

# canada courier



UNITED STATES EDITION



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VOLUME 11, NUMBER 10, OTTAWA 1974

## Canadian technology, equipment and services

# Countries seeking offshore capability contact Canada

There's more to Canada than meets the eye — nearly 1.5 million square miles (3.9 million km<sup>2</sup>) of resource-rich continental shelf hidden beneath the Atlantic, Pacific and Arctic Oceans.

So it's no small wonder that Canada spends more per person on oceanographic research than any other country and is a world leader in the development of oceanology techniques and equipment.

The expertise Canada has gained in this field will be displayed by some 17 Canadian companies at the 6th Annual Offshore Technology Conference being held in Houston, Texas, May 6-8, 1974.

This edition of Canada Courier features Canada's ocean industry and a description of the equipment, services and supplies provided that industry by individual Canadian companies.

Good examples are the Canadian designed and manufactured offshore oil drilling rigs now used internationally and regarded as the largest and most rugged in the world. The construction of such rigs and their related supply vessels earn Canada about \$35,000,000 a year.

Canada is playing other vital roles in bringing the full exploitation of the seabed many years closer. One company has developed a system that allows men to descend safely to depths of more than 1,000 feet (305m) to work at well-heads in only their shirtsleeves.

Another Canadian feat was the collection of more than 10,000 miles (16,100km) of reflection seismic data from among the islands of the Canadian Arctic. This 60-day venture proved that the collection of such important data — even under the most severe ice conditions — was technically and economically feasible and opened the door to further Arctic exploration and exploitation.

Canada is also a world leader in oceanographic research. On such ocean-related work the Canadian government spends at least \$100,000,000 a year. In January, 1974, the federal Government gave



The Sedneth 701 is the fourth semi-submersible offshore drilling vessel constructed by Halifax Shipyards, a division of Hawker Siddeley Canada Limited. The Sedneth has successfully undergone sea trials and is assigned to search for petroleum in the North Sea. Halifax Shipyards is also noted internationally for its Sedco series of floating oil rigs — the largest of their kind in the world. The Sedco rigs, of triangular configuration, are capable of drilling in the floating position in depths up to 600 feet (182.8m) and are designed to withstand the most severe maritime conditions.

approval to the Defence and Civil Institute of Environmental Medicine plan to build a sophisticated diving chamber capable of simulating dives to 5,000 feet (1,524m).

The most advanced equipment of this kind in the world, the chamber, which will be installed by mid-1975, will have a six-inch-thick (152.4-mm) steel pressure hull and a life support system to provide communications and gas mixtures for breathing.

Scientists at the Institute hope to have the chamber operating at 2,000 feet (609.6m) by mid-1976, at 5,000 feet (1,524m) by 1978.

Also a major force behind Canada's oceanographic research drive is the Bedford Institute of Oceanography, Dartmouth, Nova Scotia.

One of the largest centres of marine studies in the world, the Bedford Institute is noted internationally for its marine science research and surveys in such areas as sea bottom charting, marine biology, fishery dynamics, pollution studies, marine geology, marine geophysics, and ocean engineering.

A division of the Bedford Institute, the Atlantic Oceanographic Laboratory (AOL), carries out pure

and applied research in the fields of physical and chemical oceanography, together with the detailed hydrographic surveying of the waters bordering the eastern and northern shorelines of Canada.

AOL's research activities are supported by a fleet of six research ships, several launches, charter vessels and, when research is carried out in northern waters, by Ministry of Transport icebreakers. These hardy ships are capable of undertaking major oceanographic expeditions in any of the world's oceans.

That the Canadian government is completely behind the full de-

velopment of Canada's ocean industry is indicated by the adoption in July, 1973, of a New Oceans policy whereby Canada will develop and control within its own borders the essential elements needed to exploit offshore resources.

Some important elements of the policy provide that:

— Canada stimulate development and effective participation of Canadian industry to make sure that Canada controls the essential industrial and technological ingredients to exploit offshore resources

— Special emphasis be given to a wide range of marine science and technology programs relating to marine environment, renewable and non-renewable resources, development and maintenance of ocean engineering at universities and in government laboratories and better forecasting of weather, currents, ice and similar atmospheric and oceanic factors

— Canada, within five years, achieve world-recognized excellence in operating on and below ice-covered waters.

Many areas of Canadian offshore capability are already recognized internationally — much of this due to the first-rate equipment, services and technology described below.

International Hydrodynamics Company Limited (HYCO) and Lockheed Petroleum Services Limited are leaders in the design and manufacture of submersibles for underwater exploration and exploitation.

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, build and operate submersibles, their tools and support facilities.

The company has produced internationally recognized products, like the five Pisces models, the SDL-1 submersible diver and the Hudson handler — all synonymous with rugged endurance, safety and modest operating costs.

Vital to ocean exploration and exploitation and ideal for underwater work platforms for offshore petroleum exploration or marine construction, the Pisces class fea-

(Continued on page 4)

### And inside . . .

	Page
Product packaging is a snap!	2
Prostheses for children	2
Cool choice (vending machines)	2
A farmer's work	3
Diagnosing engine disorders	3
Sorting system (lumber and veneer)	3
New plough blades	6
Reliable's the good word	6
Small winch, big jobs	7
Husky automates mold-making	7
Trade inquiry form	7



Grohmann Knives Limited's (left to right) sturdy sheath, trout and bird knife, boat knife, Russell belt knife and survival knife. The knives were designed by Deane H. Russell, an avid sportsman. See "Game for sport" on page 8.

## New directory lists ocean industry services

More than 180 Nova Scotia companies engaged in ocean engineering activities are listed in the new 48-page English-language booklet, Directory of Ocean Industry, published by the Nova Scotia Department of Development.

The companies, complete with addresses and fields of specialization, are engaged in: research and development; professional consulting; manufacturing (ship building, repair and conversion; electronic and electrical components; plastic products and accessory items); services to the

offshore oil industry and specialized ocean industry services (boats and vessel charter for marine scientific work; divers; instrumentation, inspection and testing services; underwater welding services; offshore navigation and positioning services; and seismic and geological surveys.)

Canada Courier will be glad to forward inquiries about the Directory of Ocean Industry — simply quote this code number on the trade inquiry form on page 7. Code 1-2

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courier

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## Non-profit centre makes prostheses for children

Variety Village Electro Limb Production Centre is a three-year-old Toronto, Ontario, manufacturer of prostheses for children.

While many of the products designed at rehabilitation centres across the country fill a need for other handicapped children, these products are not economically sound ventures for private industry. Variety Village, now running on a subsidized, non-profit-making basis, hopes eventually to be able to recover operating costs.

The Village is financed by the Variety Club of Ontario, administered by the Ontario Society for

Crippled Children and associated closely with the Ontario Crippled Children's Centre in Toronto.

Among prostheses made by the Village are a parapodium for paraplegic children, an electric elbow and an electric hand.

The Mark II parapodium is designed for children with complete paralysis of the lower extremities, spina bifida or other neuromuscular disorders, who need a firm support. The device, sold in kits, is easily assembled. Adjustments can be made to fit the individual child.

The parapodium is light and sturdy. It has a locking and unlocking device which allows the child to sit down. With practice, most children can put on and remove the device themselves. The foot sockets accept standard shoes without any modifications.

The electric elbow unit can be fitted without problems in an ordinary prosthetic shop using standard

components and harnessing. This battery-powered unit is controlled by a lever on the interior surface. The lever, in turn, is connected to a strap on a regular above/elbow harness.

The standard battery is supplied in an 11-ounce (312-g) pack in a leather case which may be slung from the harness at a convenient location. The pack may also be fitted into the upper part of the prosthesis, if there is room. Also available is a lighter pack (6-oz./230-g) which is satisfactory where the total load to be lifted, including prosthesis, is less than two foot-pounds (0.27kg-m).

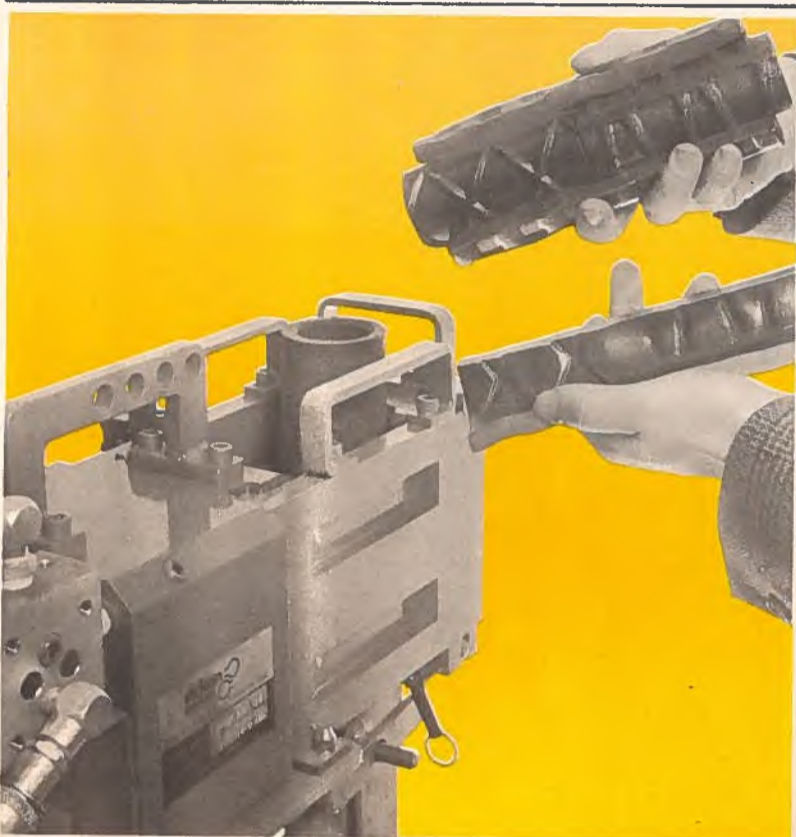
The Village also makes cosmetically acceptable hands for children. The passive hand, designed for infants, will accustom them to a prosthesis. An electric hand is available for children aged three to six. The hand, which weighs 2.3 ounces (65g) is made of solid alu-

minum parts, covered with a flesh-colored polyurethane rubber. It does not need a glove, but should be covered with polyvinyl chloride.

