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Wide-ranging projects in many countries

International demand for Canadian consultants



When it comes to the challenge of protecting the environment, Canadian engineering consultants have a great deal of expertise, ranging from detection to control for land, sea and air environments. One of many environmental projects on which Canadian engineering consultants have worked is this sewage treatment plant in Riyadh, Saudi Arabia.

by Don Wight
Canada Courier staff reporter

Success at home means success away from home — at least that's the way it is with Canada's engineering consultants who are leaving their indelible imprints on projects being conducted throughout the world.

The international demand for Canadian engineering consultants results from the experience and expertise they have gained through successfully conducting a wide range of engineering projects at home.

Domestically, Canadian engineering consultants have been responsible for such projects as: the \$950,000,000 hydroelectric development at Churchill Falls, Labrador; the new \$300,000,000 Mirabel Montreal International Airport; British Columbia's \$500,000,000 Mica dam and power house on the Columbia River; the 555-mile (893.5-km) \$175,000,000 ± 450 KV DC Nelson River transmission system in Manitoba and a 2,000,000-square mile (5,200,000-

km²) hydrometric network study in Manitoba, Saskatchewan, Alberta, British Columbia, the Yukon and the North West Territories; engineering studies of bridge and tunnel alternatives for Vancouver Harbour's 10,000-foot (3,048-m) Burrard Inlet crossing; and the \$116,000,000 nuclear power plant at Gentilly, Quebec.

And that's not all. Other areas of Canadian expertise include: vast water-supply and sewage-systems projects; forestry complexes involving sawmills, pulp and paper, newsprint and board mills totalling \$200,000,000 capital expenditure; causeways and terminals; several land bridges — one with an orthotropic deck box girder and cable stayed between two river piers and shore abutments; huge municipal incinerators; and a river basin management study, using a systems approach, for New Brunswick's Saint John River and its basin, where rise the tides of the famous Bay of Fundy.

Canadian engineering consultants work in numerous countries: in Asia, Africa, Europe, Latin

America, the Caribbean and the United States.

Projects in Asia involving Canadian consultants include: road and metro tunnel harbour crossings in Hong Kong; highway engineering in Thailand; consultancy services for setting up a model timber-industries complex from virgin jungle in Malaysia; a multi-million-dollar resort-residential project in Fiji; and, at a cost of \$57,000,000, a 360-MW extension to a thermal power station in Malaysia.

In Africa, projects by Canadian engineering consultants include: highway studies in Tanzania; a feasibility study on improving Congo (Brazzaville) Ocean Railway for World Bank, funded by UNDP; a feasibility study on building a 100-MW thermal power plant in Algeria; a major international pollution control project in Western Nigeria, funded by World Health Organization; a \$25,000,000 mining, concentrating and pelletizing plant for Rif iron mines in Morocco; and airborne geophysical surveys for UN in Sudan and Ethiopia.

Latin America and the Caribbean have relied on Canadian engineering consultants for such projects as: a plywood plant and sawmill in Colombia; a bagasse pulp mill in Brazil; design and development of a \$30,000,000 fishing complex in Peru; a tourist development in St. Lucia, West Indies; a pilot plant for asbestos production in Bolivia for UNIDO; studies and engineering for a waterworks system in Jamaica; and a \$12,000,000 steam-electric power plant in Brazil.

In Europe, projects include: a \$15,000,000, 100-ton-per-year (90.7-metric ton) asbestos-finishing plant in West Germany; rapid transit studies in Helsinki; telescope engineering in France; design engineering for a large forest industries complex to be built in

Siberia; a grain elevator facility in Britain; mining and milling projects in Ireland; a 300-ton-per-day (272.1-metric ton) kraft-pulp paper-tissue mill and a paper mill to produce 350 tons (317.5 metric tons) of fine papers plus 250 tons (226.7 metric tons) of full-bleach kraft pulp.

To meet the demands of these domestic and international projects Canada has more than 75,000 registered professional engineers of whom about 10 per cent are employed by, or practise as, consulting engineers. There are approximately 1,500 consulting engineering firms employing a total staff of 26,000. As a group these firms have a national annual income in excess of \$750,000,000.

For a Canadian engineering consultant to be registered he must be a professional engineer and have training and experience. He must obey a rigid code of ethics and be completely independent of suppliers. He cannot be directly or indirectly concerned, or have financial interest in, commercial, manufacturing or contracting activities. This independence assures sound and unbiased judgment in any professional decisions he must make on behalf of his client.

There is also the Association of Consulting Engineers of Canada (ACEC) whose membership consists of 300 of the more significant Canadian consulting engineering firms.

