

SUMMER 1990

INNOVATION

BUSINESS OPPORTUNITIES

THE SKY'S THE LIMIT

LEBLANC & ROYLE

BITA

FRE COMPOSITES

NOVOPHARM

PERCEPTECH

CAN-ENG



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INNOVATION

This magazine is open to ideas from readers. Business opportunity items from Canadian companies or individuals are welcome. Contact: Innovation; Technology Transfer Service; Technology Liaison Directorate; Industry, Science and Technology Canada; 235 Queen Street; OTTAWA, Ont. K1A 0H5; Tel.: (613) 954-3458.

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Également publié en français

Editorial

INDUSTRY, SCIENCE
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SEP 26 1990

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What does it take to succeed in both domestic *and* international markets? What motivates non-profit organizations to come to the aid of inventors, researchers and industry? How big a role does R&D play in global market success?

In an attempt to answer questions like these, this issue of *Innovation* highlights a wide range of fields, including advanced materials, ophthalmology, industrial heat treating and telecommunications.

In the Saguenay/Lac St-Jean region of Quebec, a non-profit organization named BITA (Bureau d'innovation technologique et administrative) is bringing inventors and industry together to encourage economic growth and diversification. The organization was established as a result of declining employment opportunities in local resource industries.

Filament winding is just one of many advanced processes used by FRE Composites of St-André, Quebec, to meet the extremely demanding requirements of defence, aerospace, electrical and telecommunications industries in Canada, the U.S. and around the world. In addition to manufacturing, FRE is heavily involved in R&D. The company can tailor its products to customers' exact specifications or produce designs based on an initial concept.

Can-Eng is another company that counts on R&D to excel in its field — designing and manufacturing industrial furnaces. The company has found that it must accord a priority to technological development in order to satisfy the needs of clients in Japan, Brazil, the Republic of Korea, Taiwan, China and Mexico, without forgetting the U.S., where almost half its products are sold.

Thanks to two researchers at the University of Calgary, vision testing has been greatly simplified. Drs. Kimron Shapiro and Jane Raymond have developed software for computerized vision testing that has proven more accurate and faster than the traditional method in clinical trials.

LeBlanc & Royle owes much of its success to the complete range of services it offers in Canada, the U.S. and around the world. The company — which specializes in the design, construction, installation and maintenance of communications towers — recently placed among the top 100 privately owned businesses in Canada. Its president estimates its domestic market share at about 50 percent.

In terms of prescriptions dispensed, Novopharm is Canada's leading generic drug company. It has annual sales of over \$100 million, 10 percent of which represents exports. This success is attributed to the company's emphasis on quality at a reasonable cost to consumers.

Finally, Canadian businesses interested in forging links with Japan will be pleased to discover what JETRO, the Japanese External Trade Office, can do for them.

We at Industry, Science and Technology Canada hope that business readers will find the success stories in this issue of *Innovation* interesting and inspiring.

Bringing Ideas to Market

Bringing inventors and industry together to stimulate economic growth and diversification — that's the raison d'être of the Bureau d'innovation technologique et administrative (BITA).

By helping to bring commercial success to local, innovative ideas, BITA is encouraging the emergence and growth of small and medium-sized businesses in the Saguenay/Lac St-Jean region. A non-profit organization, BITA is located at the Université du Québec à Chicoutimi. Its board of directors includes representatives from the university, the four CEGEPs (community colleges) in the region, industrialists and other members of the business community.

BITA has been very active in the community since it officially opened its doors in January 1990:

- providing information and management services;
- linking colleges, universities, research facilities and the business community;
- financing feasibility studies;
- providing marketing advice and support;
- informing clients of the research subsidies available to them;
- providing financial advice; and
- promoting research and development in small and medium-sized businesses.

Pierre Bouchard is an industrialist who has been involved with BITA since the start. He says the concept grew out of a question that is central to the future prosperity of the Saguenay/Lac St-Jean region: "How is the region going to survive the onslaught of new technologies? The large industries are saying that the traditional employment in the paper and aluminum factories will at best stay at current levels and at worst will decline by thousands of jobs. The community must work together to find the tools required to encourage technology transfer."