The hand makes a three-point contact between the thumb and two fingers and will firmly grasp a piece of paper. The maximum grasp will allow picking up a smooth cylinder 1½ inches (3.8cm) in diameter. The hand is powered by a direct current motor which operates from a 2.4-volt nickel cadmium battery. The battery is recharged each night and is sized to last all day under normal use.

An electric hand for children aged seven to nine is being introduced soon by the Village. It is designed to fill the gap between prostheses available for very young children and the prostheses available through commercial companies for teenagers and adults.

Code 2-2



## No butts about it: this splice works

A new method for full tension butt-splicing of concrete reinforcing bars has been developed by Stricon Products Limited of Mississauga, Ontario. According to the company, the Ultimate Stress Splicer and PortaForge system makes splices that surpass all requirements set by both the National Building Code of Canada and the American Concrete Institute Code. The system works in the following way: a specially machined sleeve is heated to the temperature at which it is malleable. Then two bar-ends are inserted into the hot sleeve. The hydraulic PortaForge forces the sleeve's inner wall into and around the bars' deformations. The machine's dies assure full ultimate stress on all deformation patterns, regardless of the size of the rebar. The additional contraction of the sleeve when cooling creates a greater bond and gives the splice increased tensile strength. Stricon representatives will train personnel in the use of the system.

Code 2-1

## Beer to baby food . . . product packaging is a snap!

Packaging consumer products into retail-size folding cartons is a snap with the Langen CF cartonning machine.

Manufactured by H. J. Langen & Sons Ltd., Rexdale, Ontario, the CF machine has a wide variety of packaging applications, from crackers, cookies, pretzels and pies to beer, baby food, frozen foods and candy bars.

The advantages of the CF cartonner are as varied as its applications. By using flat carton blanks it reduces carton costs and eliminates such carton convertor operations as separation after cutting and creasing and stripping broke from unneeded minor flap notches. CF blanks, unlike pre-seamed cartons, are palletized for reduced packing, shipping and storage costs. They also overcome the aging factor of pre-seamed cartons, allowing for large volume purchasing and increased carton efficiency.

With the CF system, product loading efficiency is increased. As the machine is of the wrap-around concept no restrictions of product

entry are experienced. This allows for smoother operation, eliminating most machine, package and product catch points.

Labor and machine costs are also reduced with the CF because one operator per shift can man two machines and a second machine is not required to glue the side seam.

Length of the end opening is 2.5 to 10.5 inches (64.5mm to 266.7mm); width of end opening is 0.5 to 3.5 inches (12.7mm to 88.9mm) and depth, end to end closed across machine direction, is 4 to 13 inches (101.6mm to 330.2mm). The machine itself is about 30 feet (9.1m) long, 8 feet (2.4m) wide and 4 feet (1.2m) high. It has a 30-inch (762-mm) carton blank magazine.

H. J. Langen & Sons Ltd. has been in the packaging machinery business for 17 years and exports to such countries as Britain, France, Germany, Holland, Australia and the United States.

Code 2-3

## Customers can make cool choice

One of Canada's largest manufacturers of venders and coolers is a trend setter when it comes to coin-operated soft drink vending machines.

In the spring of 1972 Ideal Venders, Don Mills, Ontario, introduced the versatile 4100L automatic two-way vender. At a simple turn of a lever the machine can dispense bottles or cans or both. With a pull-out refrigeration system and a four-product selection, the 4100L has a capacity of 400 cans or 200 bottles or a mixed combination.

In the spring of 1973 the company introduced two new combination bottle/can venders in the medium capacity (and price) range. Both the BC165L and BC265L have modular stack racks that can be changed from bottles to cans or cans to bottles simply by pulling out a knob at the bottom of each rack and rotating it 45 degrees.

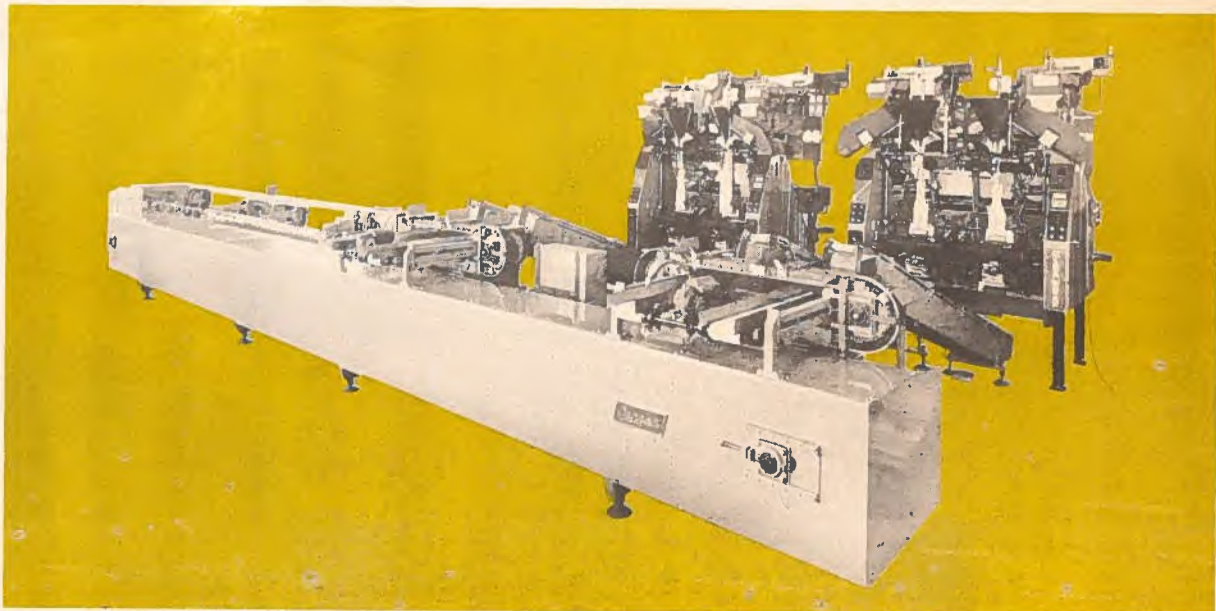
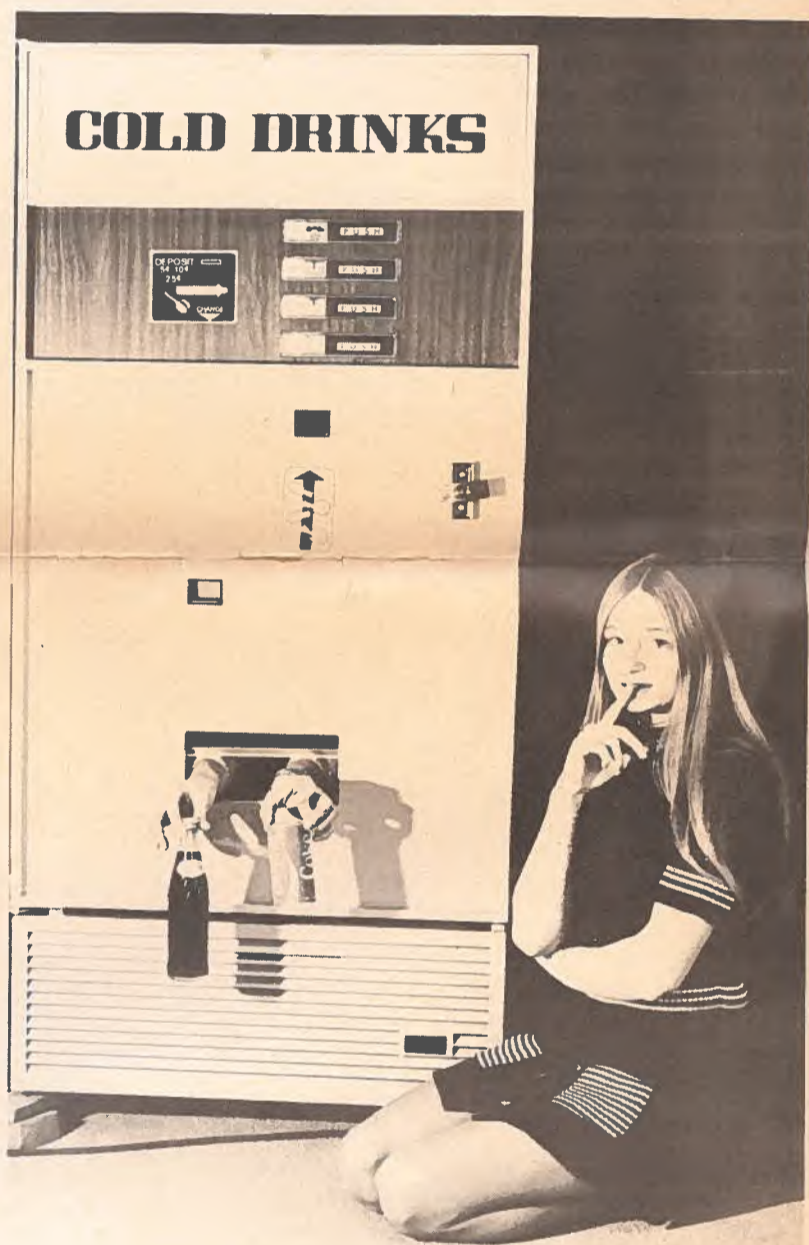
These two models also feature Ideal's patented pull-out refrigeration package. The whole unit comes out for servicing — in less than five minutes — simply by loosening two screws. The package can be instantly replaced with a new one if there is any trouble.