ACEC is a national association founded 50 years ago under federal letter patent. Among other things, it is designed to assist in promoting satisfactory business relations between its members and their clients; to foster the interchange of information, professional management and business experience

among its members; and to safeguard and maintain their high professional standards.

To assist potential clients in and outside Canada, ACEC publishes and maintains a directory containing an official list of its member firms, addresses of their head and branch offices, their fields of specialization and a summary — by firm — giving the principals, the type of specialties, services offered and examples of typical projects.

ACEC is also an active member of the International Federation of Consulting Engineers (FIDIC) which is made up of national consulting engineering bodies of some 25 countries.

There are many advantages in obtaining the services of Canadian engineering consultants. They offer the client country specialized skills and know-how; they are usually instrumental in shortening the time needed for implementation of projects; they often are credited with finding a fresh and better approach in dealing with various projects; and they offer the country the assurance of evaluations and recommendations that are independent and unbiased.

Canadian engineering consultants carry on practices in all known fields of engineering. A general breakdown reveals that 57 per cent of all consulting engineering firms work in the broad field of civil engineering; 48 per cent in structural engineering; 37 per cent in mechanical engineering; 34 per cent in electrical engineering; 14 per cent in industrial engineering; and five per cent in mining engineering.

But the capability of Canada's engineering consultants is much broader and more varied than these
(Continued on page 2)

Parka preview Eskimo clothing for international fair



These parkas are among the items of Eskimo-made clothing to be exhibited by Canadian Arctic Producers Ltd., Ottawa, at the International Sports and Equipment Fair (ISPO '75) in Munich, Germany, February 20-23, 1975. Left: a muskrat back parka with wolf trim and, right: a seal skin parka trimmed with Arctic fox. Both creations are from the Tuktoyuktuk area of the North West Territories. Other arts and crafts from the Canadian North are featured on page 8 of this issue. Code 1-1



Life sciences organization studies safety of chemicals page 3

And inside . . .	Page
Canada at marine fair	3
Quality's the thing (Canadian leathers)	4
Fit for a queen (Canadian furs)	5
Warning system	6
Design of distinction	6
Versatile grilles	7
Trade inquiry form	7
Arts and crafts from the Canadian North	8

canada courier

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(Continued from page 1) statistics indicate. For instance, few firms describe themselves as civil or mechanical engineers. Instead, a single practitioner might be a sophisticated specialist in earthquake foundation design or a firm with a staff of 1,000 might offer such services as: electrical utility management; economic studies; valuation; systems planning; generation, transmission and distribution; power supply studies; industrial power supply; industrial plants; resource and environmental studies; water supply studies; waste disposal; pollution control; agricultural and land use studies; and mine development.

The wide-ranging capabilities of the Canadian engineering consultant are as specialized, as sophisticated and as multi-faceted as any in the world. He can offer services for any particular phase of a project or he can provide a complete program, from initial feasibility studies to construction and commissioning.

The directory published by the Association of Consulting Engineers of Canada lists 53 disciplines or fields of activity in which Cana-

dian engineering consultants have experience and skill.

In addition to the traditional consulting engineering fields, the list includes: acoustical engineering; aerial photogrammetric interpretation; aeronautical engineering; chemical engineering; computer technology; electronics; forestry engineering; geological engineering; heating, ventilating, air conditioning and refrigeration; irrigation and drainage; traffic and transportation; and urban and regional planning.

Consulting engineers involved in these and other areas continue to gain significant recognition internationally and have worked for international agencies, foreign governments and industrial corporations.

For instance, in 1972, of 263 firms surveyed, 111 were working on projects outside Canada. Their total annual business amounted to \$263,000,000 of which \$58,500,000 was from export. A further breakdown shows that export services to the United States and Europe amounted to \$20,000,000 while those to Latin America, the Caribbean, Africa and Asia amounted to \$38,300,000.

Consultancy activity provided internationally by Canadian engineering consultants generally falls into five principal project sectors: power, forestry, transportation, mining and petroleum, and industry.

In forestry, Canada is the world's leading producer of newsprint and the second largest producer of wood pulp, with a logging output of more than 4,000,000 cubic feet (113,200,000m³) per year. Internationally, this expertise has been in great demand and Canadian engineers have been active in forest development studies and forest-related plants and facilities on all continents, from a \$100,000,000

integrated forest products complex in Turkey to a Java Teak development in Indonesia.

In mining and petroleum, Canadian engineers have benefited from the expertise acquired in finding and developing these natural resources which today constitute an annual output in excess of \$6,000,000,000. With investment in new installations and equipment exceeding \$1,500,000,000 annually, Canadian engineers have been instrumental in making Canada the world's largest producer of asbestos, nickel, zinc and silver. This record of success has led other countries to seek Canadian mining engineering services for projects from the 10,000 tons-per-day (9,071.8-metric tons) Cerro Verde copper complex in Peru to mineral exploration in Oman.

