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INTERNATIONAL EDITION

VOLUME 13, NUMBER 1, OTTAWA 1975

## Canada steers a steady course in ocean technology

by Robert McDougall,  
Canada Courier

Never before has man's interest in the sea been so profound.

Each day, the world's oceans are being explored at an unprecedented pace as nations seek to discover new petroleum reserves to offset dwindling supplies from traditional land wells.

Among the leaders in this hunt for oil and in the research and development of new techniques and equipment to assist in the search, is a country already rich in land resources but mindful of their exhaustibility . . . Canada.

Buffeted by three of the harshest oceans in the world — Arctic, North Atlantic and North Pacific — Canada has long been engaged with developing equipment and techniques to withstand this demanding environment. As well, it has steered a steady course towards a progressive, scientific exploration and development of its rich continental shelf that covers almost 1.5 million square miles (5.8 million sq. km), the second largest in the world.

The Canadian scientific ship Hudson 70, the first vessel to circumnavigate the Western hemisphere, has shown by its historic feat that there are untold possibilities for exploitation of the vast Arctic oil reserves.

Recently, significant strikes of gas bearing structures have been made off the coast of Labrador in some 600 feet (183m) of water. Located in what is called "iceberg alley," these reserves, once proved, will be exploited with technology that is now being developed in Canada.

A few years ago, a Canadian firm made a 60-day seismic survey of the Arctic. This survey produced some 12,000 miles (19,200km) — twice the expected output — of reflection seismic data among the islands of the Canadian Arctic, proving that thousands of miles of offshore geophysical data, even



*International Hydrodynamics Company Limited (HYCO) of North Vancouver, British Columbia, is one of the few companies in the world with the field experience and engineering expertise necessary to design and manufacture submersibles for underwater exploration and exploitation. The company has produced internationally recognized products, like the Pisces models, the SDL-1 submersible diver and the Hudson handler — all synonymous with rugged endurance, safety and modest operating costs. Last summer, a Pisces-class mini sub — regarded internationally as the "workhorse" of the sea — descended to a record depth of 6,000 feet (1,829m) while carrying out tests in connection with burying the CANTAT 2 transatlantic telephone cable linking Canada with Europe. About the same time, an Aquarius 1 — a lighter sister vessel of the Pisces — completed the first ever diverless guidelines changeout on an exploratory drilling base in 220 feet (67m) of water off the Atlantic coast of Canada. The Aquarius' versatile manipulator arm proved it could perform the intricate operation on the drilling base with the same results achieved by divers.*

in the frigid Arctic waters, can be economically and accurately gathered.

At present, Canada is leading all countries in the development of a total subsea oil production system

that will provide the most economical means of exploiting deep water wells below the ocean floor. An important part of this system already perfected is the first operational manned one-atmosphere

capsule for servicing wells at depths exceeding 1,000 feet (304.8m).

Canada has also shown leadership in the area of submersibles and semi-submersible drilling rigs. Last summer, a Pisces-class mini

sub — regarded internationally as the "workhorse" of the sea — descended to a record depth of 6,000 feet (1,829m) while carrying out tests in connection with burying the CANTAT 2 transatlantic telephone cable linking Canada with Europe.

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Meantime, in Halifax in the Canadian province of Nova Scotia, Halifax Shipyards Division of Hawker-Siddeley Canada Ltd. had completed its fifth gigantic offshore drilling rig and was busy constructing two twin-hulled, column-stabilized mobile offshore drilling units, "Sedco 705", and a dynamically stationed "Sedco 709" for delivery in 1975 and 1976 respectively.

The foremost Canadian company in this type of offshore construction, Halifax Shipyards also has on order, for 1977 delivery, a dynamically stationed drillship, the "Sedco 471".

Behind the Canadian effort and success in the oceanology field, are a number of world-renowned research establishments and a forward-looking government "Oceans Policy" that is designed to stimulate continuous growth and development of Canadian oceanology expertise and the offshore industry.

Perhaps the best known of the research institutions is the Bedford Institute, the second largest centre for marine studies in the world. This famous centre carries out research and surveys in many aspects of marine science including sea bottom charting, marine biology, fishery dynamics, pollution studies, marine geology and ocean engineering. (Continued on page 4)

## Offshore Europe '75

A cross-section of Canadian services and equipment — with emphasis on offshore oil exploration and exploitation — will be displayed by 11 Canadian companies at Offshore Europe '75 being held in Aberdeen, Scotland, September 16-19, 1975.

Offshore Europe '75, which marks the third time Canada has participated in an exhibition and conference directly relating to North Sea offshore activities, will feature such Canadian services and equipment as: satellite navigation equipment for pinpoint positioning of rigs and drillships; submersibles equipped with manipulator arms capable of doing the work of divers; semi-submersible oil drilling rigs and ships; a total subsea oil and gas well completion and production system; and gas engines suitable for oil platforms and rigs.

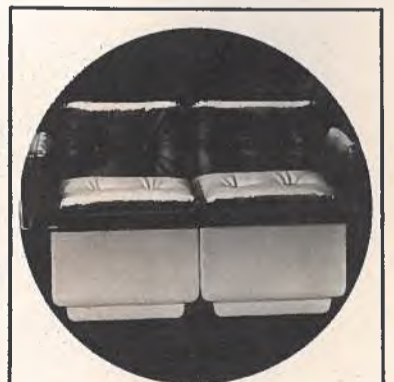
Also being displayed are: electrical slip ring assemblies, multiport rotary gas valves and wave-staffs; extruded headers for pipe-

lines, refineries and power plants; automatic safety shut-off valves and master centre for oil platforms; and submerged towing systems for seismic and other data.

Companies participating in Offshore Europe '75 are: B.C. Research (Ocean Engineering Centre), Vancouver, British Columbia; Canadian Marconi Company, Avionics Division, Montreal, Quebec; Fathom Oceanology Limited, Port Credit, Ontario; Halifax Shipyards Division, Hawker-Siddeley Canada Ltd., Halifax, Nova Scotia; International Hydrodynamics Company Ltd., Vancouver, British Columbia; Lockheed Petroleum Services Ltd., New Westminster, British Columbia; Nova Scotia Research Foundation, Dartmouth, Nova Scotia; Orenda Division, Hawker-Siddeley Canada Ltd., Toronto, Ontario; Steel-Flo Industries Ltd., Calgary, Alberta; Techwest Enterprises Ltd., Vancouver, British Columbia; and Willis Oil Tool Canada Ltd., Edmonton, Alberta. Code 1-264



Extruded headers for pipelines, refineries and power plants are manufactured by Steel-Flo Industries Ltd., Calgary, Alberta.



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courier

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## Canadian history goes on record

Getting to know Canada is easy — especially with the recordings now available from Confederation Records, Thunder Bay, Ontario.

The set of 14 long-playing records entitled "Canada, A Time to Remember," is a province by province narrative study of Canada's history. An invaluable source of information and a pleasure to listen to, it is complete with sound effects and background music.

"Canada, A Time to Remember" takes a humanistic approach, attempting to portray the personalities and personal accomplishments of the men and women who were instrumental in developing the country.

Referred to as a "talking book," the set, bound in royal blue and gold, is ideal for use at all levels of education, from elementary to university, and would be a valuable addition to any library or other information centre.

Introduced only recently, the "Canada, A Time to Remember" series is available for export to international markets. Code 2-267

## Velan valves in world demand

Approximately 80 per cent of the valves and steam traps manufactured by Velan Engineering Limited are exported to more than 50 countries throughout the world.