The BC165L has a vend capacity of 160 10-ounce (80-dram) cans or 84 10-ounce bottles. In 12-ounce (96-dram) sizes, capacity is 144 cans and 80 bottles. Vend capacity of the BC265L in 10-ounce sizes is 265 cans and 135 bottles. In 12-ounce sizes vend capacity is 235 cans and 130 bottles. The BC165L and BC265L have four-and-five product selections respectively.

Ideal has also introduced a conversion kit so that its models (C250L, C160L, C340L and C360L — which normally vend cans) can be converted in the field in only 20 minutes to stack venders that will dispense bottles, or cans or both.

Ideal exports its venders to the United States where it has opened a sales office and warehouse in Buffalo, New York.

Code 2-4



Only one operator is required to produce 12 million packages per year per shift with the Langen CF fully automatic cartonning machine.

## A farmer's work is sometimes done with aid of Renn-Cupit Industries

Grain rollers and pick-up attachments made to meet the economic and functional requirements of farmers throughout the world are designed, engineered and manufactured by Renn-Cupit Industries Limited, Calgary, Alberta.

The grain rollers — for farmers who feed their cattle rolled rather than fine-ground or powdered grain — are credited with increasing financial savings and producing better fed livestock. For instance, rolled grain increases production by 10 to 20 per cent and, by using rolled grain, a beef feeder can increase daily average gains by ½ to one pound (0.277kg to 0.454kg) resulting in a better finished animal.

Sturdily constructed with heavy duty shafts and bearings, the grain roller has one-half-inch (12.7mm) spaced grooving and leaf spring tension to provide for greater rolling capacity and to produce evenly

rolled grain. The rollers do not vibrate and solid objects can pass through without causing damage.

Non-stop clearing of rolls and setting for different grains is fast and simple with the roller's quick release and adjustments. The cut away frame permits easy removal of rolls and the top hopper is hinged, making access to the rolls quick and easy.

Available in a variety of models, the Renn-Cupit rollers vary from the Midget which has rolls 6 inches (152.4mm) wide and 7¾ inches (196.8mm) in diameter to the Model 24 which has rolls 24 inches (609.6mm) wide and 16 inches (406.4mm) in diameter.

Renn-Cupit has also introduced its new "soft action" combine pick-up attachment whose special feature is its double flexing nylon tines that will not break or damage grain.

The machine operates over any

farming terrain, an advantage made possible by the frame's twisting action which allows it to flex while operating on a side hill or over rocky ground.

The pick-up, which easily attaches to any make of combine, will also gently sweep up barley, wheat, oats, beans, grass seed, buckwheat and peas. It is also adept at raking out peas — without cutting or shelling while still leaving other growth standing in the field.

The "soft action" pick-up line is available in 8- and 10-foot (2.4-m and 3-m) models while other Renn-Cupit pick-up attachments are available in 6- 8- 10- and 12-foot (1.8-m, 2.4-m, 3-m and 3.6-m) models.

Renn-Cupit Industries Limited also manufactures industrial truck hoists and boxes. Code 3-2



Double flexing nylon tines designed to protect grain heads from breakage or damage are a special feature of this pick-up attachment manufactured by Renn-Cupit Industries Limited.

## Diagnosing engine disorders

Causes of engine faults — high speed misses, poor starting and rough idle, to name a few — are easily found with the Diagnostic Ignition Analyzer manufactured by Centaur Manufacturing Company Limited, Richmond Hill, Ontario.

A dynamic unit that is fast, accurate and easily operated by an unskilled user, the diagnostic ignition analyzer pinpoints such faults as: poor internal connections, wires, leads or terminals; shorted, broken or leaky ignition wires; defective breaker points, and even undersized wire for the load.

For the circuit under test, the analyzer shows a "go" or "no go" condition directly on the meter. At the same time it shows any changes in the engine's revolutions per minute and can also show the dwell angle under load conditions.

A compact unit with a shipping weight of only eight pounds (3.6kg), the diagnostic ignition analyzer will read out on both standard and electronic systems. It also checks both primary and secondary ignition circuits, coil, cap, rotor, condenser, points, leads, spark plugs and battery terminals.

The connections to the engine are simple and fast, requiring no external power or batteries. The meter has an accuracy of one per cent over the full scale and is pro-

ected from electrical overloads.

Centaur, which exports its ignition equipment to 52 countries, is perhaps best known for its Centi-Spark capacitive-discharge (C-D) electronic ignition. This unit has many benefits: excellent low temperature starting — full voltage at zero rpm; point and plug life exceeds 100,000 and 50,000 miles respectively; there is better idle and acceleration and improved fuel economy, especially at high speeds.

Easily installed in about 10 minutes, the C-D unit uses solid state components exclusively. And the C-D unit's condenser discharges 70 to 90 millijoules at all engine speeds, compared with about 20 to 30 for the conventional ignition systems.

Although the unit is designed for the aftermarket, some North American vehicle manufacturers offer C-D ignition as an available option and on some European cars it has become standard equipment. Centi-Spark has found greatest acceptance with industrial truck operators, municipalities, public utilities and the Canadian Armed Forces.

Now, with the production of the Diagnostic Ignition Analyzer, it would appear that Centaur has another world-wide winner.

Code 3-3

## A pick-up sit-down for tired spectators

The sports fan who wants to avoid sore feet, aching calves and tired back may find that Dyad Products' Specseat is just what he or she needs. The combination seat and walking stick can be used by spectators at golf matches, car races, football games and many other events where comfort and convenience are important. The Specseat is also ideal for golfers who want something to lean or sit on when they're between shots. Weighing in at one pound (0.45kg), it folds for walking, opens for seating and locks in both positions. The seat/handle is molded from high-impact polypropylene plastic and is attached to a sturdy steel shaft fitted with a plastic end plug. The Specseat, manufactured in many colors, can also be useful to advertisers: multi-colored labels or molded embossed designs, up to four inches (10cm) in diameter, can be put on the seat. In fact, several sponsors of Canadian and U.S. car races and golf tournaments have ordered Specseats with insignia. Gunn Management and Products Ltd. of Toronto is marketing the Specseat. Code 3-5

## Award-winning furniture simple, attractive

Form Canada is a two-year-old Toronto, Ontario furniture company with a design award from the Ontario Ministry of Industry and Tourism to back up its claim of giving the client "the best possible finished product." The frames are made of bent 1½-inch (3.8-cm) metal tubing, which is chrome-plated or finished in white epoxy. The curving frames support chair seats or seat-and-back units, table-tops, desktop-and-drawers, shelves, mattress-and-drawer units. The effect is simple, practical and attractive. Pictured are the Form Canada stools. The higher one, 7101, can be used as a drafting stool. It is shown with an upholstered seat 12 inches (30cm) square. The lower stool, 7102, can also have a round upholstered seat. Code 3-1

## Sensitive sorting system serves lumber and veneer industries

A versatile electronic green veneer sorting system that will pay for itself in a very short period is being manufactured for the lumber and veneer industries by Microdyne Modular Electronics Systems Ltd. of Vancouver, British Columbia.