The power sector is also a field in which Canadian engineers excel. Their achievements range from the current work on development of the world's largest single generating plant (5,200-MW) at Churchill Falls to the detailed design for the 90-MW Maskelia Oya hydro project in Sri Lanka.

In communications, Canada's system is one of the most advanced — with three major microwave systems stretching over 3,000 miles (4,830km) and a domestic satellite system carrying communications into Canada's northern regions. The expertise gained here has resulted in Canadian engineers working on such projects as the East African microwave interconnect system and a 2,000-mile (3,381km) microwave system in Zaire.

Canada's great size has made transportation a vital factor in her economic growth. Road, water, rail and air services are all well-developed. In Canada, engineers have built more than 516,000 miles (830,760 km) of roads and streets, a rail system carrying 238,000,000 passengers a year, urban transit systems with 1,000,000,000 passenger fares annually, and a network of airports and air services carrying 13,000,000 passengers a year — 3,500,000 being carried on international routes. Canada's ports and harbours are always active, handling more than 291,000,000 tons (263,989,380 metric tons) of cargo annually.

The development of this massive transportation system has led other countries to entrust Canadian engineers with such major assignments as the Port of Tanjung Priok in Indonesia, the 373-mile (600-km) Katsina-Ala-Biu highway in Nigeria, the Ocean Congo Railway and new international airports in Jakarta, Indonesia and Rio de Janeiro, Brazil.

Canadian achievements in the



Canadian consultants have extensive experience in the management and direct supervision of drilling operations in such diverse categories as remote Arctic wildcats, offshore wells, deep wells in the highly faulted foothills of Western Canada and wells drilled for thermal recovery operations. This producing wellhead assembly is in India.



Canada is the world's largest producer of such minerals as asbestos, nickel, zinc and silver. Canadian engineers have developed an expertise in exploiting these resources whose annual output exceeds \$6,000,000,000. Such success has led other countries to seek the services of Canadian engineers — as is the case with this asbestos fiber mill built in Nordenham, West Germany.

industrial sector range from highly efficient food processing plants to such enormous projects as a \$250,000,000 continuous slab casting facility in Canada. This led to securing contracts for a \$65,000,000 cement works in Algeria, a \$40,000,000 steel mill in Britain and a \$40,000,000 glass plant in Australia.

In the municipal and buildings sector, Canadian engineers are in the forefront with new methods of construction and innovative techniques. International municipal and buildings projects in which Canadian engineers participated include: the United States Erie

County Comprehensive Health Care Center, a \$90,000,000 hospital with rooms for 750 persons; conceptual studies and engineering design of the \$1,500,000 Parque Ahembi Exhibition Hall in Sao Paulo, Brazil; Lebanon's \$7,200,000 Mount Hermon ski resort development — including feasibility studies and the preliminary design of ski lifts, mountain roads and trails and hotel facilities; and a \$300,000,000 resort development on Lantau Island, Hong Kong. This complex, in which Canadian engineers were responsible for the master plan, design and super-

(Continued on page 3)



Transportation is a field in which Canadian engineers have a great deal of expertise. The country's road, rail, water and air services are all well-developed. This clover leaf highway is an example of the more than 516,000 miles (830,760km) of roads and streets built in Canada by Canadian engineers who have also been involved in such international projects as the 373-mile (600-km) Katsina-Ala-Biu highway in Nigeria, the Ocean Congo Railway and new international airports in Jakarta, Indonesia and Rio de Janeiro, Brazil.



Canadian engineering consultants excel in the power sector. Here construction is being done on the 555-foot (169-m) high Idikki Dam in Southern India. The largest of three dams in a hydroelectric project that will produce 780,000 kilowatts of power at full capacity, the Idikki Dam is a thin, double curvature parabolic concrete arch tapering from a thickness of 25 feet (7.6m) at its crest to 75 feet (22.8m) at its base. It is 1,250 feet (381m) long.



Canadian engineering consultants are actively engaged in international forest development studies and forest-related plants and facilities. And understandably so — Canada is the world's leading producer of newsprint and the second largest producer of wood pulp. Canadian engineers were responsible for the design engineering and supervision of construction of this news/gravure/fine paper mill in Durban, South Africa.

Consultant

(Continued from page 2)

vision of construction, has full resort facilities for 25,000 persons.

With all this technological progress, Canadian engineers have not neglected environmental factors. Canada's anti-pollution legislation is as stringent as any in the world.

