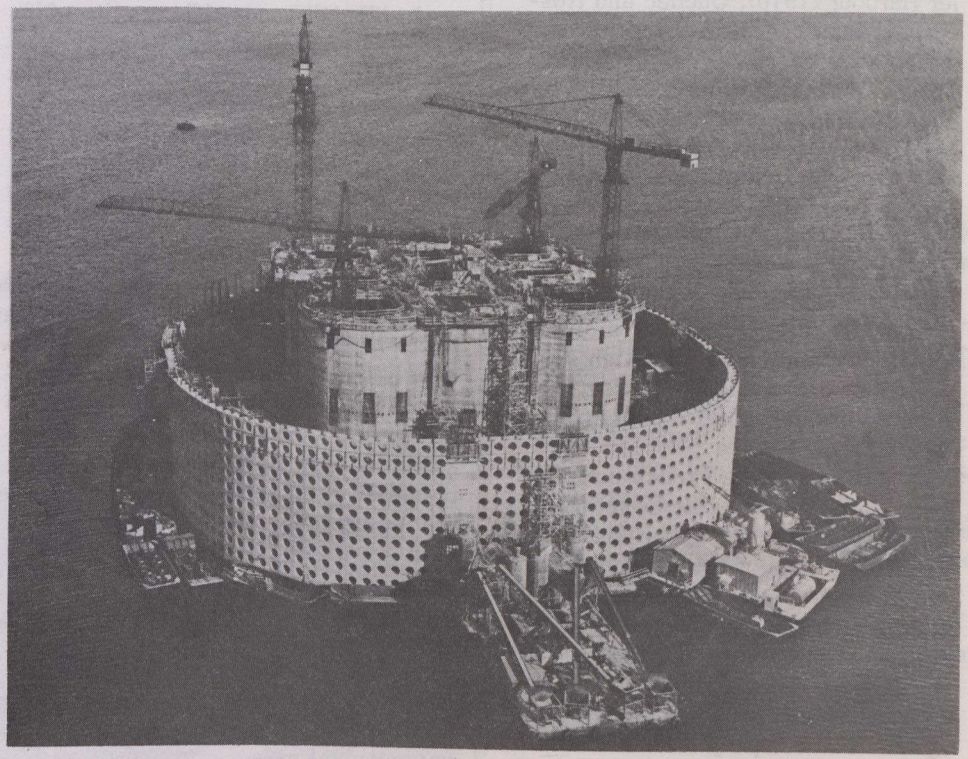
Canadian designed oil storage island in the North Sea



One of the world's largest artificial oil-storage islands is being installed in the oil-rich Ekofisk area in the Norwegian sector of the North Sea, about 200 miles southwest of Stavanger. The construction of this unique $25-million storage unit resulted from an unusual combination of international contributions. The island is owned and financed by a group of oil companies representing five countries; Phillips Petroleum Company of Bartlesville, Oklahoma, U.S.A., is operator for the group. The island was designed and built in Norway by a French company under sub-licence from a Canadian company and it is based on a National Research Council of Canada invention – the Jarlan perforated breakwater.

Million-barrel tank

The tank, which has a storage capacity of one million barrels of crude oil, was towed this spring to the Ekofisk area, where it will be linked to production wells in this vast offshore oil field. Partly immersed in 230 feet of water, the structure consists of a concrete breakwater of the perforated caisson type which encompasses internal concrete tanks. Its outer shape is that of a "round square" with a section base of 302 feet by 302 feet. The perforated breakwater is 269 feet high, the storage tank 295 feet. The tank, partitioned into nine compartiments, rests on the bottom of the North Sea and extends 65 feet above sea-level. Decks on top of the tank provide additional space for oil and gas separating and handling equipment.

The design of the storage tank was based on that of a perforated breakwater developed by G.L.E. Jarlan, a former research physicist with the Hydraulics Laboratory of the Division of Mechanical Engineering of the National Research Council of Canada. It has been patented by Canadian Patents and Development Limited, a

subsidiary of NRC responsible for patenting and licensing government inventions.

