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## CANADA BACKS "MANHATTAN" VENTURE

In August 1969, the Canadian Coast Guard Ship *John A. Macdonald* assumed her role in a daring venture which may profoundly affect the future development of the Canadian Arctic.

This tough veteran of Arctic ice is accompanying the tanker *S.S. Manhattan*, a powerful giant displacing nearly 150,000 tons specially reinforced for the purpose, in an assault on the formidable Northwest Passage which, as a result, may some day welcome the trading fleets of many nations, as do the Gulf of St. Lawrence and the Seaway.

Owing to economic, geographic, climatic and ice conditions, the so-called "passage" has never become an international waterway. Only a few ships, of which the *John A. Macdonald* is one, ever have traversed the passage; sponsors of *S.S. Manhattan* hope to prove that great tankers - at least twice the size of the *Manhattan* - can break their way through the ice-choked passage all year round.

Navigation in Arctic waters is infinitely more difficult and hazardous than in other latitudes. Ice on the surface of the water is the chief obstacle, but other Arctic features are also a great hindrance, such as almost continuous overcast, fog, extremely cold air and water, the need for navigational aids such as beacons, buoys, electronic positioning systems, supply and rescue services, etc., low-lying, featureless land masses that offer few distinctive landmarks, magnetic disturbances and deviations (the magnetic compass is useless for navigation over much of the Arctic, and gyro compasses are much less reliable). To this must be added a psychological effect, namely, boredom for the seaman, which conflicts with the need to be especially alert

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in these dangerous passages. Ships must be especially built and equipped for Arctic navigation; they must also carry extra supplies and life-saving equipment. If a ship were to go down, life jackets and rafts would prove useless, since men can survive for only a few minutes in extremely cold water. In winter, 24-hour darkness adds to the perils.

## THE PRIZE

The nature and value of the prize are far beyond the dreams of Cabot, Frobisher, Hudson and other early adventurers who sought the elusive route to Cathay and India. Even when it was known, the Northwest Passage proved virtually impassable to ships of an earlier day. The task of the *Manhattan* is to test the economic feasibility of creating, through modern technology, a regular sea-route to the frozen frontier where nature has cached one of the world's largest deposits of oil.

Prudhoe Bay is on the north Alaska coast. Here, exploratory drilling has revealed a reservoir containing, by one estimate, between five and 10 billion barrels of oil.

Getting oil out of Alaska - or Melville Island, where Canada's Panarctic venture expects to make a good strike - appears neither easy nor inexpensive. Pipelines are difficult to install and maintain over frozen but occasionally thawing tundra, but

they provide one feasible method. For the east coast and European markets, however, tankers, if they prove able to make the long haul through the Northwest Passage, will have a decided economic edge on pipeline transportation.

The voyage of the *Manhattan* is an awesome undertaking, in which the giant vessel will sail from the Atlantic seaboard to Alaska, approximately 4,500 miles, to test the question of whether the currently-exploited shipping season of three months in the ice-infested waters of Canada's Arctic archipelago can be extended, by means of super-powered, ice-breaking tankers, to nine or even 12 months.

The Canadian and United States Governments are co-operating in the project, which is being carried out by Humble Oil on behalf of a consortium that also includes Atlantic Richfield and British Petroleum, with the assistance and support of the Canadian Department of Transport and the U.S. Coast Guard.

#### CANADA'S ROLE

Canada found the grand conception of opening up the Arctic in this manner a challenging one, especially in view of the country's vast Arctic resources. Transport, designated the department of primary interest by the Government, held a lengthy series of consultations and exchanges of information with the U.S. Coast Guard and Humble Oil.

In addition to the expert advice of its Marine Operations Branch and experienced senior officers, the Department has provided an officer to work full-time on the project. He is Captain T.C. Pullen, an Arctic expert of wide experience. Captain Pullen, who made organizational plans for the Canadian part of the undertaking, is aboard the *Manhattan* as Canada's official representative, where his knowledge in Arctic operations will be available to the master of the tanker, Captain Roger Steward.