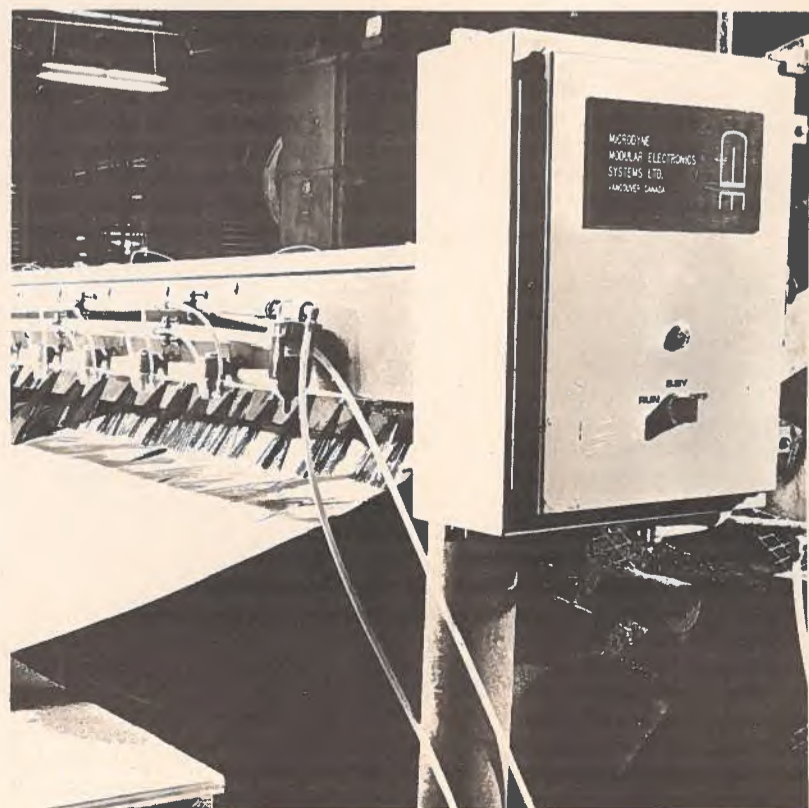
The system is designed to carry out two functions: to assess over-wet conditions in any kind of kiln-dried lumber by means of a sensing range of 17-24 per cent moisture content and to sense over-dry conditions by a lower sensing range of 5-15 per cent.

The equipment consists of a pre-calibrated one-piece unit which can be attached to a prearranged mounting by mill personnel in less than three hours. The unit can be

mounted in several ways.

The Microdyne system uses a mini-computer to increase production, save valuable time, save heat and power, and eliminate losses from over-drying.

The compact electronic cabinet which houses the power supplies, computer and the plug-in solid state modules also has direct read-out sensitivity meters for both over-wet and over-dry conditions. This means rejection can be set at any desired level. The control cabinet houses the digital counting system which gives a total count of all material which has been sensed, the number of boards which have been sensed as over-wet and the number of boards which have been sensed as over-dry. Code 3-4



Microdyne's Model 502 green veneer sorter marks wet areas on the veneer, or gives a green-end sort.

# CONTACT CANADA

(continued from page 1)  
tures high payload or lift capacity and has task-oriented tools and manipulators.

The Pisces 1 operates to 1,800 feet (548.6m). Pisces 11 and 111 operate to 3,500 feet (1,066.8m), the Pisces 1V and V to 6,600 feet (2,011.6m) and the SDL-1 diver lock-out to 2,000 feet (609.6m).

HYCO, which operates its submersibles on contract, recently produced the Aquarius, a small observation-type submersible which is to operate in the North Sea. The Aries, a powerful work submersible for the oil industry, is under development.

Lockheed Petroleum Services Limited, New Westminster, British Columbia, stands alone in that it is the only company which has successfully built and tested a manned atmospheric subsea system for producing and servicing oil wells at depths exceeding 1,000 feet (305m).

The Lockheed Capsule, capable of transporting four men plus their equipment down to a subsea oil well head, is a revolutionary system making it possible for a service crew to operate under water in a dry living environment at atmospheric pressure.

For the crew there are no cumbersome wet suits, no breathing apparatus, no slow motion and no time-consuming decompression. For exploration and exploitation purposes, the capsule means the ability to extend oil recovery capability to undreamed of ocean depths.

Lockheed 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.

Halifax Shipyards, Halifax, Nova Scotia, is fast becoming a world leader in the building of offshore vessels.

Four of the world's largest semi-submersible exploration rigs have already been completed at Halifax Shipyards — Sedco H, Sedco I, Sedco J and Sedneth 701. Two twin-hulled column-stabilized mobile offshore drilling vessels, Sedco 704 and Sedco 705, are under construction for delivery in 1974 and 1975 respectively.

A division of Hawker Siddeley Canada Limited, Halifax Shipyards

has excellent facilities for repair services, construction of offshore drill rigs and a variety of supply vessels.

At the west coast of Canada is Bel-Aire Shipyard Limited of North Vancouver, British Columbia. Expertise in the construction and repair of all kinds of steel vessels has earned Bel-Aire a sound reputation for dependability and top quality workmanship.

Bel-Aire constructs and repairs offshore supply and service vessels, tug boats, chip barges, self-unloading cement barges, beach landing craft, commercial fishing vessels and pleasure craft.

But Canada has more than shipyard expertise. There are consulting, surveying and equipment manufacturing companies with such prominent names as: Kenting Exploration Services Limited, Calgary, Alberta; Fathom Oceanology, Port Credit, Ontario; The Foundation Group of Companies, Toronto, Ontario; and John T. Hepburn Limited, Toronto, Ontario.

Kenting Exploration Services Limited has a solid reputation for technical skill of the highest order — particularly in Arctic marine seismic surveying.

The company is especially noted for its Polarquest '71 project which produced more than 10,000 miles (16,100km) of reflection seismic data from the islands of the Canadian Arctic. This feat proved that marine seismic surveys — even under the most severe ice conditions — were technically and economically feasible and opened the door to further Arctic exploration and exploitation.

Kenting has developed new techniques to record reflection data in the seismically difficult area of Hudson Bay and currently is working on a joint development-marketing venture with the Canadian government to develop a subsea core drill capable of retrieving rock core samples from water depths of up to 2,000 feet (609.6m). It is also developing technology for acquiring data needed in the design of submarine pipelines, well completions and offshore drilling platforms.

Other Kenting projects have ranged from tidal power feasibility studies to pre-structural engineering for super-tanker wharfs and

harbor dredging operations.

Fathom Oceanology is noted for its integrated underwater deep towing systems that are used in oceanographic exploration and research, especially in oil exploration and pollution control studies.

Fathom's compact system, which carries submerged oceanographic equipment at a speed and depth that allows fast and complete ocean data acquisition, is simple to install, operate and maintain.

The system's Flexnose fairing provides the ultimate in depth for a given cable length by reducing drag to a minimum. Other components include a patented winch for multi-layer cable storage, an automatic passive cable tension stabilizer, electrical signal takeoff without slip rings, custom-designed towed fish, a floating saddle assembly and optional high deck mounting.

In addition to producing deep towing systems for water sampling, sea-bottom profiling and ocean surveillance, Fathom Oceanology also produces submarine antenna towing systems and stationary moored buoys for water data sampling.

The Foundation Group of Companies engineers and constructs marine facilities and provides complete oceanographic consultant services and geotechnical engineering.

One of the Group, The Foundation Company of Canada, has constructed all types of harbour facilities, caissons, marine substructures and foundations and navigational aids.

Another, The Foundation of Canada Engineering Corporation Limited (FENCO), has provided studies and engineering for marine terminals and offshore development, and has engineered structures in Arctic waters.

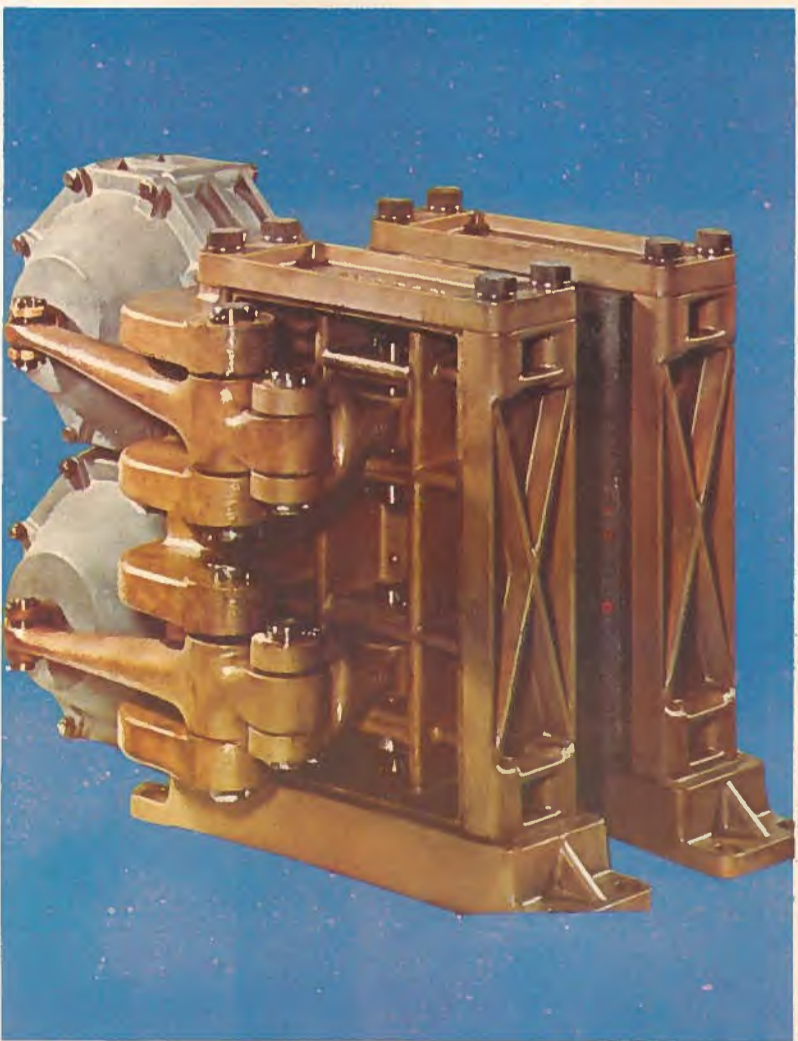
The third company, Geocon Limited, has provided offshore geotechnical investigations in open oceans and in Arctic waters.