Beginnings at Baie Comeau, Quebec

The Jarlan breakwater was first constructed in 1962 at Baie Comeau, Quebec, by the Federal Department of Public Works. Since then, perforated breakwaters have been built at Chandler Harbour (1970), Quebec and Roscoff Harbour (1972), in France, all of which have been successful. Their design, which prevents all waves, except those of exceptional size, from pouring over the top of the breakwater, makes it possible to use the opposite side of the structure as a wharf and a quiet harbour for ships.

Since the North Sea is one of the world's roughest, the Phillips Norway Group called for tenders for a storage tank that could endure the high seas and allow oil production to continue even when the regular loading of tankers was interrupted.

Mr. Jarlan and the French company C.G. Doris (Compagnie Générale pour les Développements opérationnels des Richesses sous-marines), submitted designs and quotes to the Phillips Norway Group. Mr. Jarlan acts as consulting engineer for C.G. Doris, which is sub-licencee of Protocean Limited, a Canadian company set up by Mr. Jarlan. The company and Mr. Jarlan hold the original licence from Canadian Patents and Development Limited.

The contract was awarded to Doris in July 1971, and construction began in the autumn of 1971, in Stavanger, Norway, 200 miles from the Ekofisk drilling site.

Principle of Jarlan breakwater

The perforated outside wall of the storage tank allows waves to flow through holes in the prestressed concrete instead of smashing against a solid structure. Only a portion of the impact force of a wave is reflected initially, most of the wave's energy flowing through the holes of the perforated breakwater into a chamber, where it is absorbed by friction and turbulence. The wave itself raises the level of the water in the chamber. Part of the force of the next oncoming wave is dissipated by the counterwave which flows back out from the chamber between the storage tank and the wall. Thus, the constant rise and fall of wave energy is reduced to a level that saves the inner storage tank from being battered by the brutal North Sea waves, which can reach a height of over 75 feet. About 60 per cent of the total wave energy is dissipated in the chamber between the perforated breakwater wall and the storage tank.

When operating, the nine compartments of the storage tank are always filled with either water or low sulphur crude oil with a specific gravity of 0.83 or a combination of both. The storage compartments are kept pressurized by a water tower on the top of the tank. During the tank-filling operation, the oil enters from the production separators and pushes out the seawater contained in the tank. Any residual oil in this water is removed and retained before the water is flushed into the water tower. Water level in the tower is maintained to replace automatically the oil pumped out of the tank. An internal plumbing system removes sludge from the bottom of the tank by agitating and flushing it with high pressure water jets. Oil is pumped into the tank through a 30-inch line which also serves as the discharge line for pumping oil into the holds of tankers.

The oil-water levels are continuously monitored by a system of instruments and controls in the tank. Other auxiliary equipment includes automatic venting, a fire-fighting system and required navigational aids.

Engineering and testing

The concrete and prestressing engineering was performed by Europe Etudes, Paris, and Société technique de l'utilisation de la précontrainte, Paris, both companies acting as sub-contractors. A three-dimensional finite elements analysis carried out at the University of Calgary, Calgary, Alberta, with the help of Professors A. Caili, W.H. Dilger and Y.K. Cheung showed that the stress-strain relationships derived from calculation and adopted from the design were adequate.

For the concrete structures the design standards followed were those of the American Society for Testing Materials, the American Concrete Institute and the Norwegian Concrete Code. The recommendations of the Comité européen du béton – fédération de la précontrainte were applied to the post-tensioning system.

All present indications are that the storage tank will be used safely and successfully. If the perforated storage tank proves to be an efficient and safe means of storing crude oil at an offshore drilling site and providing stable and strong deck areas, the sea platform may be used to provide marine bases for oceanographic studies and other industrial applications such as offshore nuclear power plants and offshore oil and gas drilling and production platforms. *(From* Science Dimension, *April 1973 issue, National Research Council of Canada.)*

Governor General's literary awards

Six books chosen by the Selection Committee of the 1972 Governor General's Awards for Literature were announced on April 17 by the Canada Council.

The winning books are: *The Manticore* (McMillan), a novel by Robertson Davies; *Civil Elegies and Other Poems* (Anansi) by Dennis Lee; *Lies* (McClelland & Stewart), a book of poems by John Newlove; *Histoire économique du Québec 1851-1896* (Fides) by Jean Hamelin and Yves Roby; *Signaux pour les voyants* (Hexagone), poems by Gilles Hénault; and *Don l'orignal* (Leméac), a novel by Antoine Maillet.