The icebreaker attached by the Department of Transport to the expedition is the largest Canadian Coast Guard ship now in general service. CCGS *Louis S. St. Laurent*, which is larger, was received by the Department this month and is now undergoing sea trials.

CCGS *John A. Macdonald* was built in 1959 by Davie Shipbuilding at Lauzon, Quebec. Based at Dartmouth, she measures 6,186 gross tons and is capable of travelling 20,000 miles without refuelling or revictualling. She is a triple-screw vessel with diesel-electric propulsion machinery generating 15,000 shaft horsepower at peak operation.

The vessel has spent much time in the high Arctic, gaining information on bottom topography, ice conditions and, similar to other Canadian Coast Guard icebreakers, carrying hydrographers to chart the waters. The information thus gained was of incalculable aid to those who planned the *Manhattan* voyage.

Under her veteran master, Captain Paul Fournier, the *John A. Macdonald* earned special note during

Canada's centennial year by steaming through the Northwest Passage into the polar ice of the Beaufort Sea to assist the United States Coast Guard Icebreaker *Northwind*, which was crippled and trapped in heavy ice.

Another contribution to the tests by the Government of Canada is the services of a Department of Transport-leased DC-4 aircraft recently fitted with special remote-sensing equipment for mapping and assessing ice conditions. This equipment includes a laser profiler, an infra-red thermal mapper, and a panoramic camera with associated recording equipment. The aircraft is also fitted with facsimile equipment used to send ice maps by radio to ships. Other special equipment installed on this "flying laboratory" includes closed circuit TV, synchronous astro compass, Doppler radar, a precision gyro compass and Omega navigation equipment. Records and film will be free-dropped to the *Manhattan* for processing. The aircraft, with a range of more than 2,500 miles, normally is part of the regular operations of the Meteorological Branch's ice reporting system to aid winter shipping. Ice observers will maintain constant surveys ahead of the convoy. Their reports, combined with the information obtained on short helicopter flights from the decks of the vessels, will keep the ships' navigators well informed as to ice conditions.

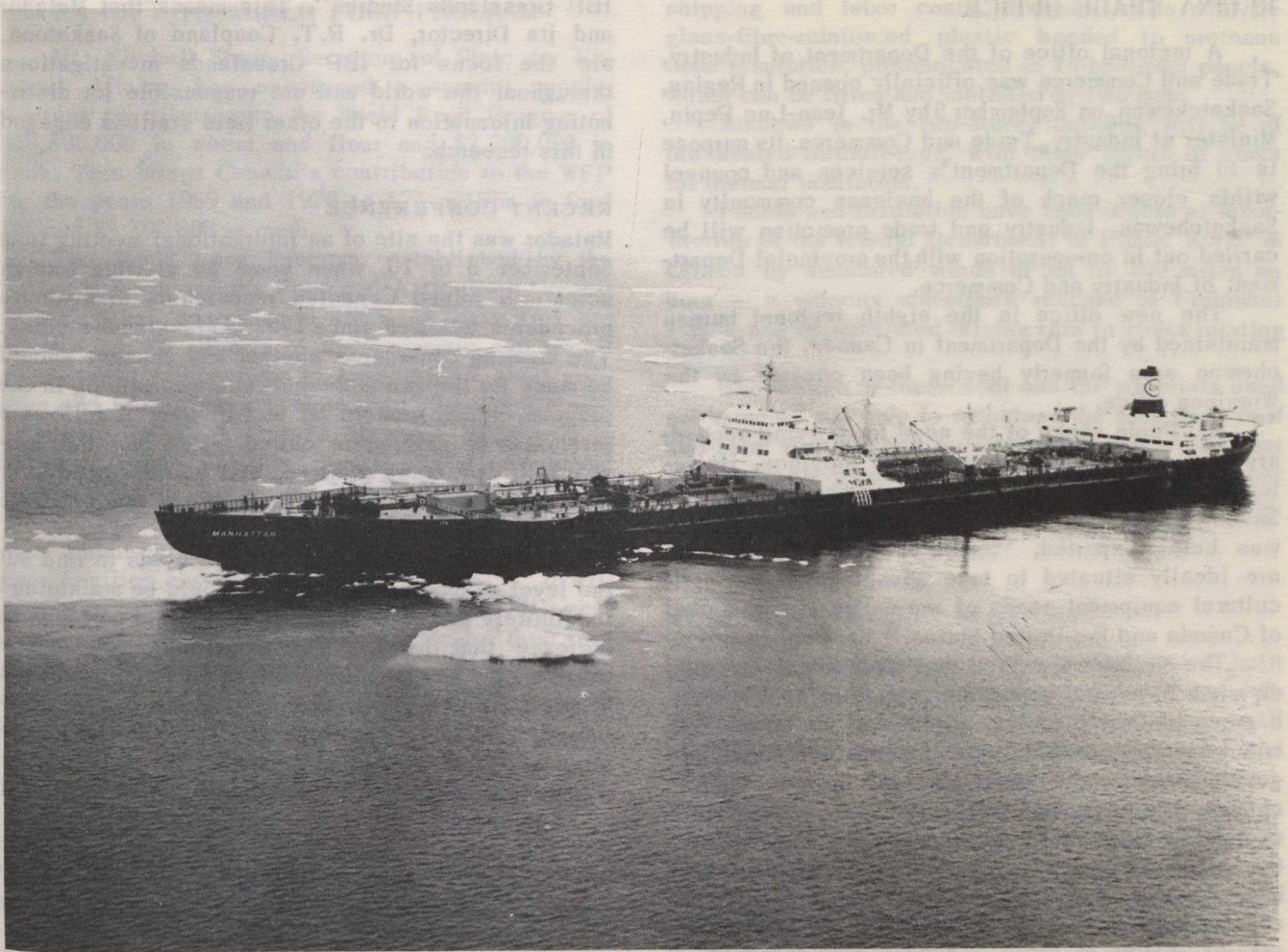
Also available throughout the voyage are the services of Canadian Government meteorological and telecommunications bases established in strategic places across the Canadian Arctic.