John T. Hepburn Limited manufactures offshore drilling rig equipment that is used around the world.

The Hepburn Blowout Preventer (B.O.P.) crane — for use in positioning and servicing the B.O.P. assembly on oil rigs — is one of the firm's products. All motions of the hydraulically operated bridge-type crane are controlled by one operator from a deck-mounted console. The console is fitted with



A sonar buoy, used extensively by Kenting Exploration Services Limited, is deployed here to record seismic refraction impulses in Hudson Bay. The unit is a telemetry device which automatically lowers a hydrophone into the water, raises its antenna, receives seismic signals and transmits the information to a receiver on board the survey ship. Kenting is particularly known for its technical skill in conducting marine seismic surveys in the Canadian Arctic. Code 4-1



Single lever control of ships' propulsion machinery is possible with this single lever control head manufactured by J. Kobelt Manufacturing Co. Ltd. The head is part of a total pneumatic control system that provides automatic pitch compensation to prevent engine overload due to the CP propeller. Manufactured in bronze with stainless steel hardware, the system is simple to install and operates on 100 pounds per square inch (7kg/cm<sup>2</sup>) air pressure. The systems can be arranged to provide single lever control from up to five remote stations. Code 4-2



The SDL-1 submersible diver lock-out is designed and manufactured by International Hydrodynamics Company Limited (HYCO). Capable of reaching a depth of 2,000 feet (609.6m), the SDL-1 offers unprecedented flexibility for a wide variety of commercial, scientific and military uses. HYCO is known internationally for its ability to design, build, manufacture and operate submersibles, their tools and support facilities. Code 4-3

an individual load gauge for each hoist and responsive manual valves give the operator sensitive control and feel of the load for accurate positioning.

Hepburn also produces such marine equipment as: replenishment-at-sea systems; winches, windlasses; deck cranes; helicopter cranes; and oceanographic winches — all of which operate successfully at sea under all climatic conditions.

Some Canadian companies providing additional equipment for use in the ocean industry include: J. Kobelt Manufacturing Co. Ltd., Vancouver, British Columbia; Integrated Survey Systems Limited, Halifax, Nova Scotia; Cougar Tool Co. Ltd., Edmonton, Alberta; Gearmatic Co. Ltd., Surrey, British Columbia; and Pederson Industries Ltd., Ottawa, Ontario.

J. Kobelt Manufacturing Co. Ltd. specializes in precision control equipment for the ocean industry.

Kobelt designs and manufactures pneumatic and mechanical remote control systems and components for marine propulsion controls and deck machinery. These include: pneumatically-operating disc brakes for prime movers such as ships' propeller shafts; gearbox controls and single lever throttle for marine engines; cable winches and pneumatic cylinders.

Integrated Survey Systems Limited is part of a consulting engineering group specializing in marine structures, hydrographic work, radio-positioning and control surveys.

Backed by solid professional, scientific and engineering talent, Integrated provides comprehensive surveying and positioning services on an international basis for the oil industry, geophysical contractors, government agencies and public and private institutions involved in land, marine and airborne operations.

Developing downhole drilling tools for the oilfield industry is the business of Cougar Tool Co. Ltd.

A recent development is the Cougar Cub Stabilizer, a non-rotating stabilizer that eliminates unnecessary reaming of the wall of the well bore and centers the drill collars in the well bore to reduce possible differential wall sticking.

Other Cougar products are the Shock Tool, which dampens downhole vibrations caused by the rotating drill bit and the Cougar Bumper Sub, which bumps down

the drill during offshore drilling operations.

Gearmatic Co. Ltd. constructs winches and hydraulic drives that are built for smooth, trouble-free operations under rigorous conditions.

Gearmatic winches are used in such operations as offshore oil exploration, oil and gas pipelines and dock installations and deck, land and mobile installations.

The modular design allows selection of quality components to be assembled in countless combinations to meet performance requirements. Optional features include drum configurations, gear ratios, automatic brakes, free-fall or high-speed reverse, high or low pressure hydraulic motors, and two-speed primary drives.

Pederson Industries Ltd. is engaged in the research, development, production and marketing of industrial products for ocean science applications.

The firm is particularly noted for its Pelcon Connector. Designed to function at maximum efficiency in underwater and salt-spray environments, the Pelcon Connector is used in underwater television, voice communications and monitoring of sonar systems.

The unique electrical and mechanical capabilities of the Pelcon Connector result from using electromagnetic induction as the means of transferring electrical energy and signals.

There are also Canadian companies engaged in the manufacture of electronic systems and components for use in ocean industry as well as those companies concerned with pollution control. These include: ComDev Marine, Ottawa, Ontario; Hunttec (70) Limited, Toronto, Ontario; and Pollution Control Systems (International) Limited, Thornhill, Ontario.

ComDev Marine, serving the ocean industry around the world, is one of Canada's largest marine electronic navigation and survey companies and provides complete navigation and survey services which constantly position ships or aircraft at ranges up to 500 miles (804.6km) from shore.

ComDev also provides global positioning with satellite navigation receivers; conducts complete hydrographic surveys as a basis for offshore resource development; surveys underwater pipeline and cable routes; surveys offshore drilling locations and subsequently posi-

tions drill rigs and drill ships; designs comprehensive data acquisition systems for in situ or remote recording environmental parameters.

Hunttec (70) Limited produces components and systems which provide accurate cross sectional profiles of sub-bottom geology of water-covered areas.

Hunttec's line of highly versatile HYDROSONDE marine seismic components and systems include such instruments as: single and dual-channel graphic recorders; wide band signal processors; variable powered seismic sources for high resolution or deep penetration; power supplies; and hydrophone arrays.

The modular design and portability of HYDROSONDE components permit the selection of units best suited to particular project requirements and enable them to be operated from virtually any type of survey craft — large ships to small inflatable dinghies.

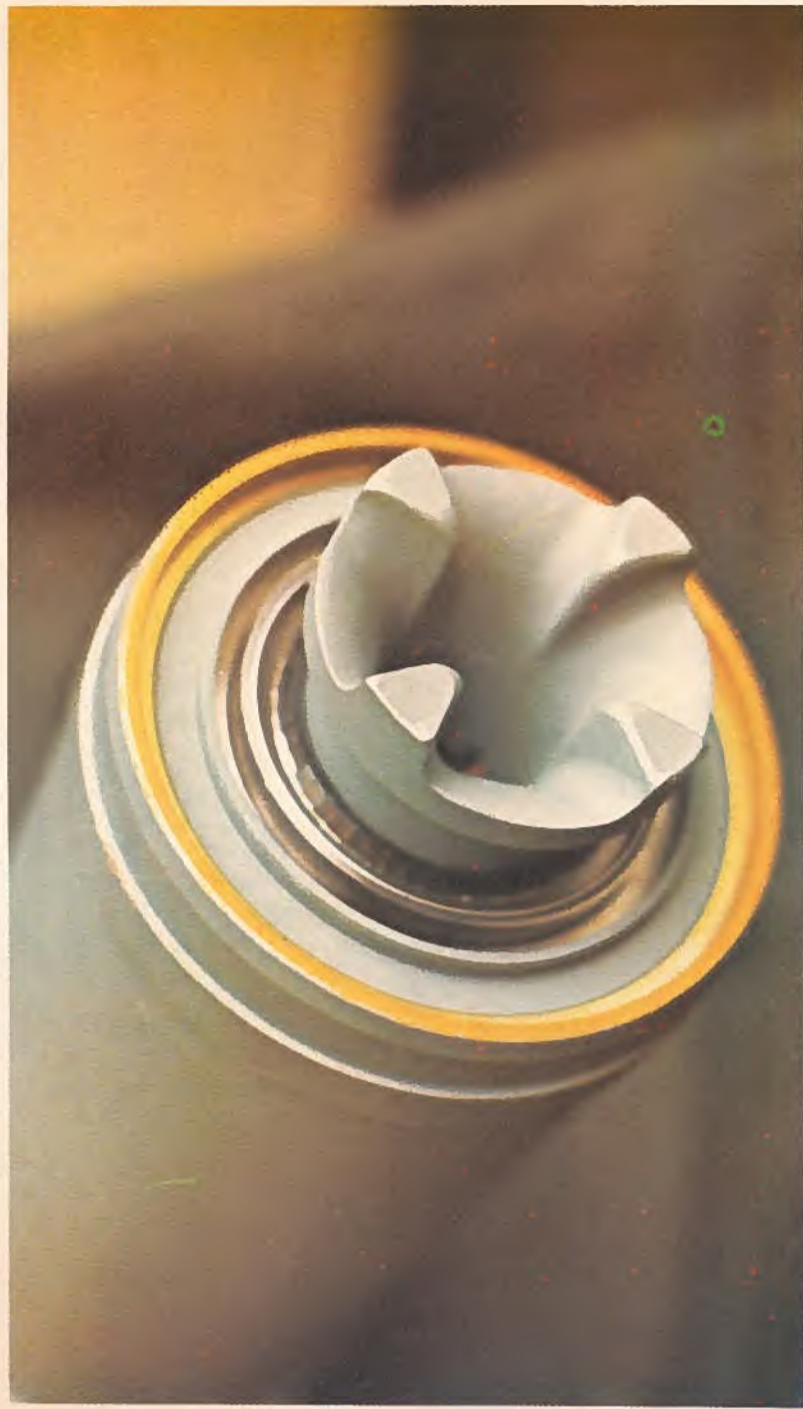
Pollution Control Systems (International) Limited has been manufacturing and marketing water pollution control equipment for 20 years.