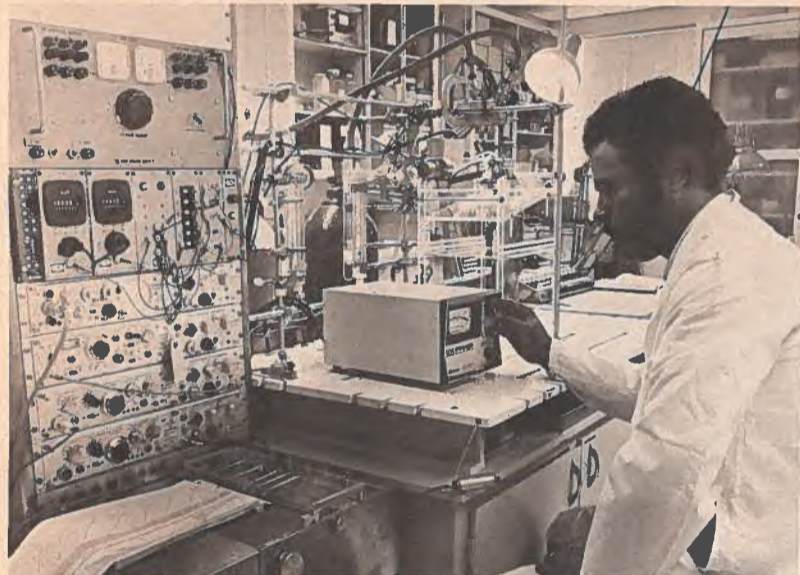
To meet the challenge of protecting the environment, Canadian consulting engineers have developed an outstanding level of expertise — ranging from detection to control for land, sea and air environments. This assures all clients of cost-effective solutions to environmental problems posed by both small and large projects.

Canada is a relatively young

country, one that is dynamic and progressive, flexible and adaptable. So too are her engineering consultants. They have proved their flexibility in meeting the peculiar needs and demands of international engineering. This, together with their specialized skills and record of engineering achievements, has earned these engineering consultants a reputation second to none.

Readers filling in the trade inquiry form on page 7 for further information on the subject of Canada's consulting engineers should quote the code number at the end of the story and indicate specific interests if possible. Code 3-1

Life sciences organization studies safety of chemicals



Measurement of the distribution of inspired air (in the monkey) by the nitrogen wash-out technique as part of the assessment of pulmonary function is just one of the activities of Bio-Research Laboratories Limited, a consulting and research organization specializing in the life sciences.

Studying the safety of natural and man-made chemicals is the work of Bio-Research Laboratories Limited, a Montreal, Quebec, consulting and research organization that specializes in the life sciences.

Established in 1965, initially to provide independent research services in toxicology and pharmacology, the company has since expanded its capabilities to include consulting and research services in microbiology, analytical chemistry, drug metabolism, environmental science and food technology.

The toxicology department is skilled at designing and conducting acute, subacute and chronic studies of the local and systematic toxicity of drugs, food ingredients, cosmetics and agricultural chemicals. This department is also able to determine the effects of chemicals on reproduction as well as their carcinogenic, mutagenic, embryotoxic and teratogenic potential. Careful attention is always given

to the requirements of the appropriate regulatory agencies in Canada, the United States and Europe.

In pharmacology, Bio-Research offers its clients a variety of options for the generation and evaluation of data on medicinal agents, providing a complete screening and testing service on such drugs.

Specific tests are available for evaluation of anti-inflammatory agents and for compounds affecting the central nervous, cardiovascular, gastro-intestinal, genito-urinary, reproductive and circulatory systems.

Screening and testing procedures can be performed in a variety of animal species from rodents to primates and both in vivo and vitro test methods are employed. Here the department has considerable expertise in utilizing the inhalation, percutaneous and implant routes of administration in addition to the more conventional routes.

Capabilities of the microbiology

Canada will be making waves at Amsterdam marine fair

The world's largest shipbuilding and marine trade fair will see nine leading Canadian companies exhibiting marine products and services that have gained an international reputation for quality, durability and performance.

The event, which attracts more than 1,500 exhibitors from more than 45 countries, is Europort '74, being held November 12 to 16, 1974 in Amsterdam, The Netherlands.

While Canadian companies have participated on an individual basis in previous fairs, this marks the first time the individual displays will be concentrated in one national Canadian exhibit.

Marine transportation has always been important to Canada. It was instrumental in the country's discovery and, ever since, has played a vital role in its development. Today, shipping along Canada's three coasts and in the St. Lawrence Seaway — a 1,500-mile (2,415-km) waterway penetrating into the heart of North America — helps to maintain Canada with one of the world's most buoyant economies.