The awards will be presented by Governor-General Roland Michener on May 16. The authors will also receive cash prizes of $2,500 each from the Canada Council.

An 18-member selection committee chose the winners from 400 literary works by Canadians published in 1972. Co-chairmen of the committee were Robert Fulford, editor of *Saturday Night,* and historian Marcel Trudel.

Members of the fiction sub-committee were Joyce Marshall (head, English section), Jean-Cléo Godin (head, French section), Ernest Buckler, Robert Kroetsch, Jean Ethier-Blais and Antoine Sirois. The poetry and drama section was headed by Eli Mandel and Suzanne Paradis, and included D.J. Jones, Sheila Watson, Rina Lasnier and Jean-Louis Major. For non-fiction there were Robert Fulford (head, English section), Marcel Trudel (head, French section), Gregory Baum, William Eccles, Maurice Blain and Robert Vigneault.

AECL's CANDU station wins nod from Argentina

Atomic Energy of Canada Limited (AECL) was notified recently by Argentine authorities that a 600-megawatt CANDU station offered by AECL and its Italian partner, Italimpianti, had been chosen as Argentina's next nuclear-power plant.

The price – about $220 million – does not include heavy-water and customer costs, such as escalation and interest, during construction. Canadian "imput" is estimated at about $100 million.

The principals, AECL-Italimpianti and the Argentine Atomic Energy Commission, will now begin negotiations with a view to signing a formal contract, which could take some weeks.

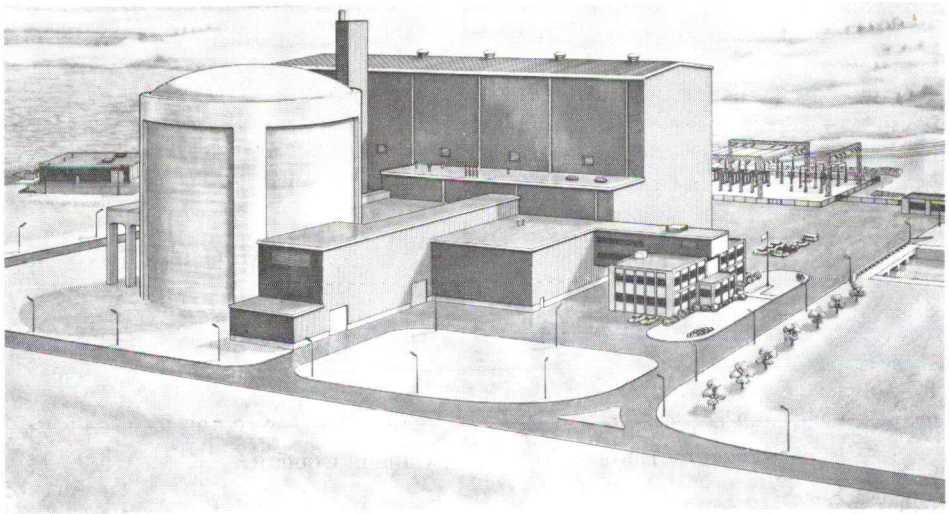
According to information received by AECL, the Argentine Junta decided in favour of a reactor fuelled with natural uranium for the nuclear-power plant to be built at Rio Tercero in the province of Cordoba, about 500 miles west of Buenos Aires. Implementing the decision, the Argentine Atomic Energy Commission chose the heavy-water-moderated, natural-uranium-fuelled CANDU reactor offered by AECL-Italimpianti.

The partnership calls for AECL to supply the nuclear portion of the plant and Italimpianti the conventional part.

The Canadian Government has approved Export Development Corporation financing for the Canadian portion of the project, details of which will be settled during contract negotiations.

Other bidders were General Electric and Westinghouse of the United States and Kraftwerk-Union of Germany.

The AECL-Italimpianti offer provides for a construction period of 59 months from the date the contract is signed.



AECL photo

Artist's impression of the 600 MW CANDU nuclear power station to be supplied to Argentina by Atomic Energy of Canada Limited and Italimpianti.