To help combat the pollution of coastal waters, inland waterways and harbors, the firm offers its Seaway line of shipboard sewage treatment systems. Used successfully in more than 1,000 vessels throughout the world, the systems are trouble-free, require little maintenance and are readily adapted to space limitations.

The offshore industry is also aided by Dominion Aluminum Fabricating Limited, Toronto, Ontario, a company that devised a means to safely house a helicopter on board ship.

Dominion Aluminum's telescopic or retractable helicopter hangar is now used by most modern navies and coast guard ships throughout the world. The company has also developed a safe means of assisting helicopter takeoff, landing, securing and traversing operations during adverse weather conditions. As well, the company designs and manufactures crane booms, tower drills and aluminum structures.

For further details of Canadian offshore capability, fill in the trade inquiry form on page 7, quoting the code number at the end of this story and specifying particular interests. Code 5-1



Viewed in the retracted position, this probe tip is just one of the components of the assembly system used in landing and securing helicopters during adverse weather conditions. The grooved notches prevent trapping of the hold-down cable when a helicopter is being secured. The assembly system is manufactured by Dominion Aluminum Fabricating Limited, a company that is also noted for the design and manufacture of retractable or telescopic helicopter hangars. Code 5-3

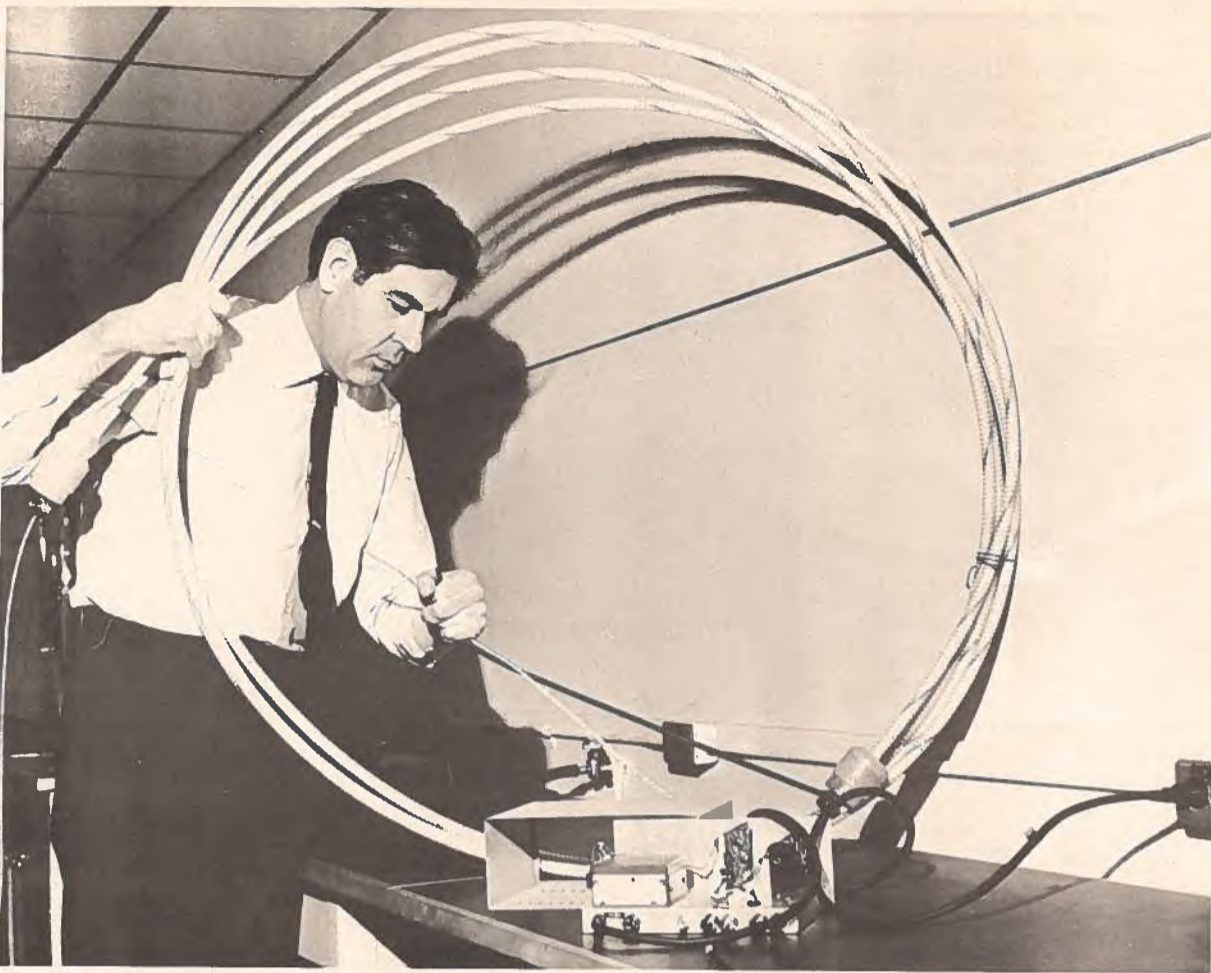


Lockheed service vessel M. V. Coastal Cruiser launches a utility capsule to a subsea oil well in the Gulf of Mexico. The design of the capsule minimizes the cost to water depth ratio and opens up the possibility of economical exploitation of the continental shelves. Lockheed Petroleum Services Limited has also built and successfully tested a manned atmospheric subsea system for producing and servicing oil wells at depths exceeding 1,000 feet (305m). Code 5-2



Audiotape control survey equipment used by Integrated Survey Systems Limited, a Canadian company that provides comprehensive surveying and positioning services on an international scale for the oil industry, government and oceanographic agencies. Integrated also provides complete site investigations for marine terminals, drilling and production platforms. Code 5-4

## Sensor records water level changes



John Osborne, Engineering Physics Division, Nova Scotia Research Foundation, coils the flexible new wave-staff developed by Foundation scientists. When the wave-staff, with associated electronic equipment, is set up on a rigid structure in water, it records water level changes such as occur with tide and wave action.

Recording waves in salt or fresh water is an uncomplicated task with the resistive wave sensor developed by scientists at the Nova Scotia Research Foundation, Halifax, Nova Scotia.

The distinctive feature of this new instrument, and one which makes it easier to transport and install than its predecessor, is the one-piece, flexible construction of the wave-staff which can be rolled into a three-foot (0.9-m) coil and set up from a small boat.

The wave sensor is durable, with resistance and return wires well recessed into grooves to protect them from damage. It is also accurate: initial accuracy is maintained; resistance to fouling is good, and operation in fresh water

is possible if at least 10 feet (3m) of staff is immersed at minimum water level.

The resistive wave sensor consists primarily of a grooved plastic tube entwined by a spiralling resistance wire. An insulated return wire is attached to the tube and a stainless steel mounting cable is enclosed by the plastic.

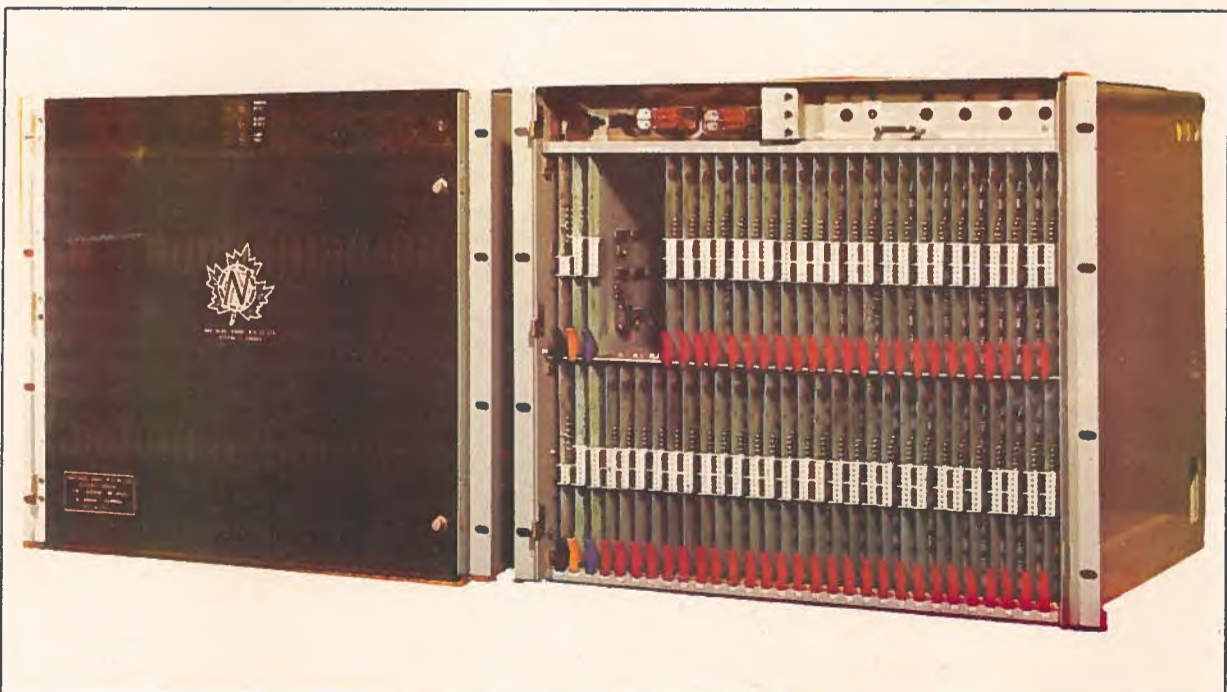
When set up — it has to be on a rigid structure such as a moored tower or pier — the sensor is held in a vertical position with its center at mean water level. As water levels change, due to wave or tide action, resistance changes occur between sensor's terminals. These changes are picked up and translated into electrical output by associated electric equipment.