The 25-year-old Montreal, Quebec, company recently signed contracts with the Soviet Union for the supply of \$13,000,000 worth of

# Volcano ships boilers around the world

New advances in design and manufacturing techniques are bringing a Montreal company orders for industrial boilers from many parts of the world.

Volcano Limited is a specialist in the fabrication of packaged boilers that produce hot water or steam for industrial process applications as well as heating for commercial buildings.

Well established in the export market, Volcano's boilers are in use in 24 countries including the Bahamas, Iran, Nigeria, Pakistan, Tanzania and the United States.

Providing maximum heat transfer, the Duofin Watertube boiler has a capacity of 10,000 to 75,000 pounds (4,540 to 34,050kg) of steam per hour. Double fin tubes on the water walls and the monolithic casing eliminate the need for inner casing.

Another product from Volcano is the International-LaMont High Temperature Water Generator, one of which heats the entire town of Inuvik in Canada's Northwest Territories by producing 90 million BTU's per hour for 720 homes plus commercial properties.

Among the company's standard units is the Starfire firetube boiler available in models rated from 15

valves — the largest single sale of valves ever made to that country from North America.

Originally supplying the petroleum, refining and process chemical markets, Velan Engineering expanded its capabilities to include the manufacture of valves for installation in both the primary and secondary systems of nuclear power plants.

Today, Velan is a major Canadian manufacturer of nuclear valves and a respected leader in this specialized field: The company was the first North American valve manufacturer to be awarded the Nuclear "N" Stamp of Approval (Classes 1, 2 and 3) by the American Society of Mechanical Engineers.

With distributors, sales offices and representatives around the world, Velan Engineering is constantly engaged in research and testing and uses modern facilities with sophisticated manufacturing equipment. Code 2-331



Canadian-made boilers for plant heating and industrial process applications are sent out regularly from the yard of Volcano Limited of Montreal, Quebec. These units, ranging from 20 to 150 HP are awaiting shipment to Venezuela, Syria, Lebanon and Hong Kong, while the largest, a 500 HP unit, is destined for Trinidad.

to 600 BHP. A three-phase concentric design, it requires no baffles or retarders, and provides maximum heat transfer per unit area of heating space.

The Exair deaerator is another

Volcano product and it has capacities up to 300,000 pounds (136,200kg) an hour in both dome and low head horizontal models. The two-stage design incorporates spray valves and steam scrubbers.

Agency representation is available in a number of countries, and Volcano would welcome inquiries from firms with sales and service facilities in the boiler field.

Code 2-164

## Versatile systems apply protective coatings

Dressing up metals, plastics and glass materials with a protective coating is no problem when the equipment that applies the covering is from Metalmac Designs Ltd.

This Toronto, Ontario, company provides manufacturers and fabricators with fully automatic tape applicators that safeguard sheet materials during further processing, handling and installation procedures.

Protective coatings are being used by industry more and more for their ability to reduce surface damage and increase savings. But conventional methods of application are time and labour consuming, creating bottlenecks in production, and it is difficult to achieve a uniformly smooth deposition with them.

Metalmac tape applicators eliminate these problems. Each unit is a complete self-contained handling system capable of conducting materials through the coating process

and then onto further fabricating or into storage.

The system works by applying pressure-sensitive tapes of vinyl, plastic or fabric to sheet rectangles and coils in a wide range of widths and thicknesses. Whether the coating is being put on metals, plastics or glass, the covering is always deposited uniformly, wrinkle-free and bubble-free.

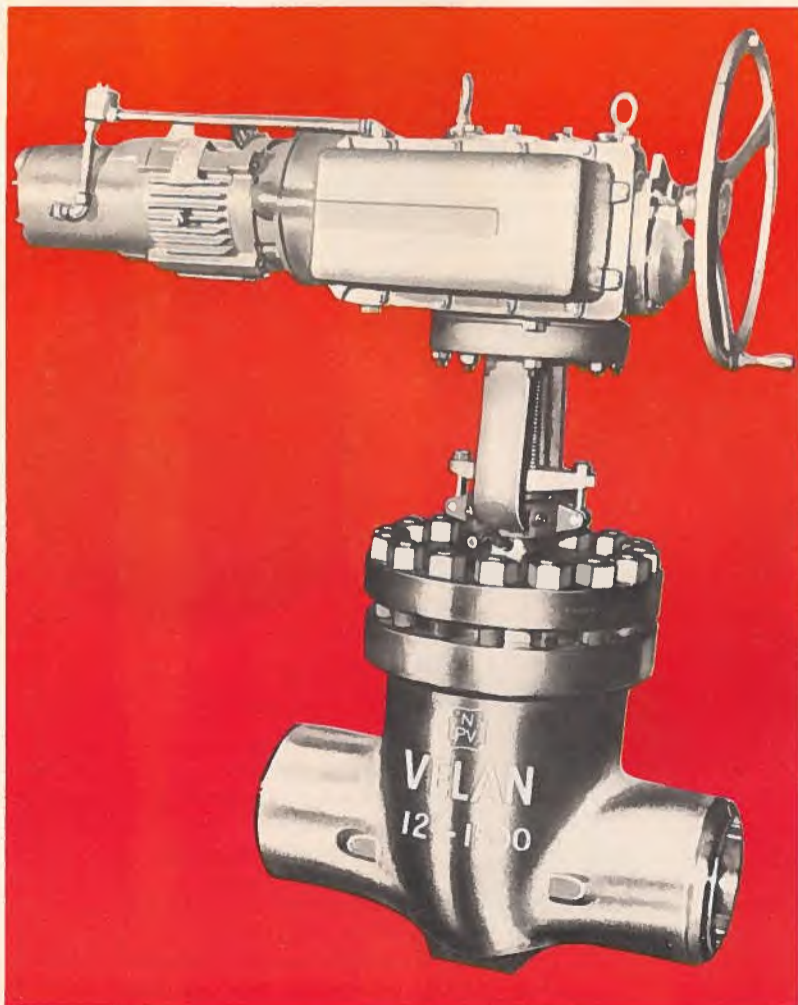
With Metalmac's special features, a close watch can be kept over the entire taping operation. Roller type side guides guarantee precise alignment of the coating to the sheet edges. An electric sensor and three timing units in the control mechanism minimize tape wastage, synchronize the coating speed to the preceding or following manufacturing steps to maintain an even work flow. The sensor and timing units also allow sheets of different lengths to be coated consecutively without interruption. A variable speed drive permits

coating to be carried out at any pre-determined rate between 20 and 60 feet (6 to 18m) per minute.

Efficient and economical, Metalmac equipment needs only a minimum amount of supervision and maintenance. The machinery will give continuous trouble-free service and can be flush-mounted on the existing floor. Available in either power-driven or manually-operated tables for the conveyor system, Metalmac units come in a wide range of sizes from a bench-mounted model for coating 6-inch (15-cm) wide materials up to a unit that can coat five-foot (1.52-m) wide material.

Already, Metalmac units have proved themselves versatile and well-suited to the requirements of the metal industry where they are in service with metal producers and distributors, custom polishing shops and sheet metal fabricators.

Code 2-464



This 12-inch (30.5-cm) bolted bonnet nuclear gate valve is just one of many made by a major Canadian manufacturer of nuclear valves, Velan Engineering Limited, Montreal, Quebec.