A few years ago, Canada embarked on an ambitious ships-for-export program that has had rapid success. Vessels built under this project range from 76-foot (23.1-m) aluminum fishing craft to tankers of 80,000DWT (72,560 metric tons). Exported Canadian-made vessels now fly flags of Greece, France, Britain, Bermuda and Liberia.

Canadian marine equipment and component manufacturers are also keeping pace with the shipbuilders by providing advanced, high quality products. Much of this equipment is unique and dependable — the result of intensive Canadian research and development in the harshest of marine conditions. And, these Canadian-built items are produced at prices that make them competitive anywhere.

Among Canadian marine equip-



The 4,300hp tug, M. V. "Angus Sherwood", owned by Northern Transportation Co. Ltd., uses the highly reliable hydraulic steering systems built by Wagner Engineering Limited, Vancouver, British Columbia. The company's newest designs surpass traditional steering systems by providing simpler operations, fewer components and reduced weight. The systems also feature a patented control-valve system that gives full follow-up, electro-hydraulic steering with motion storage, automatic slack compensation and smooth acceleration and deceleration. Torque ranges from 350 pound feet (521.5kg/m) in the manual systems to 3,600,000 pound feet (1,633metric ton/m) in the electro-hydraulic systems. The systems are normally designed around a medium pressure of 1,000 pounds per square inch (70kg/cm²) which minimizes component size without reducing reliability or increasing cost. Wagner has supplied its systems to Canadian Navy Harbour tugs, to U.S. patrol and rescue vessels and to 28 other countries, including Japan, Germany and Britain. Code 3-2

ment and components used worldwide are diesel engines up to 4,500hp, boilers, propulsion control systems, propellers, shafting, steering gear, refrigeration and air conditioning systems, deck machinery, electrical and electronic communications systems and towing systems.

A cross-section of this Canadian capability will be on display at Europort '74 and company representatives and members of the Canadian Department of Industry, Trade and Commerce will be on hand to answer any questions about Canada's marine and components industry. Code 3-3

department lie in two main areas — product quality investigations and fundamental studies.

For product and quality control requirements, a full range of microbiological methods, supplemented with biochemical and serological techniques, is available. Services include microbiological assays for amino acids, determination of pathogenic and spoilage microorganisms, assessment of microbial quality of raw materials and finished products, and determination of effectiveness of processing or preservatives.

The research activities in the microbiology department have been concentrated on the development of isolation and identification methods for detection of food-borne pathogens such as Salmonella, E. coli and Staphylococcus.

To meet the need for advanced capability in analytical and clinical chemistry, Bio-Research has developed a full range of analytical and biochemical services which provide an important support function for its research in the other departments.

For instance, this department offers the pharmaceutical industry services which touch on many

facets of the development and production of high quality drugs. These include specialized investigations of drug metabolism and the tissue and cellular distribution of drugs. The department can develop methods for determining specific metabolites and assaying enzymatic activity. For tracing pathways of drug metabolism and measuring drug distribution and excretion, Bio-Research has full competence in isotopic labelling.

Bio-Research's skills and experience in food technology are available to the food processing and allied industries to supplement a client's own capabilities or provide a total testing and research program.

Bio-Research can perform the analytical determinations required for nutritional labelling of raw materials and finished products. Proximate analyses, caloric measurements, metal analyses, pesticide residue determinations, vitamin assays, nutritional evaluations, aflatoxin and other mycotoxin assays, additive studies, shelf life and storage stability determinations are typical of the testing carried on.

The environmental science de-

partment offers short term monitoring services and long term research programs into the evaluation of the impact of waste disposal on the environment.

In the water pollution field, Bio-Research offers complete analytical services, including qualitative analysis of the complex organic compounds in effluents from industries such as paper making and oil refining or from domestic sources such as sewage treatment systems.

Trace amounts of potentially harmful pollutants such as pesticides and polychlorinated biphenyls are also extracted and identified and special emphasis is given to invertebrate ecology and the effects of effluents on aquatic life.

For air pollution, Bio-Research offers the routine monitoring services that are needed to inform plant operators of the levels of particulates and noxious gases present, both inside and outside their factories, in order that health hazards may be recognized.

Bio-Research Laboratories Limited's high quality services — all of which are supervised by senior personnel — are offered to clients throughout the world. Code 3-4

quality's the thing

What's so great about Canadian leather fashions? Ask any expert and he'll tell you, quality is what. Quality of the leathers themselves, quality of styling by imaginative designers. When you marry that quality to the flexibility of Canada's manufacturing capability, you get great Canadian leather fashions in demand in world markets.

Leather has come a long way. Once purely utilitarian and practical, it has exploded on the fashion scene in all areas of styling.