Electronics used with the sensor include variations which can be used with chart or tape recorders or with multiplexed telemetry systems. They can operate over wide temperature ranges and in environments with relative humidity from zero to 90 per cent.

Wave staffs are made in standard lengths of 20, 30, 40 and 60 feet (6, 9, 12 and 18m). Other lengths can be provided.

Resistive wave sensor instruments, already in use by federal government departments and private firms in Canada, are made to suit the particular needs of the purchaser. The Nova Scotia Research Foundation currently is accepting small pre-production orders. Code 6-1

## Reliable's the good word in NR Systems equipment



A "cover-off" view of the NR-TDM-2 Time Division Multiplex Terminal manufactured by NR Systems Limited, a world leader in data communications equipment.

A world leader in data communications, NR Systems Limited, (formerly Northern Radio Mfg. Co. Ltd.) Ottawa, Ontario, has been designing and manufacturing data transmission equipment and peripherals for 20 years.

While the firm's principal product is frequency division multiplex

data transmission equipment, it also designs and manufactures telemetering systems, regenerative repeaters of all types and terminal equipment, including high density time division multiplex systems.

One of the firm's newer products, currently being used in Canada, Manila and Hong Kong, is

the Time Division Multiplex System (TDM) which is designed to meet the specific requirements of the telex network.

The TDM makes efficient use of existing trunk circuits and, instead of having only 18 to 24 channels on one voice band, allows 50 or more channels to be used. For in-

## New plough blades last longer, cut costs

Letco Limited of Preston, Ontario has designed a new plough blade that decreases cost by increasing blade life. The design is used in the company's snow plough, ice and grader blades. These blades can be attached to trucks, graders, loaders, bulldozers and ploughs, and are especially useful for snow clearing and road building. Average snow plough blade-life is claimed to be 13,500 miles (21,735km), significantly reducing the cost per mile and saving downtime.

The sectional tungsten-carbide tipped blades are made with a 5/4-inch-deep (133.3mm) curve to fit the contour of the moldboard. This design not only reduces shockwear on the blade, but also makes for longer-lasting moldboard. This cuts moldboard maintenance costs.

The company produces the blades in standard lengths, combining the sections to give whatever length the customer requests. All sections are designed to be interchangeable. End pieces, for example, can be interchanged so either section can be used as the lead corner when wear becomes evident. If the blade is damaged, only the damaged portion, not the whole blade, need be replaced. The

sectional blades have the added advantage of withstanding impacts that would cause longer blades to bend.

Letco's carbide-tipped shoes are optional equipment with the blades. When used with the shoes, the blades last even longer. However, when used without the shoes, the blades are in direct contact with pavement. The contact lowers salt costs and reduces pollution.

Hard surfacing metal is applied to the face of the steel surface of the grader blades after the carbide is brazed on. This strengthens the steel and means that, after the carbide is worn down, the blade still has life in it.

The ice blades are designed for breaking up ice on paved or well maintained gravel roads. The grader blades can withstand tougher use, as in pits.

The company also manufactures carbide-tipped bucket blades (used mainly at airports for clearing snow), carbide-tipped wing blades, runners and nose pieces for ploughs and snowblowers, rock drill bit bodies, and finished percussion rock drill bits. The company also does custom machining. Code 6-2

## For your bookshelf . . .

The first supplement to the fourth edition of the Directory of Canadian Consulting Engineers is now available to holders of the Directory. Supplements are free of charge. To obtain this and further supplements, fill in the trade inquiry form on

Just off the press — a comprehensive, cross-referenced directory of some of Canada's leading steel centers. The 48-page Directory, Canadian Steel Service Centers Industry, lists 31 Canadian steel service centers, their services and facilities.

page 7 (Code 6-4).

The Directory itself is still available at a nominal cost of \$Can. 20 and this also may be obtained from the Association of Consulting Engineers of Canada by filling in the trade inquiry form on page 7 (Code 6-5).

Published in both English and French by the Iron and Steel Division, Department of Industry, Trade and Commerce, the directory is available, free of charge — just quote this code number on the trade inquiry form on page 7. Code 6-6

stance, 50 channels can be obtained with a 2,400 bit modem and 106 channels with a 4,800 bit modem. More channels can be accommodated if higher speed modems are employed.

All of the common equipment in the TDM is duplicated to provide 100 per cent redundancy; if any piece of the common equipment fails, the system automatically switches to the back-up unit and registers an alarm so that it is virtually impossible for a fault to occur that would put all of the channels out of operation.

An integral part of the TDM unit is the alarm and diagnostic panel. The alarm system — in which any fault is indicated by a light — operates on the failure of any card, loss of synchronization, failure of any fuse, failure of any power supply and malfunctions of the modem clock.

Another NR Systems product destined for world markets is the NR 24 CHAN-1 system which can be supplied tropicalized and which will operate anywhere in the world from any AC or DC power source.

This system uses a combined transmit and receive card in which all frequency determining components are mounted on separate plug-in cards to minimize inventories and to facilitate changes of frequency and speed in the field. As well, this new system can be

fitted with Pilot Tone assemblies which automatically correct translation errors in the received signal. These assemblies eliminate the distortion caused by frequency drift of the radio or microwave equipment.

The system, which meets all CCITT (International Telegraph and Telephone Consultative Committee) standards, is a complete 24 channel package that stands only 17 1/2 inches (445mm) high so that 5 x 24 channel systems can be mounted on a standard 9-foot (2.7-m) rack. This arrangement conserves space and leaves room for terminal blocks or other special features the user may wish to add.

NR Systems Limited also manufactures a sophisticated Automatic Telex Test Set which is located in the central office of any telex centre. This device enables both the send and receive circuits of any telex machine — located at a subscriber's premises — to be tested on site without the need of additional test gear. This means that servicemen need not carry expensive and fragile telegraph message generators and distortion analyzers with them on service calls.

NR Systems' products are used in such countries as the United States, Puerto Rico, Australia, Singapore and Turkey. Code 6-3

# Small winch handles big jobs

The efficiency of large hydraulic winches is now available for small capacity applications with a new winch being manufactured by a Delta, British Columbia company. B.C. Gearworks is now marketing the Pull Master GT-50.

Although this hydraulic winch was designed primarily for the small hydraulic crane market, the utility industry and the marine market, it can be used in nearly all industries.

The standard unit has a line pull of 4,200 pounds (1,950kg) at 55 feet (17m) per minute. This is based on a hydraulic volume of seven United

States gallons (26 liters) per minute at 2,000 pounds per square inch (140kg/cm<sup>2</sup>).

The Pull Master GT-50 has a planetary gear reduction system, a feature which increases efficiency and which is normally seen only in big winches. In the past, winches in the Pull Master's power range were offered with worm gear reduction, a design which required an excessive hydraulic input.

The winch is designed to raise and lower any load up to the specified maximum with smooth acceleration and deceleration.

The winch is available in three

models. The GT-50-0, for pulling applications only, has a free spooling feature and no brake. The GT-50-1, for lowering applications, has free spooling and automatic disc brake. The GT-50-2, for pulling applications only, has free spooling, no brake, and ratchet and pawl for positive locking of the cable drum.

The aluminum castings and baked epoxy finish preserve the appearance of the winch, even in a salt water atmosphere. The winch weighs only 140 pounds (63kg).

Code 7-1



B. C. Gearworks' new Pull Master GT-50 winch — a small horsepower, planetary, hydraulic winch — can be mounted on cranes, tow trucks, drilling rigs, small tug boats and many other pieces of equipment.

# Husky automates mold-making

Husky Injection Molding Systems Ltd. of Bolton, Ontario is one of the world's leading designers and manufacturers of injection molding systems.

Most of the world's mold-makers are tied to old methods of creating molds — using craftsmen who are rapidly disappearing. Husky, however, has used numerically controlled machines to develop a high-technology, pre-designed method permitting production-line mold-making with great speed and precision.

Offering an automated injection-molding system which includes molds, the company can supply its system as a turnkey operation. President R. D. Schad says the system provides a manufacturer of injection-molded products with an engineered method of handling everything from the moment the raw material enters one door to the

moment the finished product, packaged if necessary, leaves another door. The company provides all the equipment needed and can train the customer's employees, if necessary.