At the touch of a button, the Metalmac tape applicator deposits a wrinkle and bubble-free coating of plastic, vinyl or fabric to sheet materials to protect them during further processing and handling. This Model T4800, will coat sheets up to four feet (1.22m) wide including narrow strip widths, and is adjustable for thicknesses of .016 inches (.04cm) up to 1/4 inch (0.6cm).

The first series of Canadian coins struck to commemorate the 1976 summer Olympics in Montreal was an immense success — 9,000,000 were minted, grossing \$75,000,000 in some 40 countries; the second series is arousing much interest among collectors of silver, coins and Olympic souvenirs, and the third series — launched in January, 1975 — is expected also to be a great success. Altogether seven separate series of British sterling silver coins will have been minted by the summer of '76.

## "Early Canadian Sports"

That's the motif of the Olympic coins series III which is now available. Legal tender of Canada, the series consists of four coins, two of \$10 value and two of \$5 value, and each with a different design illustrating various early Canadian sports.

The first of the two \$10 coins depicts the game of lacrosse, a sport developed by the North American Indians before the arrival of Columbus. It became so popular with the settlers in Canada that, in 1867, it was declared Canada's official sport. While lacrosse was an Olympic sport only during the games of 1908, it does have counterparts in several current field games.

The second \$10 coin depicts cycling, an activity that currently is enjoying a worldwide revival and one that was extremely popular in Canada during the 1870s. In those early days penny farthing machines were ridden in well organized clubs across the country. The first cycling club in Canada was in Montreal, site of the 1976 Olympic Games.

First of the \$5 coins shows an Indian in a canoe. Canoeing in Canada's early days was both a way of life and a sport. Frequently the only mode of transportation over the vast and turbulent inland waterways of the new land, the canoe also featured prominently in

competitions of skill between voyageurs and Indian teams.

The second \$5 coin depicts rowing. The first Canadian athlete to be crowned World Champion was sculler Ned Hanlan of Toronto. Around the turn of the century as many as 40,000 spectators would attend regattas held throughout the country. And the regatta in St. John's, Newfoundland is the oldest continuously competed sporting event in North America.

The early Canadian sports motifs, designed by Canadian artist Ken Danby, are carried on the reverse side of each coin. The obverse or face side of each coin, designed by Arnold Machin, carries an uncrowned image of Her Majesty Queen Elizabeth II.

The coins, struck with meticulous care at the Royal Canadian Mint in Ottawa, are ultrasonically sealed in clear styrene capsules to keep them in their "brilliant uncirculated" condition. They are sold all over the world by banks, other financial institutions and official distributors who have been assigned by the Olympic Coin Program. Proof-like coins in sets of four for each series can be purchased from banks or from the Royal Canadian Mint, through its mail order service.

The fourth series, scheduled for September 1975, will cover Olym-

pic track and field sports.

The fifth series — for which there was a national design competition in Canada — scheduled for December 1975, will illustrate Olympic water sports.

In early 1976, the sixth series — which was an international design competition — will feature Olympic team and body contact sports.

The seventh and final series will be a souvenir issue and is scheduled for distribution in June or July 1976. Olympic sites at Montreal and Kingston, possibly including an aerial view of the Olympic Stadium, will be shown.

All \$10 coins are 45mm in diameter, weigh 750 grains and have a fine silver content of 1.44 troy ounces. The \$5 coins are 38mm in diameter, weigh 375 grains and have a fine silver content of 0.723 troy ounces. All coins are sterling (92.5 per cent pure silver, 7.5 per cent copper alloy) and minted in brilliant, encapsulated uncirculated or proof quality. They are available individually or in various custom-crafted presentation cases.

Actual mintage figures are based on firm orders received. Quotas are established for each major market to ensure equitable distribution to numismatists and collectors throughout the world. Canada's Post Office is in charge of the program. Code 3-167



The third series of Canadian coins designed to help finance the 1976 summer Olympic Games in Montreal has early Canadian sports as its motif. Obverse side of all coins bears the profile of Queen Elizabeth II.

## Canada's capital is site of international air show

Exhibitors and advertisers from around the world are expected to participate in Ottawa's first international air show, Air Expo, being held in Canada's capital September 13-14, 1975.

Air Expo will feature top professional military and civilian performers from Canada, the United States and Britain and possibly from France and the U.S.S.R.

An outdoor ground display of aircraft and aerospace equipment will include aircraft which are seldom seen at close range by the public. An indoor display

will occupy 72,000 square feet (6,488m<sup>2</sup>) with 90,000 square feet (8,361m<sup>2</sup>) available for pedestrian traffic.

The show, whose dates coincide with the 35th anniversary of the "Battle of Britain," Canadian Forces Day and Aviation Week in Canada, is sponsored by 410 (Ottawa-District) Wing of the Royal Canadian Air Force Association in co-operation with the Department of National Defence and the Canadian Forces in Ottawa. Code 3-250

## For your bookshelf . . .

The third edition of the Diamond Drill Handbook is now available from its publishers, J. K. Smit & Sons Diamond Products Limited, Toronto, Ontario.

Recognized internationally as the only comprehensive reference book on the principles of diamond drilling, the 541-page handbook covers the techniques of diamond drilling, contains 143 illustrations as well as 67 drilling data tables.

The third edition has been completely revised and updated with new material on wireline drilling, the use of mud as a drilling fluid, standards adopted in countries using the decimal system and other important subjects.

First published in 1951, the Diamond Handbook has gained pre-eminence in its field and is now used by engineers, geologists, drilling contractors and universities in 92 countries. Code 3-509

## Tired of "flats"?



Permafil is a reactive blend of liquid polymers that hardens to a resilient urethane rubber, preventing tire deflations or under-inflations.

All-terrain vehicles, payloaders, construction and mining equipment are likely to have a much longer working life when the tires they ride on are processed with Permafil®.

Greater efficiency, safety, and the end of "flats" are a few of the many advantages claimed by Permafil's developers — Industrial Tires Limited, of Mississauga, Ontario.

Permafil tires maintain constant pressure, so that they require no attention during their lifetime. Ideal wherever the work surface presents a serious risk of puncture, the Permafil centre provides good deflection and shock absorption. There is much less driver and equipment fatigue than with solid tires because the soft, resilient inner core lets the tire continue to ride like a pneumatic with the outer casing providing traction, flotation and abrasion resistance.

And "flats" — one of the major causes of emergency breakdown

and job delay — are eliminated because Permafil tires won't blow out.

Permafil is a urethane compound that goes solid in the tire so it can't leak out. A reactive blend of liquid polymers, it can be injected into pneumatic tires to any desired inflation pressure over a range from 40 to 120 psi. The permanent flex and deflection it provides give the added performance advantages of both solid and pneumatic tires. Permafil tires operate effectively to -24°C (-75°F) with a rebound of only 20 per cent even at that level.

Speeds of up to 35mph (56.35 km/hr) for loads up to rated capacities are easily sustained and the Permafil tires can be run at intermittent speeds to 50mph (80.50 km/hr) for a maximum distance of 25 miles (40.25km).

Job sites where Permafil can be used include open-pit and underground mines, freight and marine docks, scrapyards, factories, farms, airports, military installations and lumber yards. Code 3-316

## . . . went to market Landrace fetches record price



This Landrace boar was recently sold at a record provincial price by the Nova Scotia Swine Breeding Stock Sales Society to a United States buyer. The boar had a remarkably low back fat measurement of 0.35 inches (0.89cm). More and more, the quality of Canadian swine is being recognized by discriminating buyers. This is largely a result of the national performance testing program supervised by Canada's Federal Government, which permits an accurate assessment of merit. Excellent health too, makes the Yorkshire, Landrace, Lacombe, Hampshire and Duroc breeds a good investment. Code 3-400



# CANADIANS

(Continued from page 1)

The Nova Scotia Research Foundation of Dartmouth, another prominent research establishment, offers specialized contract services to both government and industry that includes high resolution profiling of the sea bottom. Among the many specialized products it produces to customer requirements is an innovative 19-ring, high power, slip ring assembly.