Computer-communications policy paper proposals

Proposals to deal with the fast-growing future of computer-communications (transmission of signals from a computer through a carrier) were tabled last month in the House of Commons by the Minister of Communications, Mr. Gérard Pelletier.

The 29 proposals are contained in a "green" paper on computer-communications. Together, they are intended to ensure that growth in this field is orderly, that developments are co-ordinated, that a healthy Canadian industry is maintained and developed, and that the use of computer-communications is compatible with Canadian identity and social values.

Mr. Pelletier said that it was important to recognize that the proposals were not Government policy but were an "expression of Government thinking which will develop into concrete policies after appropriate consultation with the provinces and the private sector".

The paper has emerged eight months after the Canadian Computer-Communications Task Force handed down its report, and is a result of study of that report and of reaction to it from interested parties. It also follows by a month the tabling of a paper on general telecommunication policy proposals.

Mr. Pelletier said that although the computer-communications field was in its infancy, "its potential growth and influence on Canadian society" could not be ignored.

"Because of the importance of the computer-communications to future society, the Government rejects a *laisser-faire* approach, recognizing the need for an active governmental role in helping to ensure the development of computer-communications for the benefit of Canadian society," Mr. Pelletier stated.

One of the paper's main proposals is that an interdepartmental committee be created within the Federal Government to co-ordinate policies and to analyze alternatives on an on-going basis – its chairman and secretariat to be provided by the Department of Communications. Dr. Hans von Baeyer, formerly head of the Canadian-Computer Communications Task Force is the chairman.

Major proposals

Some of the highlights contained in the paper were that:

– recognizing that the computer-communications field was a key area of industrial and social activity, its use should reflect Canadian identity and Canadian influence and control should be at a maximum;

– the Government will consult with the provinces to promote co-operation among public and private sectors to develop systems and services and to achieve equitable access to computer services across the country;

– Government procurement policies will be used to stimulate the Canadian computer and communications industries and particularly the Canadian-controlled computer service industry;

– it is vital that the potential capabilities of computer-communications technology be closely harnessed to serve the needs of people as well as institutions;

– the Government will encourage the development of systems having broad

social benefit (the orientation will be towards the formation of regional and nation-wide systems);
– the Government favours the participation of the federally-regulated communication carriers in the computer services industry *via* the mechanism of a separate affiliate, subject to appropriate conditions to prevent abuse of their privileged position;
– on the other hand, it also favours the relaxation of rules under which computer service firms and users are given access to the carrier transmission facilities;
– improvements in data communications should be distributed equitably throughout all Canada if critical disparities between regions are to be avoided;
and that, recognizing the critical and pervasive role of financial institutions in the economy, and the impact of computer-communications systems on the nation's payment and other financial services, the Government will undertake an examination of the development of the computer facilities and services of the chartered banks and other financial institutions (this would be done with a view to determining how the Government can best promote the continuing development of the payments system and determine the appropriate role of the banks in the computer-services industry).

Mr. Pelletier said that the next step would be consultation with the provinces, with industry, with associations and other interested parties, before drawing up concrete computer-communications policies which would be introduced administratively or would, if necessary, be brought before Parliament.

Beef bred in Canada will be born in Australia

Last month, for the first time, Canadian bovine semen was exported to Australia.

Under an agreement signed in February 1972 with Australian veterinary officials it is possible to export the semen if Canadian donor bulls meet rigid health requirements.

The semen, collected and processed in March 1972, mostly from dairy bulls and beef sires, has been quarantined in frozen storage for the past year.

Fifty thousand straws (plastic containers) were eligible for the first shipment. An estimated 400,000 straws have been processed in the past five months in anticipation of a continued demand for Canadian bovine semen in Australia and New Zealand in 1974.

This year the semen will be exported by four artificial insemination units in Ontario, Saskatchewan and Alberta; next year, ten more units in New Brunswick, British Columbia, Ontario, Saskatchewan and Alberta will qualify.

Exhaust-emission standards review

In the light of the decision taken on April 11 by the United States to adopt less stringent automotive-exhaust emission standards for 1975 model production, the Ministry of Transport, in consultation with other Canadian departments and agencies, will review the proposed Canadian standards for 1975, Transport Minister Jean Marchand announced recently.