To transform the huge tanker into the type of strong icebreaker they had in mind, Humble Oil executives had to have her cut into four parts, allotting each piece to a different shipyard in order to get the job done as quickly as possible. The gigantic sections, transformed into temporary barges, were towed by tugs to their separate shipyards. A specially-designed icebreaking bow was built, replacing the ship's conventional one.

The results of this historic voyage are no foregone conclusion, but they obviously will have widespread impact on the international economy. It presents an exciting example of what governments and large industries can accomplish together.

#### HISTORY OF ARCTIC NAVIGATION

Navigation in the Canadian Arctic, which began in the sixteenth century as part of the general exploration of the Western Hemisphere, was usually motivated by the desire to find a route to the Far East. Martin Frobisher made three voyages (1576-78) to Frobisher Bay on the southeastern tip of Baffin Island. He believed the bay to be a strait leading to the Orient. John Davis also made three voyages (1585-87) skirting the southwest coast of Greenland, the southeast coast of Baffin Island and the coast of Labrador. Henry Hudson discovered Hudson Strait and Hudson Bay (1610), the most important discoveries thus far. He, too, was instructed to search



The S.S. Manhattan on its way through the Northwest Passage. In preparation for the hazardous voyage a 125-foot bow was specially designed that lifts the vessel up and over the ice until the weight of the ship breaks through.



This map of the Canadian Arctic shows the route of the Manhattan and the great expansion in charting achieved by the Canadian Hydrographic Service since 1950.

## REGINA TRADE OFFICE

A regional office of the Department of Industry, Trade and Commerce was officially opened in Regina, Saskatchewan, on September 5 by Mr. Jean-Luc Pepin, Minister of Industry, Trade and Commerce. Its purpose is to bring the Department's services and counsel within closer reach of the business community in Saskatchewan. Industry and trade promotion will be carried out in co-operation with the provincial Department of Industry and Commerce.

The new office is the eighth regional bureau maintained by the Department in Canada, the Saskatchewan area formerly having been covered by the Winnipeg office.