Other research and development agencies contributing to the progress of Canadian ocean sciences are the Nova Scotia Technical College, the Atlantic Laboratories of the National Research Council, the Atlantic Industrial Research Institute and B.C. Research, a non-profit research organization situated on Canada's west coast.

Through its multi-faceted operations, B.C. Research, its Ocean Engineering Centre and associate Techwest Enterprises Ltd., supply almost every service required by marine industries, from research to production and marketing.

Canada's "Oceans Policy" contains four stratagems aimed at maintaining Canadian leadership in the oceanology field:

(1) Canada must continue to develop and control within its own borders the essential industrial and technological ingredients needed to exploit offshore resources.

(2) A concerted effort must be made to further Canada's recognized excellence in operating on and below ice-covered waters.

(3) The development of a first class up-to-date information "bank" on offshore resources and the pur-

suit of marine science and technology programs relating to the management of the marine environment.

(4) The development and maintenance of ocean engineering at universities and in government laboratories.

Obviously, the implementation of such a policy will ensure Canada maintains its high reputation in oceanographic and resource exploration activities.

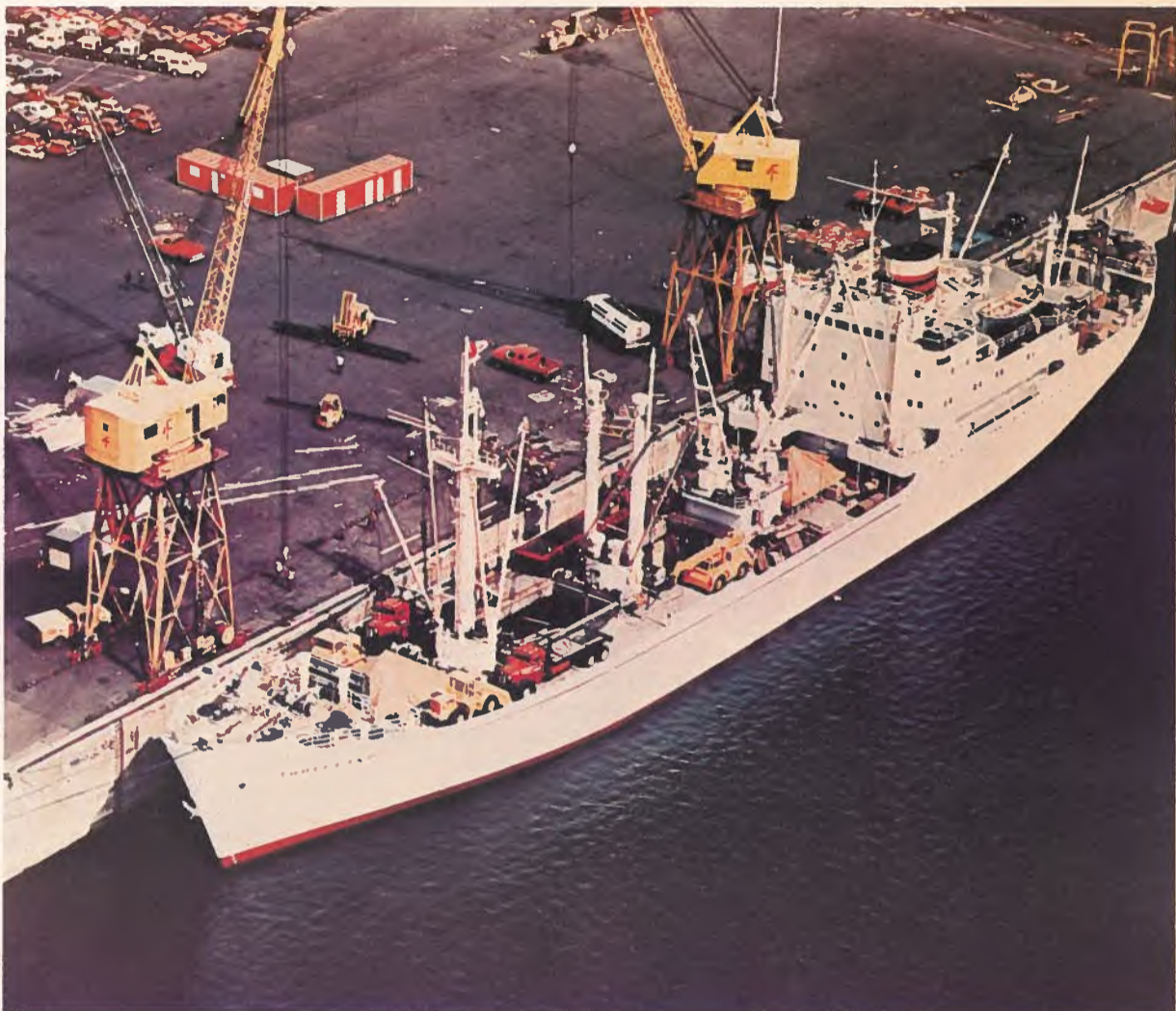
A sign of the confidence nations around the world place in Canada's special knowledge of the sea is the increasing attention these nations are giving Canadian expertise as they seek to exploit their off-shore resources. In recent years, many have drawn on this knowledge through an exchange of scientific and technological information.

Another indication is the orders for Canadian-built cargo vessels, bulk carriers and medium-sized tankers that continue to be placed in Canada at near record rates.

During the past four years alone, the number of vessels for export — sold, on order or under option — has climbed to more than 70 with a total value exceeding \$800 million.

Much of the marine equipment and components used in the construction and outfitting of Canadian vessels is supplied domestically. This holds true as well when it comes to supplying oceanographic research instruments and providing marine engineering services.