Ministry of Transport engineers will begin an immediate review of the new U.S. national standards to determine whether similar regulations would be applicable in Canada. Based on a review of this study, Mr. Marchand stated that he would announce early in May whether Canadian standards would be made compatible with those of the U.S. He stressed that the quality of life of the Canadian public would be paramount in making this decision.

"The 1973 Canadian and U.S. standards have resulted in a reduction in exhaust emissions from new motor vehicles of about 70 per cent, as compared to the pre-1966 uncontrolled automobile engines. The new 1975 U.S. national standards announced last Wednesday would result in 83 percent reduction from the emissions of pre-controlled automobiles. This represents a substantial advance but is somewhat short of the originally proposed 96 percent reduction," said Mr. Marchand.

The new U.S. 1975 national standards could be accomplished by the use of engine features such as exhaust gas recirculation, air injection, early fuel evaporation, electronic ignitions and carburator modifications. It is estimated that these changes could be accomplished at an added cost of from $30 to $40 on each car.

Houses to victims of Icelandic volcano

Ten modular houses built in Gimli, Manitoba, will be flown to the Icelandic capital of Reykjavik as a gift to victims of the volcanic disaster from the Westmen Islands (Vestmannaeyjar).

The two and three-bedroom dwellings, worth $112,500, are a gift from the federal and Manitoba governments and from Misawa Homes Company Limited of Japan.

The Japanese firm and the Manitoba government are the joint owners of Misawa Homes of Canada, Limited, Gimli, the builders of the modular dwellings.

Announcement of the gift was made last month by External Affairs Minister Mitchell Sharp and National Defence Minister James Richardson on behalf of the Federal Government, and by Premier Ed Schreyer of Manitoba and C.C. Hunt, president of Misawa Homes of Canada, Limited.

The National Defence Department will transport the components for the modular homes by *Hercules* aircraft, direct from Gimli airbase to Reykjavik.

Premier Schreyer said that ever since Icelandic settlers first came to what is now Manitoba almost a century ago, there have been close and continuous ties with Iceland, and it was fitting that Manitoba contribute a donation that reflected this association "in both a practical and symbolic way".

The volcanic eruptions that first occurred on January 23 and again on March 22 have caused extensive damage on one island, Heimaey, and will have far-reaching effects on the Icelandic economy. It is estimated that between $20 and $30 million will be needed to resettle the 5,300 people who were evacuated to the mainland. Vestmannaeyjar fishermen have accounted for about 17 per cent of Iceland's fish catch – the lack of which will be a significant loss for a country where over 80 per cent of the economy is tied directly to the fishing industry.

The contribution made by the Canadian Government supplements donations from the Icelandic community in Canada. A Westmen Island Disaster Fund with a target goal of $25,000 has been set up by the Icelandic National League in Winnipeg. The Government of British Columbia has also contributed $25,000 to the disaster fund.

Montreal wins the Stanley Cup

The Montreal *Canadiens* won the National Hockey League trophy, the Stanley Cup, on May 10 in Chicago, beating the Chicago *Blackhawks* by four games to two in the final of the seven-game series. It was the eighteenth time Montreal has won the Cup.