Mr. Pepin spoke of the need for thriving secondary and service industries in the province. He referred to the flourishing farm equipment industry in Saskatchewan and the fact that much of its output was being exported. "Saskatchewan manufacturers are ideally situated to take advantage of the agricultural equipment needs of the entire plains market of Canada and the United States," Mr. Pepin said.

The Minister remarked that trade missions could do much to expand export markets. Earlier this year, a group of United States agricultural equipment distributors sponsored by the federal and provincial governments toured Saskatchewan. In turn, Saskatchewan businessmen visited the U.S. "More interchange of this nature is needed and more of your businessmen should go out personally and see just what the market possibilities are," he said.

He urged greater development of skills and ideas within the province and pointed out that Federal Government assistance was available for research and development and other purposes.

Other regional offices of the Department are in Vancouver, Edmonton, Winnipeg, Toronto, Montreal, Halifax and St. John's.

## GRASSLANDS RESEARCH

Headquarters for grasslands studies that are under way in 30 countries as part of the International Biological Program (IBP) have been established at Matador Project, a field station set up in 1967 by the University of Saskatchewan, with funds provided by the National Research Council of Canada, near Kyle, 30 miles north of Swift Current, Saskatchewan. By opening this station for the study of biological productivity on grasslands, the University assumed a leading role in the world-wide IBP study of the biological basis of productivity and human welfare. The IBP was organized under the auspices of the International Council of Scientific Unions to evaluate the world rate of food production in view of the requirements of a rising population.

The special committee on the IBP with scientific headquarters in London, England, has now designated the Matador Project the "International Center for

IBP Grasslands Studies". This means that Matador and its Director, Dr. R.T. Coupland of Saskatoon, are the focus for IBP Grasslands investigations throughout the world and are responsible for distributing information to the other field stations engaged in this research.

## RECENT CONFERENCE

Matador was the site of an international meeting from September 5 to 10, when some 50 visiting foreign scientists joined Canadian researchers to evaluate procedures followed since 1967 in grasslands studies. The meeting considered whether any changes should be made for the two-and-a-half years remaining in the program, which centers on fact-finding. A follow-up international programme called "Man and the Biosphere", now being planned, will be concerned with the application of these findings to the efficient management of the landscape.

Dr. Coupland said that the object was to find out the level of food production that could be maintained indefinitely and what steps, if any, could be taken to increase that level. "The usual approach to the world's food problems is to strive for large increases in yield on the assumption that these can be sustained," he said. "Our approach requires the evaluation of total biological productivity to determine whether the yield that is harvested can be depended on in perpetuity."

The study of animals that transform plant food into secondary products, of micro-organisms, and of soils, nutrients, and soil and aerial atmospheres, is involved, as well as the central study of plants.

Dr. Coupland pointed out that there were former fertile areas of the world where the productivity of land had dropped to near zero and he went on to say: "We, in fact, do not know how long the soil will continue to deliver food to us, even though we follow the best recommendations for cultivation and fertilizer use."

He stated that native prairie grassland was in balance with the prairie climate and could, therefore, maintain itself indefinitely. "If we could understand how the grassland system works, we might then be able to develop a crop system on a similar sustained basis."

Project Matador is located on three sections of the last extensive uncultivated area of first-class wheatland on the prairies. The studies are being carried out mainly on native grassland and on a recently-cultivated wheat field. About 100 people representing numerous branches of biology, soil, crop and animal science, and meteorology, are directly involved in the research. Scientists from the University's Saskatoon and Regina campuses and from the federal Department of Agriculture, the Canadian Wildlife Service, the National Research Council, and the Universities of Calgary and Manitoba are co-operating in the project, which is financed largely by the National Research Council.

## EXTRA GIFT TO WORLD FOOD PROGRAM

Mr. Mitchell Sharp, Secretary of State for External Affairs, has announced a special supplementary contribution to the World Food Program of \$10,800,000 in wheat and flour and \$2,700,000 in cash. This brings Canada's contribution to the WFP for the years 1969 and 1970 to \$27 million in food aid and \$5,200,000 in cash.