Code 4-164



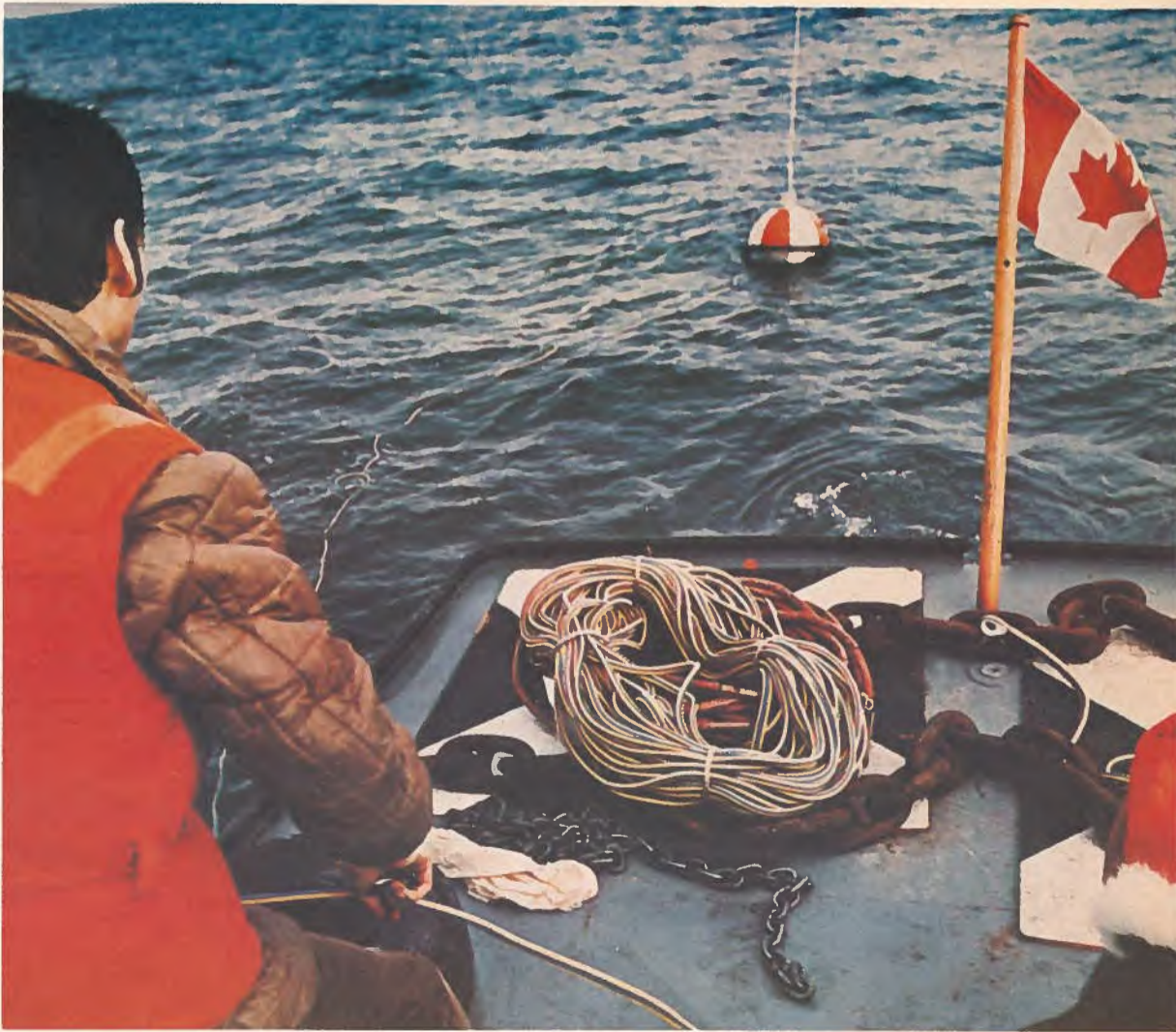
Cargo, bound for the high Arctic, is loaded aboard M. S. "Thuleland," part of a service fleet of Resolute Shipping Limited — the Arctic arm of Canada's largest deep sea shipping company, Federal Commerce & Navigation Company Limited, Montreal, Quebec. The company, with more than 20 years of Arctic shipping experience, owns and operates specialized ice-class tankers and dry cargo vessels on a worldwide basis. Resolute ships, formerly engaged primarily in government-sponsored sea lifts to the north, are now increasingly employed by private industry. They transport oil rigs, mining equipment, housing and fuel and carry cargo loads up to 50,000 tons (49,359 metric tons).

Code 4-250



The combined efforts of two Canadian companies have produced this unique underwater system that, compared to previous methods, more effectively gathers data from the ocean bottom. Whereas previous systems were towed on the surface, the newer system — which contains highly sophisticated oceanographic measuring equipment — is towed underwater and records data required to solve ocean engineering problems, such as offshore oil rig replacement, laying pipelines underwater and the design of new port facilities. The companies involved in the joint venture are Fathom Oceanology of Port Credit, Ontario and Hunttec (70) Limited, Toronto, Ontario. The companies are also noted for their submarine antenna towing systems and stationary moored buoys for water data sampling (Fathom); and for the manufacture of components and systems which provide accurate cross sectional profiles of sub-bottom geology of water-covered areas (Hunttec).

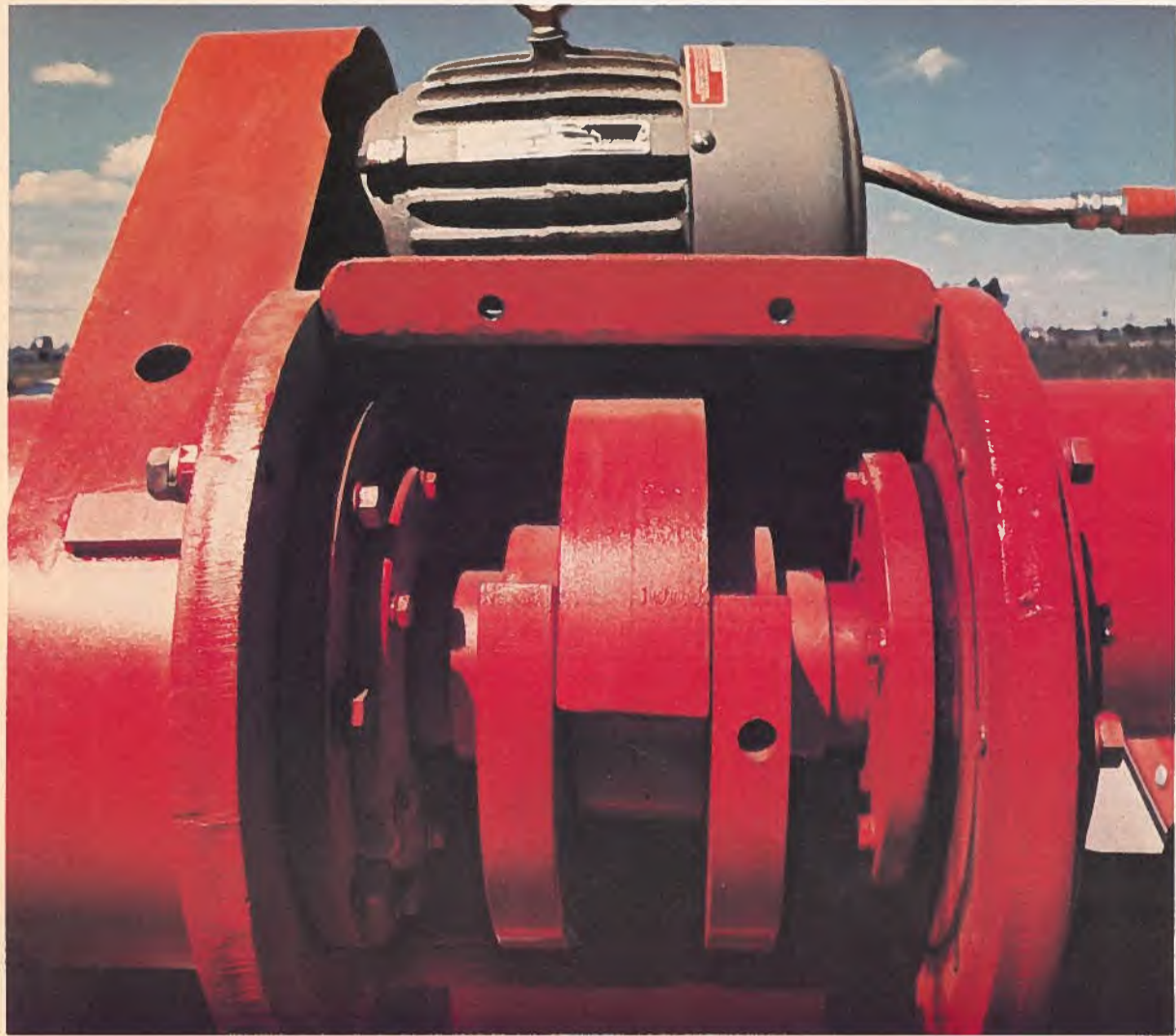
Code 4-454



Techwest Enterprises Ltd., Vancouver, British Columbia, offers the offshore industry a complete source of procurement for a wide variety of special research, development and manufacturing projects. The firm, an independently operating subsidiary of the British Columbia Research Council, will consider any contractual engineering or scientific requirement, large or small. In addition to these services, Techwest Enterprises provides such ocean industry products as: motion-compensating cranes for handling submersibles and towed bodies in severe sea conditions; submersible pumps with hydraulic drives used for pumping large volumes of sea water or gases to high pressure or, without the need of umbilical cords, they can be used to expel stale air or explosive gases from underwater vehicles and habitats. Here, in conjunction with B.C. Research's Ocean Engineering Centre, wave motion is being monitored as part of buoy maintenance.