Man's first clothing material, after all, was leather. Ages before he domesticated wool-bearing animals or learned to plant cotton and spin cloth, early man was skilled in the tanning and use of leather. Today chemists and tanners are teamed to produce leather with deep lasting colours, handsome textures, greater durability.

In Canada, particularly in the past 10 years, exciting and unique

finishes have been developed and Canadian designers have taken full advantage of their availability.

This year, suedes, in greater demand than ever, are available in a variety of weights and an astonishing range of colors.

The heaviest are the rugged outdoorsy split suedes which continue to be popular for both men and women's fashions. The smooth, lightweight suedes are buttery soft and supple.

Still popular are the veined suedes. These feature a tracery of veining in the leather which is smooth and not as heavy as the split suedes. They come in light shades with an attractive dapple finish. The trend to smooth, fine leathers is well established with the emphasis on nappa and the glossy gloving leathers.

Meanwhile, gaining in importance is pigskin in both grain and brushed finishes. Code 4-1



This handsome tan suede jacket comes from Crown Waterproof & Clothing Co. Code 4-2

In this group, clockwise: navy suede trench coat by Percy Lindzon Leather & Sportswear (Code 4-3); women's denim blue suede suit by J. J. Sheepskin (Code 4-4); men's denim blue suede jacket by J. J. Sheepskin (Code 4-5) and brown suede jacket with belt by J. J. Sheepskin (Code 4-6) and finally the soft suede tan suit, also by J. J. Sheepskin (Code 4-7).



The peat calf coat with bleached raccoon collar is made by Rajac Leather & Sportswear (Code 4-8); man's light tan leather coat is from Aljac Sportswear Ltd. (Code 4-9); suede suit with opossum collar, by Percy Lindzon Leather & Sportswear (Code 4-10).



This brown leather short jacket comes from Aljac Sportswear Ltd. (Code 4-11).

fit for a queen



Who knows? No fur, perhaps no Canada. Certainly during most of Canada's history the fur industry has been a major factor in the country's development.

Today, Canada's wild fur harvest is carefully controlled to maintain supplies which, together with ranched fur harvests, feed a giant industry. In fur garments alone, Canadian exports yield in the region of \$30,000,000 each year.

The reasons for such a high demand in world markets are not hard to find: quality, workmanship, design. These elements attract international buyers in large numbers to Canada during the spring buying season and of course Canadian exporters display their fabulous wares at international fur fairs in other countries.

Canadian furriers are rightly proud of the skilled workmanship that distinguishes their garments — and pleased that this is recognized by people around the world from the most glamorous of titled heads to the working Ms. When the lovely Queen Alia of Jordan recently visited Ottawa — the Canadian capital — what did she shop for? A fur coat of course.

While leading fur fashion houses report that Canada Majestic Mink is still the front runner, other top-rated furs for this year are wild and ranched fox, lynx, wolf, raccoon and muskrat. Connoisseur Canadian furs like beaver, otter and fisher are also in evidence and soft, fluffy opossum still rates high both for its economy and youthful fun-fur look. Code 5-1

The Quebec Preserve Beaver, sheared and "Phantom Blend" is by Louis Zamanchek for Leclair Fourrures (Code 5-3). Otter-dyed champagne muskrat from Elgin Furs (Code 5-4).



Canadian red and white fox, in alternating bands, from Fabulous Furs (Code 5-2).

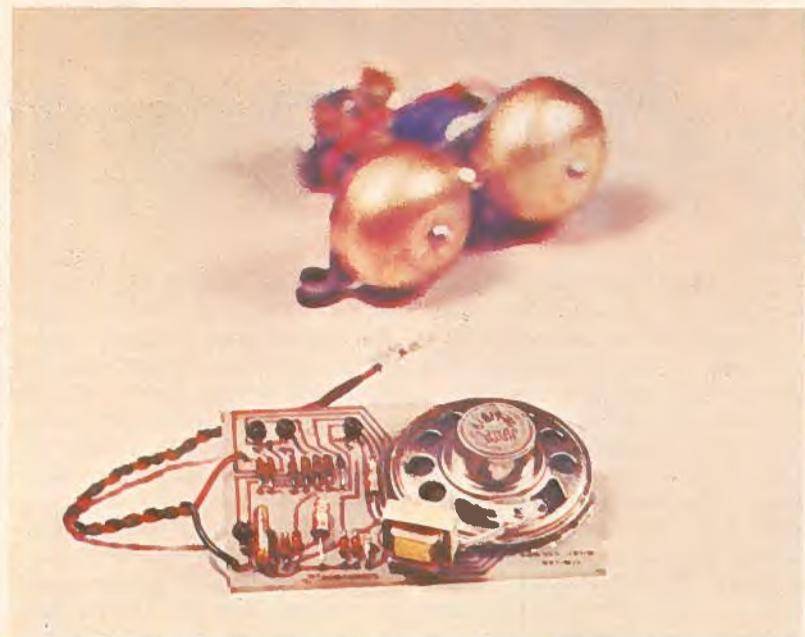
Canadian lynx by Robert Bernard for Amsel & Amsel Inc. (Code 5-5).