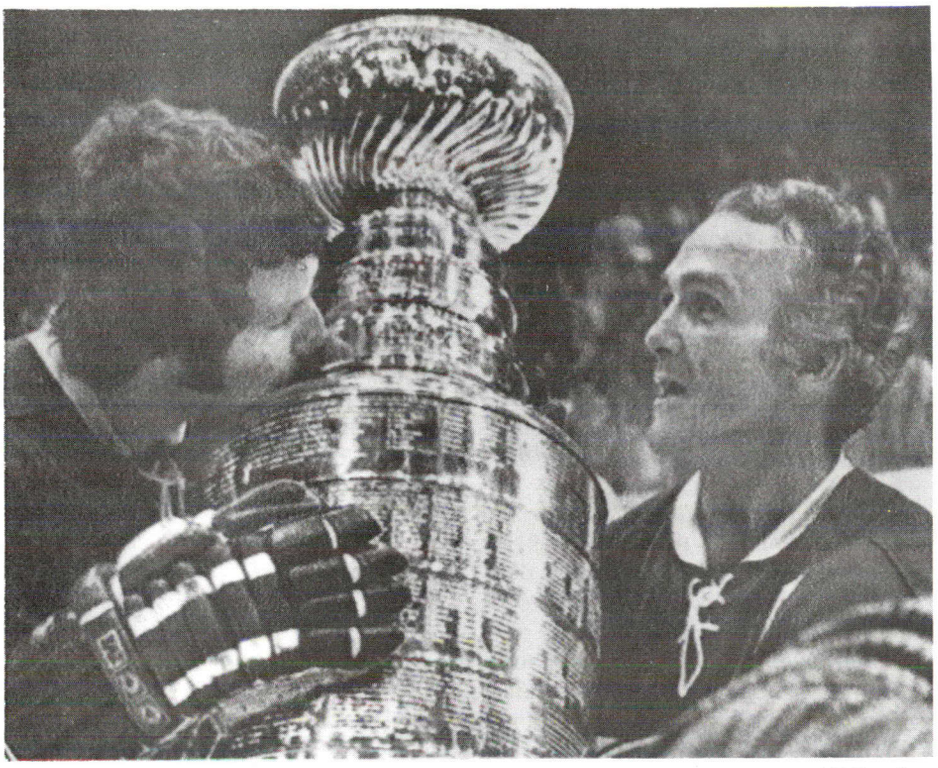
Montreal took the first game 8-3, the second 7-4, the fourth 4-0 and the sixth by 6 goals to 4.

Yvan Cournoyer of Montreal won the Conn Smythe Trophy for outstanding player of the NHL play-offs, scoring 15 goals to break team-mate Frank Mahovlich's record of 14 goals, two years ago.

Chicago won the third game 7-4, the fifth by 8-7.

World Hockey Association

In the World Hockey Association finals, the New England *Whalers* beat the Winnipeg *Jets* by four games to one in their seven-game final series. New England won by scores of 7-2, 7-4, 4-2, 9-6 in the first, second, fourth and fifth games, Winnipeg winning the third game by a score of 4 goals to 3.



AP Wirephoto

Larry Robinson shows how he feels about his team winning the Stanley Cup after Montreal beat Chicago 6-4 on May 10 to win the National Hockey League trophy. Team captain Henri Richard (right) *looks on.*

Another look at the Protection of Privacy Act

The Minister of Justice, Mr. Otto Lang, recently reintroduced in the House of Commons a bill entitled "The Protection of Privacy Act", which is aimed at protecting the right of people to communicate privately without fear of being listened to through the use of bugging devices.

Mr. Lang has said that, with recent advances in surveillance techniques, "it has become possible for almost anyone to penetrate the privacy of offices and homes and to listen in on conversations". The right to privacy in these areas, he said, "has to be recognized and protected from invasion".

The bill would make it a criminal offence wilfully to listen in on or record a private conversation by electromagnitic, acoustic or mechanical devices. Under the proposed legislation, it also would be a criminal offence to possess, sell or purchase any device of this kind knowing that it was primarily useful for invading privacy. Similarly, anyone revealing information obtained unlawfully would be guilty of an offence.

The bill would not prevent authorized monitoring aimed at preventing or detecting subversive or criminal activity, where other investigation procedures have or are likely to fail.

Provision is made for recovering substantial damages from anyone convicted under the legislation and for jail terms ranging up to a maximum of five years.

Federal assistance for food sanitation code

The federal health department will contribute $10,000 to the Canadian Restaurant Association to assist in the publication and distribution of a national sanitation code for Canada's food-service industry.

National Health and Welfare Minister Marc Lalonde noted that the preparation of the sanitation code, which includes the establishment of standards of cleanliness for food-service establishments, had come about through the combined efforts of the Canadian Restaurant Association, municipal and provincial health agencies, and his Department's Health Protection Branch.

The Canadian Restaurant Association represents about 10 per cent of the food-service operators in Canada, and 80 per cent of the total volume of the prepared food served in Canada.

"The Canadian Restaurant Association, through its national, provincial and territorial organizations, has been most diligent in developing the code in co-operation with their respective health departments. Expert advice has gone into the preparation of the draft code, and I am sure it will be of great benefit to all concerned," said Mr. Lalonde.

The sanitation code was given final review and approval at a joint meeting of health and food-service officials in September 1972.