Code 4-300

# ALL AT SEA!



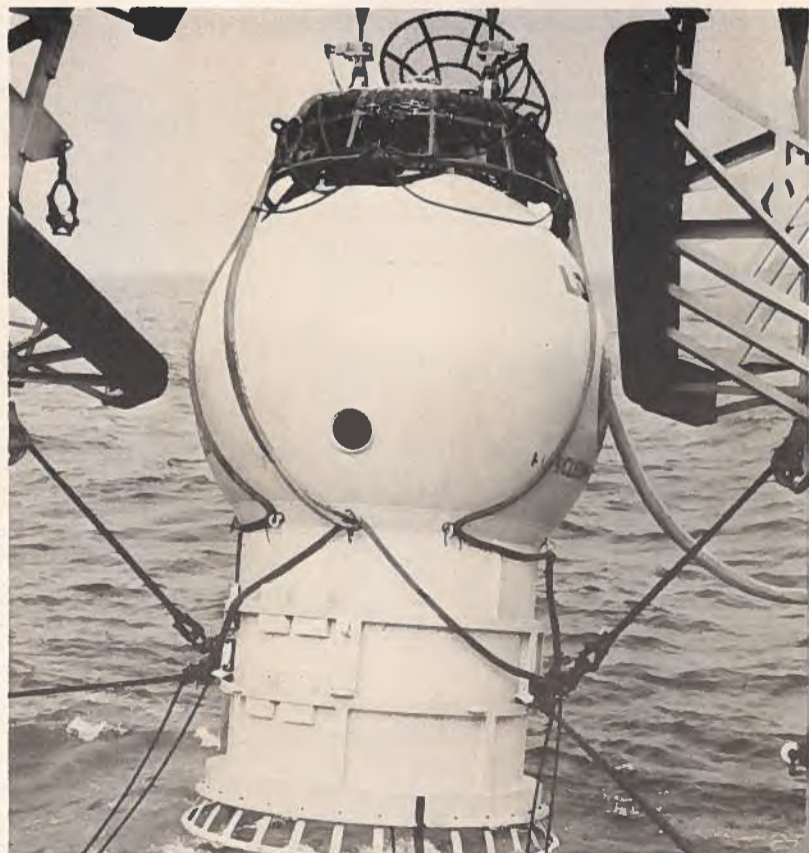
Drilling and mud system components, such as this BRUTE high speed shale shaker with single adjustable thrust vibrator, are manufactured by Pyramid Steel Industries Limited, Edmonton, Alberta. The shaker bed utilizes four screens in a series for efficient solids removal. The primary feature is that the thrust is variable to 11,000 pounds (4,994kg) by moving a single eccentric weight. In addition to manufacturing and servicing oilwell drilling masts and substructures, Pyramid also manufactures mud hoppers, desanders and distillers. Code 5-136



A wide range of scientific, engineering and technical services — including high resolution profiling of the sea bottom — is provided on a contract basis to government and industry by the Nova Scotia Research Foundation of Halifax-Dartmouth, Nova Scotia. The Foundation's principal activities focus on the design of instruments, equipment and services for the oceanographic research community and the deep diving industry. One of the specialized products it produces is this innovative and highly reliable 19-ring, high power, electrical slip-ring assembly. The Foundation also produces — to individual customer specifications — multi-port rotary gas valves for life support application and flexible wavestaffs for precision wave recording. Code 5-264



This self-propelled, dynamically positioned drilling ship, the Sedco-445, is manufactured by Halifax Shipyards, a division of Hawker-Siddeley Canada Limited — a company that is known internationally for the construction of its floating oil rigs, the largest of their kind in the world. Also being constructed by Halifax Shipyards is a second drilling ship, the Sedco-471. This ship, with an overall length of 470 feet (143.3m), has three cranes, a 147-foot (44.8-m) derrick and a drilling depth of 20,000 feet (6,096m). With twin screw propulsion and 12 thrusters, the Sedco-471 has a maximum draft of 24½ feet (7.5m). Code 5-350



Ready for descent, a Lockheed service capsule is positioned above a submerged wellhead by surface vessels. The capsule is an integral part of a total subsea well completion and production system offered by Lockheed Petroleum Services Limited, New Westminster, British Columbia. The design of the capsule minimizes the cost to water depth ratio and opens up the possibility of economical exploitation of the continental shelves. Lockheed, which has built and successfully tested a manned atmospheric subsea system for producing and servicing oil wells at depths exceeding 1,000 feet (305m), also provides engineering and consulting services and has the capability to design, manufacture, install and service a variety of subsea petroleum completion and production equipment. Code 5-436

## Considerable care ensures quality leathersgoods



Luggage and personal leathersgoods to suit the most discriminating buyer are made by Renwick of Canada Inc., Montreal, Quebec. The 45-year-old, family-owned company makes use of specially selected leathers and accessories of the highest quality to create a fashionable article with a lifetime of serviceable use. Exceptional personal care goes into the making of Renwick products: the company's vice-president for production and product development — himself an exacting craftsman and an award-winning leathersgoods designer — oversees the development and styling of each item. Renwick products include Continental luggage in velvet-soft Caribou steerhide; various styles and colours of tote bags; luggage and business cases in Italian Verona oxhide; travel kits; wallets; key and credit card holders. The all-russet Caribou steerhide articles shown here, clockwise from top centre, are: attaché case with leather-covered brass plated steel shank handle, one combination lock and two brass plated closures; sport bag with separate credit card organizer and large compartment; European style envelope portfolio; carry-on all purpose tote with shoulder strap; carry-on one-suitier with two compartments; and twin-handled wide-opening-frame brief bag. Renwick of Canada currently exports to such countries as the United States, Britain, Australia and Japan.

Code 6-167

## Putting it all together



Ideal for public waiting rooms, reception areas, lounges and recreation rooms, the-modular design of this Fiberglass reinforced plastic furniture makes it truly versatile, attractive and comfortable. Designed by George B. Sayegh for Standard Desk Limited of Laval, Quebec, the GBS Modular Seating System consists of a planter, table, single seat with upholstered cushion and back, seat with a single upholstered side-arm and a club chair, covered in glove-soft vinyl, suede vinyl or nylon fabric. The modular units can be combined in twos and threes to form lounge settees, sofas or benches. The standard colour of the units is beige, but others are available as options. The System was introduced last November at Toronto's 1974 National Interior Design Show where Standard Desk also exhibited its "Now" Series of landscape office furniture.