Classic Canada Majestic Mink — demi-buff — is by Dita Martin for Natural Furs (Code 5-6).



Warning system is cheap, effective



A low cost, effective, unique public address system has been devised by an Ottawa, Ontario, electronics company.

Mitel Canada Limited's Mitone signalling system allows the broadcasting of emergency warnings or messages through an ordinary telephone without lifting the receiver.

The basic device is a two-by-three-inch (5-by-8-cm) mounted electronic circuit and speaker that is inserted in place of the ordinary telephone bell. This is activated by a central public address device connected at the central telephone exchange. (If the system were installed in a highrise building, it could be activated by a central public address device connected at the telephone junction box in the basement of the building.)

No additional wiring or switching equipment is needed.

This unit reproduces any signal originating from the switching office. This means it can provide tone ringing sounds as well as public address announcements. The unit is directly interchangeable with the telephone bell, so that bells and Mitone units can be mixed in the same system.

It is fully compatible with existing telephone systems using standard ringing voltages of 90Vrms.

The Mitone system is extremely versatile. In a hotel, for example, announcements can be made to single rooms, blocks of rooms or all rooms simultaneously. As well, ringing loudness can be automatically reduced at night and message waiting lamps can be replaced

by special tones or pre-recorded messages.

The audio unit is silent and draws negligible power until accessed by a pilot signal when it draws power via the telephone line. The unit uses no batteries or hydro power and is thus reliable and unaffected by hydro power cuts.

Despite the added features offered by the system, Mitel projects a lower total installed cost for its system than for the standard ringing system using the bell.

For those who worry about telephone eavesdropping, the company says the system permits only one-way broadcasting from a central telephone exchange through various telephones hooked to the system. No one can listen in on conversations. Code 6-1

When the going is rough . . .

No terrain is too tough for the Hover Jak HJ15 air trailer manufactured by Hover Jak Limited, Richmond Hill, Ontario. A non-selfpropelled air cushion platform, the HJ15 is designed to carry a payload while being propelled by helicopters, muskeg crawlers or cables. It works in mud flats, swamps and areas where it is impossible or uneconomical for conventional vehicles to operate. The HJ15 can carry payloads in the order of 15 tons (13.5 metric tons) at foot print pressures of less than one half pound per square inch (0.035kg/cm²), thereby causing little or no ecological damage. Hover Jak vehicles are of standard modular construction and use diesel engines and large commercial fans. They feature a simple mini-cell skirt suspension system which has fail-safe capabilities and is good for ditch crossing and obstacle passing.

The vehicles can be adapted to carry specialized equipment or linked to work in multiples to increase load capabilities. Their amphibious nature and built-in buoyancy, which keep the vehicle afloat even when the engine is turned down, enable them to be used in a ship-to-shore

operation in remote areas. Hover Jak Limited also designs and manufactures the HJ105, a self-propelled half-ton (0.453-metric-ton) payload utility air cushion vehicle; the HJ250 for logging operations, and air cushion assist equipment to standard tractor trailers. Code 6-3



A case for keys



Keys to car, home or office are seldom lost or misplaced when carried in the plastic-laminated Key Kard manufactured by Quest Enterprises, Ancaster, Ontario. Designed to hold up to four keys, Key Kard is the same size and shape as a credit card and fits a wallet, purse or billfold. It is available in a set of two or in a master carton of 250 cards. Code 6-2

Design of distinction



Passers-by take notice when this truck makes an appearance — and that's because of its eye-catching design, the work of the internationally recognized design and consulting firm of Stewart & Morrison Limited, Toronto, Ontario. The truck's corporate identification and related packing designs were done for Waltner KG, a well-known meat packing firm located in Cologne, Germany. Stewart & Morrison, which offers a complete marketing design and consulting service — including industrial product design, packaging and exhibition design — has had an office in London, England, for the past three years. It has been involved with a broad cross section of European consumer, industrial and service companies that are engaged in the manufacture or distribution of a wide range of products. Stewart & Morrison has designed bottle shapes, labelling and gift packs for Ireland's largest distillery firm, Irish Distillers Limited, and is currently providing marketing and design counsel to Canada's Olympic Coin program. Other projects assigned to the Toronto firm include the design of aircraft livery for Air Jamaica, one of the world's newest airlines; the design of candy packages for Laura Secord Company; and the package design for Cana, an international line of foods marketed by Canada Packers. Code 6-4