The World Food Program, established by the United Nations and the Food and Agriculture Organization, began operation in 1963. Its activities are devoted to the support of the economic and social development of countries in Asia, Africa, the Caribbean and Latin America. More than 80 countries now belong to the WFP. Canada played a major role in the establishment of the Program and is the second largest donor to it.

Canada's latest contribution will help the WFP feed school-children and provide food to workers and their families engaged in developed projects. It will also support families taking part in resettlement programs until they are able to provide for their own needs. Canada's contribution will also bring further resources to the WFP for emergency aid to victims of famine and natural disasters.

## NEW ARCTIC SCHOOL

A new occupational and secondary school, of unique design, will be constructed at Frobisher Bay on Baffin Island in Canada's Eastern Arctic. Mr. Arthur Laing, Minister of Public Works, and Mr. Jean Chrétien, Minister of Indian Affairs and Northern Development, who made the joint announcement, said that the construction contract, worth \$2,957,000, was awarded to two Quebec firms, which would undertake the project as a joint venture. Funds are being provided by the Department of Indian Affairs and Northern Development which will operate the new high school, the first in the Baffin area.

Some 475 students, mainly Eskimos from Baffin Island and the Keewatin Region, will be enrolled when the school opens in the autumn of 1971. The curriculum will be suited to the needs of northern students. About 100 will take regular secondary courses; 375 will be occupational students, whose academic level has been limited because of the remote areas in which they live. As higher grades are attained, these occupational courses will be gradually phased into a vocational program.

At present, students from Baffin Island attend school in Churchill, Manitoba.

## MATERIALS AND DESIGN

Unusual materials and novel design will be used, which may revolutionize construction, not only in the North but in other remote parts of Canada which are subject to severe weather conditions. One feature is the light weight of materials, which will reduce both

shipping and labor costs. Exterior walls will be glass-fibre-reinforced plastic bonded to urethane foam insulation, prefabricated in 14-by-6-foot panels, which can be lifted and installed by two men.

Windows in the two-storey building will be of the sealed aircraft-type, with three layers of glass for thermal insulation.

Panels and insulation have been tested at laboratories of the federal Department of Public Works in Ottawa by simulated winds of up to 100 miles an hour — a velocity sometimes reached at Frobisher Bay — and by simulated driving rain to check jointing efficiency.

The design of the school and the materials used are intended not only to withstand the long periods of sub-zero weather and hurricane-velocity winds, but also to harmonize with the rocky, barren, almost lunar landscape where the buildings will be located, less than 200 miles south of the Arctic Circle.

## TELEPHONE PAGING SERVICE

A new electronic telephone-paging system built round a computer has been developed and put into service by Bell Canada. The paging service will enable people in the Ontario cities of London and Windsor, where the system was inaugurated simultaneously on September 2, to contact persons within the five-mile radius of the local transmitter who are carrying small portable receivers. When the receiver's number is dialled a signal is activated within the unit. The person being paged telephones a predetermined number — home or office, for example — to receive the message.

The system has been described by J.D. Fahey, Bell's director of engineering design, as "a project of considerable significance — a Canadian development that has made us leaders in this developing area of telecommunications." "We have patents on this system in 17 countries," Mr. Fahey said, "and telecommunications experts from the United States and other countries have come to study it."

Mr. Fahey says that the paging service itself does not differ from Bellboy service<sup>(1)</sup> in Toronto, Montreal and other large centers, but that the technology is "quite revolutionary", and is significant because of its potential for future communications.

Possible future developments could include a one-way voice service, where a brief message is received on the portable unit, and a "roaming" service, where a customer could be contacted away from his home city.

Mr. Fahey said that the system, which uses a computer and existing communications switching equipment, was the first to make automatic telephone-paging economically practical outside large metropolitan centres.

<sup>(1)</sup> See "National Capital Calling" *Canadian Weekly Bulletin*, Vol. 23, No. 4, dated January 24, 1968, P. 5.