Code 6-326



Heavy duty trucks and trailers manufactured by Pacific Truck and Trailer Ltd. are engaged in logging operations in several countries including Swaziland, Australia, New Zealand, Borneo and the Philippines. Built to customer specification, the trucks can also be found hauling sugar cane in Hawaii, carrying ore in the United States and hauling hydro-electric equipment in India and South Africa.

## Just the truck to do the job

Logging trucks and trailers that are recognized internationally for dependability and excellence of design are manufactured by Pacific Truck and Trailer Ltd., Vancouver, British Columbia.

The 27-year-old company, exporting to countries throughout the world, manufactures four models of trucks, three of which are strictly off-highway. The smallest unit, the P-500, has a rated G.V.W. of 56,000 pounds (25,424kg) and is for use both on and off the road.

In the off-highway models, the P-10 has a rated G.V.W. of 81,000 pounds (36,774kg). The P-12 and P-16 have identical G.V.W. rates of 128,000 and 150,000 pounds (58,112 and 68,100kg). All models except the P-16 are based on flexible-channel, bolted frame rail construction. The P-16 frame, however, is a rigid weldment built around a pair of 16-inch (40.6-cm) "I" beam rails.

A typical Pacific manufactured truck, like the P-10, is powered by a six-cylinder turbocharged engine, has main and auxiliary transmission, hydraulic power assist steering and 10 wheels with conventional rib tread on front and conventional lug tread on rear.

The P-16 cab is all steel and equipped with full length door hinges, safety glass throughout, sliding rear windows, vent win-

dows, cowl vents, Boston Air Viking driver's seat and Swampers seat. There is also a 34,000 BTU heater, a defroster fan, dome light and cigarette lighter.

Instruments on the P-16 include speedometer, tachometer, ammeter, air pressure gauges, water temperature gauge, engine oil gauge, fuel gauge, low air pressure warning light and low oil-high water warning light.

The 80-gallon (364-litre) capacity fuel tank is mounted on the left side and equipped with non-skid flat top to serve as running board and fuel filter.

Trailers manufactured by Pacific Truck and Trailer are used primarily for logging and have rated capacities ranging from 30 to 60 tons (27.2 to 54.4 metric tons).

Pacific also manufactures — under the tradename "Porto Tanks" — mobile water reservoirs for fighting forest fires. These tanks have a 3,600-gallon (16,380-litre) capacity.

Pacific Truck and Trailer is not a high volume truck producer — it is a relatively small company. This factor, however, enables Pacific to adjust its product to specific job requirements and to give the product the careful and individual attention it deserves.

Code 6-250

## B & O Plastic is right on the button!

From upholstery buttons to television controls, B & O Plastic Industries Ltd., of Montreal, Quebec, has a knob for every use.

Established in 1950 to manufacture buttons through injection moulding, the company has since broadened its activities while continuing to produce buttons. Today it makes the Tuff upholstery button of sturdy, quality plastic with a rugged steel shank and prongs that really hold. With the Tuff there is none of the popping, tearing, cracking or splitting associated with fabric-covered buttons. Rich in appearance, it is available in a variety of colours to match all vinyl fabrics including bright gold and silver plated finishes.

In 1954 the company invented a process using vacuum plating equipment to become one of Canada's first platers of plastic and metal. Through its subsidiary company, Vacuum Platers, Inc., it is one of the leading platers of ABS, acrylic, styrene, polycarbonate, nylon and polypropylene. The

firm also moulds and plates parts sold to lamp manufacturers.

The production of knobs for radios, televisions and electrical appliances began in 1964 and since then the company has branched out into many industrial products. In 1975, B & O Plastic is a leading maker of all types of knobs, push-buttons, slide controls, name plates, escutcheons, dials, fine tuning controls and spacers. An extensive selection of merchandise is kept in stock by the company to conform with variations of shaft controls, slide bars and pushbutton assemblies.

Knobs can be custom plated in silver or gold and special metallized colours are available on request. The process can be applied to metals and plastics of all types. All knobs can also be made with special spun aluminum caps and diamond polished edges. Special effects can be created as well, using B & O Plastic's hot stamping machinery, special spraying and fabrication equipment. Code 6-416

# Strong but flexible hose and duct has variety of applications

Housed in a modern manufacturing facility in Whitby, Ontario, Flexaust Canada Ltd. is a leading producer of flexible hose and duct.

Flexaust is a close pitch, wire reinforced hose that is manufactured with neoprene-impregnated fabrics. Up to four coatings of neoprene can be applied for heavier duty jobs such as low pressure liquid handling or higher air pressure applications. To prolong service life, a bonded outer-wear strip is also available for cases where severe external abrasion is encountered.

The most popular type of hose is CWC, made of two-ply cotton for tensile strength, high crush-resistance and great flexibility. It has many industrial applications including dust collection, fume control and air handling.

CWS is similar to CWC but single ply instead of double for increased flexibility. For severe use, Flexaust also makes CWY, a nylon fabric hose.

Flexaust hose is available in 25-foot (7.6-m) lengths and a wide range of diameters from 1 1/4 inches (3 1/8 cm) to 18 inches (45.7-cm). Upon request, it can be manufactured to a maximum diameter of 48 inches (122cm).

Flexaust also makes a line of duct called Spring-Flex. A wide, pitch duct, it combines extreme flexibility and a retractability ratio of seven to one. Used for heating, drying, cooling, ventilating, fumigating and on portable blowers, Spring-Flex is stocked in 4-inch (10.2-cm) through 24-inch (61-cm) diameters and is available up to a 48-inch (122-cm) diameter on spe-

cial orders.

Many different types of Spring-Flex duct are available. Type SD, a general service duct, is a cotton neoprene-impregnated fabric hose. SD-W is similar but with a tough external wear strip. A glass-fabric hose, GF-W is designed for higher temperatures such as those found on portable heaters. Also offered is a self-retracting duct known as STO, which has an external wear strip, excellent tensile strength, and stows to 1/6 of its fully extended length. And SY, a nylon fabric hose, is intended for use where severe flexing is met.

In business since 1973, Flexaust Canada Ltd. is now entering the export market and is able to sell its products anywhere in the world.

Code 7-164



Capable of being dragged over rough surfaces, hose type CWC-W from Flexaust Canada Ltd., Whitby, Ontario, is made of two-ply cotton fabric, neoprene-impregnated with a tough plastic wear strip. The great flexibility of the hose, illustrated here, is characteristic of all Flexaust hose and duct.

## Exploration, the game, Terra Surveys, the name

In less than a decade, Terra Surveys Ltd. of Ottawa, Ontario, has completed mapping and mineral exploration projects in 28 countries on five continents.

A Canadian engineering company, it has expertise in photogrammetric engineering, geodetic and engineering surveys, route location studies, land registration surveys and terrain analysis from aerial photographs and other remote sensors.

In addition, Geoterrex Ltd., the exploration division of Terra Surveys, offers a variety of geophysical services for petroleum, mining and water exploration and for engineering studies including airborne, ground and drill-hole geophysics.

Established in 1966, Terra has grown rapidly. Today it has upwards of 40 engineers and geophysicists, more than any other company of its type in Canada. With the aid of a supporting staff of 110, the firm is able to maintain strict control of data quality and inter-

pretation — key elements in Terra's operating philosophy.

Clients include oil and mining companies, governmental agencies, engineering firms and consulting groups in North America, Africa, Australia, the Middle East, Central and South America.

Terra carries out airborne surveys that include: high-sensitivity magnetics, used primarily for petroleum exploration; airborne E.M. for base metal exploration, both BARRINGER INPUT® and "Otter" In-Phase; and conventional magnetic and radiometrics for uranium prospecting.