Stepping unit steps up corrections

Correcting errors in punched paper tapes is a simple task for teletype operators who use this OS-33 Stepping Unit designed and manufactured by K. O. Mair Associates Limited, Ottawa, Ontario. Without the Stepping Unit, corrections are difficult to make because the reader of the teletype steps the tape along automatically at a speed determined by the particular model in operation. The result is that when the user tries to operate the reader switch "on" and "off" quickly enough to cause only

one character to be read, he usually finds that two or more characters have been stepped through. The OS-33, used with Models 32 and 33 ASR Teletype communications equipment, is the solution to this problem, allowing the operator to step a teletype reader character by character or one step at a time. Established in 1970, K. O. Mair Associates has become a major supplier of special design engineering services and a third party servicer of computer peripheral equipment. Code 6-5



Versatile grilles decorative too

Colorful, decorative and secure are the sliding and rolling grilles designed and manufactured by Dynaflair Corporation Ltd., Pointe Claire, Quebec.

The Canadian-made grilles, many of which have been patented in Canada, the United States and Europe, have a wide range of applications — storefront entrances, shopping malls, hotels, banks, schools, restaurants and recreational areas.

Dynaflair's Centurion grille, available in a variety of models and color patterns, is the company's fastest-selling sliding grille. It is easy to install and service, requires no headroom and, since no floor tracks are necessary, it can be easily removed and installed elsewhere.

The Centurion has the ability to go around curves — offering the designer and architect a wide range of design possibilities — and can turn in any radius greater than 10 inches (25.4cm). It is constructed of aluminum sections three inches

(7.6cm) wide by 0.062 inches (0.15cm) thick. The hollows incorporate 5/16-inch (0.79-cm) diameter rods on 2½-inch (6.3-cm) centers. Fastenings are concealed and cylinder locks are operable from both sides.

The Centurion sliding grille works well in small openings but is much better suited to areas that are 18 feet (5.5m) or more in width. Superior to sliding glass doors, the Centurion eliminates the hazards of glass, allows complete air circulation and requires little cleaning.

A new development in sliding grilles — combining the best features of grilles and glass doors — is Dynaflair's Elegance models. Made of Lexan polycarbonate panels, the Elegance is fire resistant and virtually indestructible, having an impact resistance 250 times that of safety glass.

The Lexan panels, which maintain the clarity of glass, are five inches (12.7cm) wide and fitted into tubular extruded aluminum

sections, providing a grille that is tough, pure in design and easy to operate.

Dynaflair's rolling grilles are available in a variety of models and color patterns, including Legionnaire 2, Debonaire, Sentinel and Dynaplex. The Legionnaire 2, which offers the ultimate in vision and ventilation, is the company's most economical rolling grille.

With a simple and slim-line appearance, the Legionnaire 2 has a grille curtain constructed of ¼ by ¾ by 3¼-inch (0.307 by 1.58 by 7.93-cm) flat vertical links. These are connected to 5/16-inch (0.79-cm) diameter aluminum round bars covered by ½-inch (1.27-cm) aluminum tubes 12 inches (30.4-cm) long.

All Dynaflair grilles are custom made to specification. The company has a licensee in the United States and seeks international export markets or licensing arrangements. Code 7-1



The Centurion sliding grille by Dynaflair Corporation makes a colorful and secure enclosure for display areas while at the same time allowing complete air circulation. A variety of colors is available in painted or anodized finishes.

Keen observation



From the 57th floor an observer views the City of Toronto through this 30 magnification observation gallery telescope designed by Bredberg Optical & Scientific of Markham, Ontario. The styling, optical system and user-adjustable height lever make it one of the world's most advanced observation gallery telescopes. Two separate optical trains, one for each eye, preserve the three dimensional aspect of normal vision — even at night when it is possible to decipher car license plate numbers a mile (1.61km) or more away. The telescope also features a mechanism which yields — in only two seconds — a focus range of from 110 feet (33.5m) to infinity. The highly reliable unit can be re-styled to meet the need of practically any observation gallery. For instance, the Bredberg telescopes to be used in the John Hancock Building in Boston, Massachusetts, will be of circular shape to match the building's decor. And they will be suspended from the ceiling to reduce installation costs and provide additional column-free floor space. Bredberg Optical & Scientific, whose forte is telescopes, optics and specialty systems, is also noted for its six and 12-inch (15.2 and 30.4-cm) aperture Reflector telescopes for the hobby and school market. Code 7-2

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