## DIPLOMATIC APPOINTMENTS

Mr. Mitchell Sharp, Secretary of State for External Affairs, has announced the appointment of Mr. Gordon E. Cox as Ambassador to Thailand, where he will succeed Mr. J.C. Britton, who has held the position since 1967 and will be retiring shortly from the Public Service. Mr. Cox, who is currently Deputy Permanent Representative and Minister at the Permanent Mission of Canada to the United Nations, will be replaced in New York by Mr. David C. Reece, former Counsellor at the Office of the Canadian High Commissioner in New Delhi.

## VISITORS FROM FRANCE

Six graduates of the Ecole nationale d'administration (ENA), Paris, visited Canada as guests of the Government of Quebec from August 16 to 31 and, as guests of the Federal Government from September 1 to 22.

In 1964, under the terms of a cultural agreement, the Government of France agreed to admit a number of Canadian civil servants to the ENA each year, and Canadians have been attending training courses there since then.

The Ecole nationale d'administration recruits and trains future management and supervisory personnel for the principal agencies of the French Government.

Since 1965, the Canadian Government has extended a reciprocal invitation to ENA graduates to visit Canada. This year, again, six of them had the opportunity to study current activities in public administration in Canada. The program for the graduates' visit to Ottawa included lectures and discussions on Canadian political, administrative and economic institutions, as well as a number of meetings with Canadian Government officials. During their visit, the ENA graduates toured Canada from coast to coast, observing Government programs in action at first hand and seeing some aspects of Canadian cultural life.

The visit was arranged by the Cultural Affairs Division of the Department of External Affairs, in conjunction with the Public Service Commission.

## CANADA BACKS "MANHATTAN" VENTURE

(Continued from P. 2)

for a passage to "the Southern Sea". Robert Bylot and William Baffin sailed around the entire circumference of Baffin Bay in 1616.

In 1819-20, Edward Parry became the first explorer to venture beyond the eastern Arctic. He sailed nearly the entire length of what is now called Parry Channel, reaching the south coast of Melville Island, and coming close to passing through the Arctic islands. Heavy ice in M'Clure Strait prevented him from reaching the Beaufort Sea.

Sir John Franklin attempted the Northwest Passage in 1845, but perished with all his men somewhere in the vicinity of King William Island. His disappearance set off a series of rescue expeditions (at one time, 14 ships were searching simultaneously), which did much to further knowledge of the Arctic islands and waterways.

Possibly the most important was the voyage of Robert M'Clure, who sailed north through Bering Strait (1850-54) and became icebound on the north coast of Banks Island. He and his party continued on foot toward Viscount Melville Sound, reaching the point attained some 30 years earlier, from eastward, by Edward Parry. There, M'Clure and his men were rescued by a British ship, which took them home through the rest of the Arctic.

The existence and location of a passage being known, the full-length navigation through the Arctic islands became a question of survival of crew and ship in Arctic ice. This endurance question was not solved until 1903-06, when the Norwegian explorer, Roald Amundsen, with a specially-equipped 47-ton herring boat, the *Gjoa*, took three seasons to pass from east to west through the Arctic, stopping to locate the North Magnetic Pole.

In 1940-42, Sergeant H.A. Larsen, in the Royal Canadian Mounted Police schooner *St. Roch*, made the Northwest Passage from west to east, in the course of normal supply operations in support of RCMP posts scattered through the western Arctic, and in 1944, again in the *St. Roch* he accomplished the passage, east to west, in a single season.

The Canadian icebreaker *Labrador* became the first deep-draft vessel to make the Northwest Passage in 1954.

Three United States icebreakers - *Spar*, *Storis*, and *Bramble* - sailed through the Arctic west to east in 1957. The ships were carrying out hydrographic surveys in connection with DEW Line requirements, and were escorted over the last half of the trip by the *Labrador*.

In 1967 the icebreaker *Sir John A. Macdonald* (which is accompanying the *Manhattan*) made the passage east to west, more or less as an accidental by-product of icebreaking duties in support of other vessels.

### POSTSCRIPT

Since this report was written, the *Manhattan* has successfully navigated the Northwest Passage.

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