Canada contributes to international study of science and technology

Canada has committed $25,000 to a new Club of Rome study to identify where science and technology may most effectively be applied to solving world problems, Mrs. Jeanne Sauvé, Minister of State for Science and Technology, announced recently. Canada's contribution is the first from any nation to this follow-up of the Club's widely-discussed report, *The Limits to Growth.*

Dr. Dennis Gabor, a winner of the Nobel prize and inventor of holography, will lead the research study, to be called "The New Research Imperative". His team includes two more Nobel laureates, Dr. Norman Borlaug of Mexico and Dr. Emilio Serge of the United States, as well as ten other eminent scientists from other countries.

The Club of Rome is an unofficial grouping of up to 100 scientists of international reputation whose aim is to define key problems of man's predicament and indicate solutions.

Among the Canadian members are Senator Maurice Lamontagne, chairman of the Senate science policy committee; Dr. Pierre Gendron, president, Pulp and Paper Research Institute; Dr. Robert Uffen, Dean of Applied Science, Queen's University; Ronald Ritchie, vice-president, Imperial Oil Ltd; and Dr. J. Rennie Whitehead, assistant secretary, Ministry of State for Science and Technology.

The new study will attempt to identify specific areas where science and technology may be effective. It then will be reviewed by science ministers of various countries to introduce political judgments and achieve more balance.

The report will be one of the first internationally-prepared documents which makes practical recommendations for research and development with positive indication of where government policies could be effective.

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Cette publication existe également en français sous le titre Hebdo Canada.

Metallurgist wins U.S. award

Sol L. Gertsman, chief of the Physical Metallurgy Division of the Department of Energy, Mines and Resources, has been chosen by the American Foundrymen's Society (AFS), to receive the Thomas W. Pangborn Gold Medal for 1973 – the society's highest form of recognition for those who have served the industry well.

The coveted award (the seventh to be presented in 15 years) was conferred on Mr. Gertsman on May 2 at the seventy-seventh AFS Casting Progress held in Montreal from April 30 to May 4, the first time the Congress has been held in Canada.

Mr. Gertsman has always been active in various technical societies and organizations such as the Canadian Institute of Mining and Metallurgy, where he was chairman of the executive committee of council and also chairman of the Ottawa branch. Internationally, Mr. Gertsman has served on committees of the North Atlantic Treaty Organization for Economic Co-operation and Development and the International Standards Organization. He is immediate past chairman of the Technical Co-operation Program Metals Committee (Australia, Britain the United States and Canada) and past chairman of the Defence Research Board Structures and Materials Committee, which advises on research grants to Canadian universities. He is listed in the twelfth edition of *American Men of Science* and he is a trustee on the board of the American Society for Metals. He was elected a Fellow of the Society in 1970.

University students voluntary tutors

University students in Nova Scotia are taking part in a volunteer program called "Outreach Tutoring", under which they spend an evening a week with elementary school children who are having difficulties with their school work.

This project, first proposed to the student councils of Dalhousie and Mount Saint Vincent by Veith House Community Centre, has been going since autumn 1970. For its first two years, "Outreach" ran on a small scale (about 60 tutors and 60 children), relying mainly on word-of-mouth to bring the program to the attention of both university students and parents. This year, however, nine schools are to be involved; and almost 200 university students are needed for tutoring.

Workshop beginnings

To "tutor the tutors", a workshop was held at Dalhousie University, where the students heard such speakers as John Bremer and Dr. Barbara Clark of Dalhousie's Education Department, Dr. Joseph Lauwerys of the Atlantic Institute of Education, Paul Cable from the Halifax School Board, and Ernie Rafuse from Veith House. Each tutor also received a "resource" kit to help him in his work with the children.

The program has been instrumental in establishing several new projects and helpful in continuing existing ones. For example, the tutors are assisting with a remedial reading program now in its second year.

The "Outreach" program hopes to continue its in-service training programs throughout the year to provide a forum where the student-tutors can discuss their ideas, successes, problems and feelings about their tutoring work. As the year continues, a training film and slide presentation will be made, and it is possible that a book about the tutoring program will be published in the summer.

The whole "Outreach" operation is run by the university students and is funded by their student councils: an exciting example of how the university can involve itself with the schools and the people of the community.