The reduction in labor costs, both in Husky's own manufacturing operation and in customer plants, is another good reason for dealing with this company.

Husky claims it is five years ahead of its competitors, thanks to its policy of intensive research and development. The company also has an aggressive marketing and sales program. It won't sell a machine anywhere in the world unless it can assure the customer of service "on call" whenever necessary.

The company has developed a manual on the successful molding of plastic products. It has become a "bible" for the industry, and re-

quests for copies reach the company daily.

The German born Mr. Schad came to Canada in 1951, set up the company with a garage full of small tools and designed a cargo-carrying snowmobile "for which the world wasn't ready."

Today, the company manufactures injection-molding machines and product handling equipment at its Toronto plants, and molds at its Bolton operation. It has more than 400 employees, including 20 professional engineers. The Husky system is used in Canada, the United States, Europe, South America and the Far East.

Husky has acquired a company in Whittier, Calif. (Pre-Met) to make molds for the U.S. West Coast market and has entered licensing and joint venture arrangements with companies in Japan and West Germany.

Code 7-2



Customer approves a mold and part in Husky's new testroom. Here all molds are tested for two hours before being shipped to customers.

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## trade inquiry form

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## Skates for all seasons will cut a fine figure

Customers can skate all year 'round with products from Dominion Skate Co. Ltd. The Mississauga, Ontario, company makes five models of strap-on roller skates, five models of roller skates with boots, one adjustable bob skate, four models of boys' and girls' figure skates and four models of adult figure skates.

The company's top-of-the-line adjustable roller skate weighs 4.5 pounds (2g) and extends from eight to 11 inches (20-28cm). The skate has reinforced leather backs, double ball bearing wheels, sponge rubber instep protectors, rubber shock absorbers, wing clamps, and a rust-resistant finish.

For adults, the company makes polished and unpolished aluminum alloy skates with boots attached. Wheels — in red, blue, black or yellow — and toe

stops are available in several sizes.

Dominion also sells wheels and cones, completely assembled and adjusted, ready to be mounted on skates.

The company's ice skates for children are made with sturdy cold-proof uppers, fully lined for comfort and built-in support. The girls' skate model 712 even has a fur top! The boys' model 713 has a tendon guard. All blades are finished in bright, rust-resistant zinc.

The men's figure skate and the women's top-of-the-line figure skate both have high quality grain leather uppers (white elk in the women's boot and black in the men's boot), and leather soles and heels. Boots are securely attached to nickel-plated blades. The skates are available in half-sizes. Code 8-1

## Fishy stories come true with the Canadian Wiggler

Lures are the solution for fishermen who are fed up with worms. And considering the great fishing in Canada, it's not surprising that one of the best lures is Canadian. It's the Canadian Wiggler, made by Lindquist Bros. Bait Co. Ltd. of Windsor, Ont.

Anglers in Canada, the United States, England and Australia have discovered that these hollow brass lures are ideal for catching walleye, northern pike, bass, muskellunge, trout and salmon. The brass gives the lures the proper weight for intermediate and deep trolling, as well as the strength to endure the most vigorous actions. Unlike plastic and wood lures, which have the eyes screwed in, the Wiggler's eyes are actually welded into the brass.

The Wiggler is designed to go through the water at any depth with a swimming motion.

The lures are available in five sizes:

junior spinning (1.5 inches/38mm), spinning (2.4 inches/60mm), casting and trolling (3.2 inches/82mm), muskie (4 inches/101mm), and jointed trolling (5 inches/127mm). The weights vary from approximately 1/8 ounce (3.5g) to 1 1/8 ounce (32g). A sixth lure, an aluminum floater, is 2.4 inches (61mm) long and weighs about 1/16 ounce (1.5g). And there are 23 color combinations.

Lures are cut by a machine, then welded, sanded, polished and painted by hand. Some of the lures are chrome-plated, some have crinkle finishes and some have fluorescent colors. All are "water tested" before leaving the plant. An employee ties a leader to each lure and pulls it through a tank of water. If the lure wobbles with the right action, it is packed and shipped; if not, it goes back to the production table.

The company was started in 1950 when Walter Lindquist Sr., then 53 and a life-long fisherman, designed a brass lure in his basement. The company now makes about 650 lures a day and has sold more than one million. Code 8-3

## Award-winning knife fills outdoor needs

A Pictou, Nova Scotia company has won devoted customers and international awards for its sports knives.

Grohmann Knives Limited's first knife, designed in 1957 for trappers and hunters skinning wild animals, is still the company's best seller. Called the Russell belt knife (model RBK # 1), this hand-made hand-honed knife has a four-inch (10.2-cm) elliptical blade to lessen cutting drag.

Other features include special slitting tip, flat back edge for slitting without penetrating flesh, anti-slip finger milling, finger- and palm-fitting handle for safe, comfortable grip, offset handle to keep knuckles away from work, and safety-ground blade choil. (The choil is the curved part of the blade, between handle

and sharp edge, that would deflect fingers away from, rather than under, the sharp edge.)

Ideal for all slitting, flaying, slicing, peeling and whittling operations, the knife has won a National Industrial Design Council of Canada award and has been displayed at the Museum of Modern Art in New York.

The company's second knife, called the trout and bird knife (model RBK #2), is a smaller version of the original Russell belt knife. Its blade is 3 3/8 inches by 3/4 inches (10cm by 2cm). This compact, light-duty, fixed blade knife is designed for game or fish dressing and general outdoor knife needs.

The third knife, called the boat knife (model RBK #3), has a stainless steel

## Brooms sweep curlers right off their feet

Brooms to sweep any curler off his feet (figuratively-speaking!) are made by Curl-Master Brooms Ltd. of Port Elgin, Ontario.

The Curl-Master broom, which the company says sets the standard for the curling broom industry, has a lower tie for whippier action and a skirt for durability. The broom is made in light, medium and heavy weights.

The ladies' Curl-Master has a similar construction to that of the Curl-Master, but comes in one weight only.

The Club Broom, with lower tie and skirt, is made for rack or rental use and will outlast any ordinary broom. It is made in the one weight best combining durability and ease of sweeping.

The company also makes slapper and reverse curl brooms. They are known as the Little-Beaver, the Tiger, the Amazon, the Richardson, the Black-Jack and the Mustang.

With the exception of the actual turning and sanding of the broom handles, the entire production process — including the major portion of the corn prep-

aration — is done by hand.

Only the best corn is selected for use in the brooms. First it is sorted, then stemmed and finally cut to the specified lengths.

Next, the handle is turned from selected straight-grained hardwood, well-sanded and finished with a heavy lacquer.

Then the various layers of the corn are securely bound to the handle with wire. A covering layer of extra-fine shorter corn is applied for the brooms produced with a skirt. If there is no skirt, this same fine corn is applied in full length.

The wire band (or cable) is secured, and then the sleeve or canvas band is pulled on and stitched into place. Finally, the handle is given a finishing coat of lacquer and the broom is ready for labelling and packaging. Curl-Master also makes curling brushes and broom protectors.

The company has a warehouse — Curl-Master Brooms Inc. — in Madison, Wisconsin. Code 8-2

## Accessories complete the picture

The sports enthusiast who wants high quality hunting, fishing and archery accessories will find Edwards-Day Limited's equipment ideal. This Toronto, Ontario, company has been making high quality leather and vinyl accessories for 13 years. Its predecessor, J. E. Edwards & Son Limited, had been in the business for more than 100 years.

Edwards-Day's archery equipment includes bow quivers, belt quivers, side quivers, shoulder quivers, bow slings, bow cases, bow string keepers, arm guards, finger tabs and gloves. The company will also make other accessories to specifications.

The quivers are available in composition rubber, vinyl-coated leatherette and cowhide leather. One side quiver, which comes with zippered accessory pocket, arrow separator and pencil holder, is available in both right-hand and left-hand versions. The leather shooting glove is noteworthy for its closed-end tips which give complete finger protection.

The company makes about 20 gun cases and coveralls, for rifles with and without scopes, and for pistols. The cases and covers are available in sueded cowhide leather, textured cowhide, soft vinyl, cloth reinforced vinyl, water-repellent canvas and soft kasha.

Edwards-Day's patented guncase cushion cap protector with length selector is made of durable polyethylene specially designed to withstand extreme impact without danger of muzzle damage. The protector is "self aerating" to breathe away harmful moisture and will not cause distortion if there is water exposure. It is integrally connected to the sight guard leather, so there are no weak fastening devices such as staples. Case length can be changed easily by simply snapping the length selector in or out.

Other hunting accessories made by the company include military slings, solid leather oilings, cartridge belts, shotgun shell belts, axe sheaths and snow shoe harnesses. Code 8-4

All knives come in six- or eight-ounce (170- or 227-g) sheaths of top grain, stained and polished cowhide. Handles are made of Brazilian rosewood and rivets are made of a nickel-silver alloy, which is stronger than the brass often used in other knives.

A company determined to satisfy its customers, Grohmann Knives once made a special knife for a Boston, Massachusetts outdoorsman. The man, a diabetic, was afraid of losing his hypodermic needle and insulin in the woods. The company made him a custom knife with a hollow rosewood hilt that could hold needle and insulin. No tool was needed to get at the insulin and the hilt was waterproof. Code 8-5