On the surface, the company tackles ground E.M. and magnetics done mainly as a follow-up to airborne E.M. surveys; induced polarization; refraction seismic for mining and engineering studies; and resistivity surveys for water and engineering studies.

Also performed and interpreted are gravity electromagnetic and magnetic surveys. Various electrical method exploration techniques are

applied to problems related to shallow gas, coal and mining projects.

The company has, in addition, a diamond drill-hole logging facility that to date has utilized induced polarization, resistivity and electromagnetic equipment for depths up to 2,500 feet (762m).

Services in shallow and deep penetration magneto-tellurics for oil and gas geothermal exploration are also offered in addition to services in the detection of shallow cavities using high resolution gravity meters.

To carry out its projects the company uses Wild aerial cameras and photogrammetric instruments, electronic co-ordinate printers, Aerodist, an Airborne Profile Recorder, Tellurometers, surveying instruments and complete photographic laboratories, as well as airborne and ground geophysical equipment and automated data reduction systems.

Code 7-209



The search for porphyry copper deposits takes this engineer from Terra Surveys Ltd. to the desert where he uses Terra's modern geophysical exploration equipment in his investigation.

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# NOW THERE'S A SHIP

Invariably that's the proud reaction of yachtsmen who see, own or want to own a vessel designed and constructed by Rosborough Boats Ltd., Armdale, Nova Scotia.

And a justifiable reaction it is. Rosborough boats — schooners, ketches, brigantines, brigs and barquentines — are handcrafted by men whose heritage in the art of traditional boat building goes back to the days when the sail was master of the seas.

More than 60 Rosborough boats — with no two being exactly the same — have been built in the last 10 years and are now plying the waters of the world. As the well proven company motto says: "Our test tank is the seven oceans of the world; our test engineers, our owners."

Rosborough vessels combine the largest practical size, comfort and safety with ease of handling for long passages or short-handed crews, often only husband and wife.

Usually ranging in length from 30 to 100 feet (9.1 to 30.5m), these boats provide clean bright cabins with comfortable settees, modern galleys and ample locker and storage space. Spacious decks provide

plenty of room for life top-side, with deep bulwarks, monkey rails and life lines to offer security to children and crew alike.

Built to order, Rosborough vessels are designed for free air circulation throughout; are treated with wood preservative during construction and have their fiberglass decks sealed to prevent moisture seeping in. They are also equipped to "sailaway" condition and delivered after trials at the builder's yard.

Sail rig and cabin layout are the results of years of careful planning and suit the requirements of most owners for comfortable cruising, living aboard or chartering. Various custom arrangements in rig or layout can also be provided to give the customer exactly what he wants.

While all boats are designed by Rosborough, the vessels themselves are constructed — under Rosborough supervision — at Nova Scotia shipbuilding yards.

For comfortable, staunch and sea-worthy vessels which perform smartly under varying conditions of wind and wave — the place to look is Nova Scotia's Rosborough Boats Ltd.

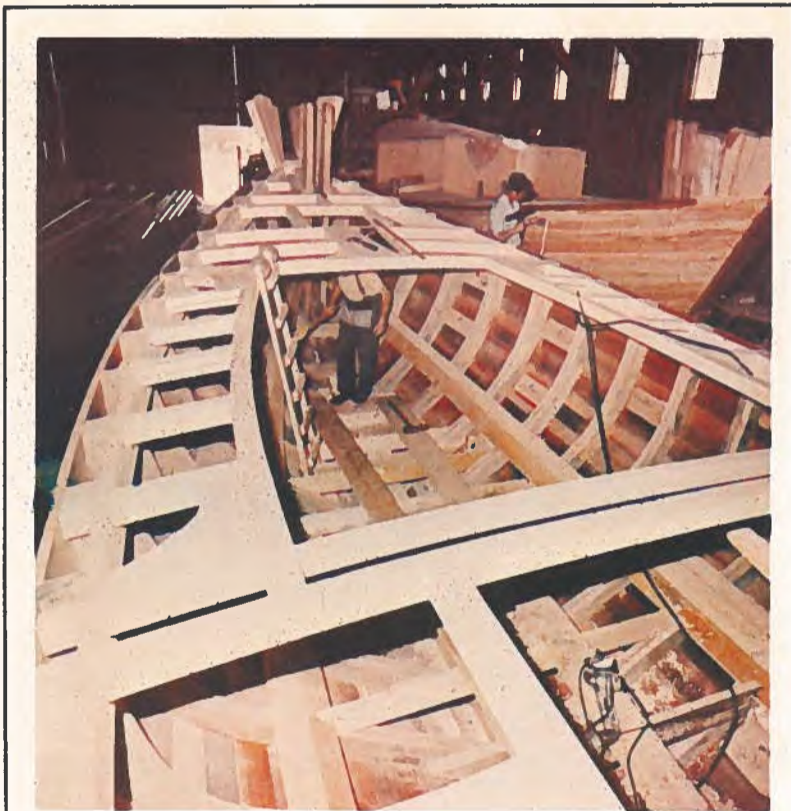
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The tradition that went into the building of the Bluenose is reflected in this impressive armada of vessels designed by Rosborough Boats Ltd., Armdale, Nova Scotia, and built, on a subcontract basis, at the yard of A. F. Theriault & Son Ltd., Meteghan River, Nova Scotia. In various stages of launching are, from left: the "Ingomar," a 65-foot (19.8-m) Vagabond with barquentine rig; the bright yellow 45-foot (13.7-m) Privateer "Golden Girl," a Marconi ketch with full deck-house and lounge; the 55-foot (16.8-m) Aquarius "Rattlesnake" is resplendent in her revolutionary period brig rig with a crossing of seven yards; the 45-foot (13.7-m) Privateer "Rebel's Chariot," the Rosborough firm's first Privateer with a galley-deckhouse-lounge layout; and, being launched for a trip to Florida via Ontario and the Hudson River, is the "Flint Sea," a 45-foot (13.7-m) Privateer ketch.



Resplendent in her revolutionary period brig rig — crossing seven yards — the Aquarius brig "Rattlesnake" undergoes power and sailing trials on St. Mary's Bay, Nova Scotia. Built for a Long Island, New York, buyer, this 55-foot (16.7-m) "modern" brig-of-war is complete with swivel guns, freezers and diesel generators.



Seeing is believing and believe it: Rosborough boats are built to go anywhere and take it. Between 6,000 and 18,000 hours of handcrafted experience go into the making of each vessel. Hulls, like these for a 45-foot (13.7-m) Privateer ketch, are heavily constructed of seasoned, air-dried native hardwood. Planking has been completed on one and a workman will begin to install an 85hp diesel engine in the other. The engine room, as in all Rosborough boats, will be spacious and big enough to work in. On completion, the vessel will meet all the prime requirements: graceful looks, safety, comfort, ease of handling and maintenance, and ability to keep the sea.

A new addition to Rosborough's usual ketch rig — and one that is extremely popular for Pacific cruising — is the Marconi main sail rig with yard, square-sail and raffe as seen here on the 45-foot (13.7-m) Privateer ketch "Nan Adele Marie." In addition to her extra light air sails and comprehensive quantity of cruising gear, the "Nan Adele Marie" is noteworthy for her "plank" bowsprit with anchor rollers, permanent backstay, aftdeck single station steering position and, instead of stern and quarter windows, her spacious and safe cockpit.