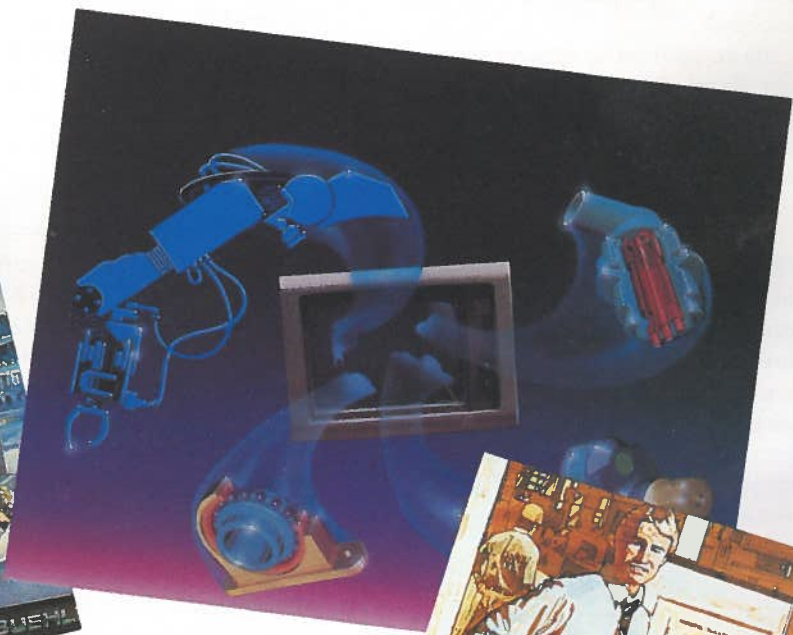
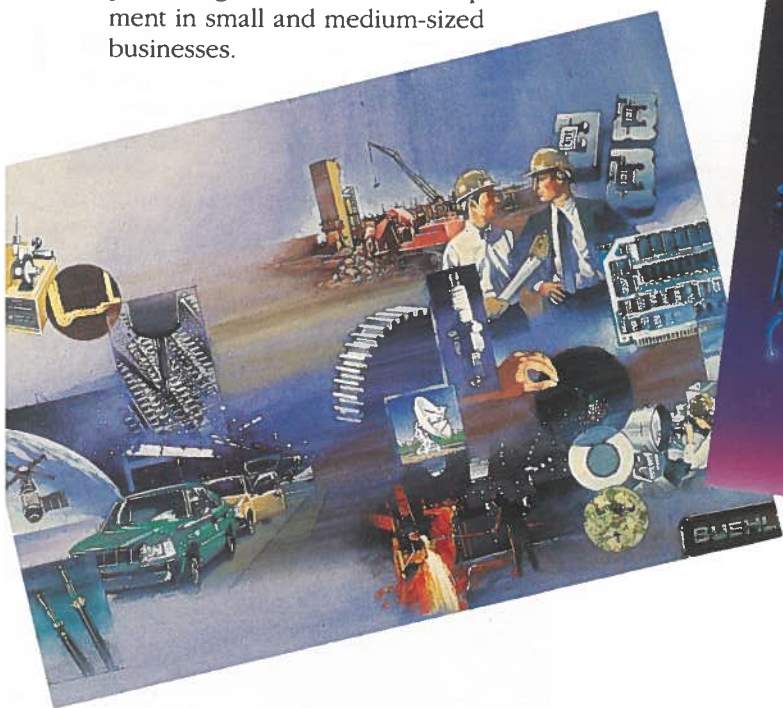
BITA encourages the transfer of knowledge and technology out of the laboratory and into the hands of local entrepreneurs. It provides both technical and marketing assistance to further promising projects. To date, the organization has received twenty proposals; of these, seven or eight are still being reviewed and three or four have been accepted.

According to BITA's Director, Roger Thifault, many good ideas that originate in a college or university — or in a laboratory anywhere — die before they have been properly analyzed in terms of market potential. Identifying innovators with ideas that have commercial potential is one aspect of the organization's mandate.

The Inventor

Louis-Marie Lalancette is an inventor who is presently using BITA's services. He began experimenting with circular fishing traps about 20 years ago. After about 10 years of research, both in the laboratory and in the field, he concluded that by using an ellipsoid trap, rather than the conventional type currently used by the fishing industry, the catch would increase tenfold. Experiments carried out by the Quebec ministry responsible for fishing and by other institutions support his conclusion.

He says that prior to his introduction to BITA, he had not seriously considered commercialization. His invention had been on hold for five or six years. Now, with financial support from BITA, two similar organizations (Centre des innovations de Montréal and Centre de recherche industrielle du Québec) are determining the commercial viability of the trap by assessing it against over 30 criteria.



This assessment will give Mr. Lalancette a good idea of whether his invention is likely to be profitable. "If the feedback is positive, I think many companies will be ready to invest without reservation and with full knowledge of the facts. In this sense, BITA is marvellous. Next, I would like to place my invention in the hands of a company that will try to sell it around the world."

BITA serves as a link between an individual with a promising idea and the businessperson with the ability to turn the idea into profits. As BITA economist Gilles Bergeron puts it: "It is not just the idea that counts. It is also the production and the marketing. The process involves many important players who must work together for the innovation to be a success."

"BITA's role, as we conceive it, is to establish harmonious relationships among inventors and innovators, researchers who can assist in the definition of prototypes, representatives of manufacturing firms, engineers and marketing specialists."

Mr. Lalancette says that BITA knows where to find the resources required to advance each particular project. "It is much easier for BITA to facilitate joint ventures among interested parties, to access competent professionals, and to knock on the right doors."

The Industrialist

Mr. Bouchard is one of the industrialists who has benefited from BITA's expert assistance. "Our company had an idea that had fallen by the wayside because we didn't have the resources to develop it on our own. BITA put us in touch with professors at the university who are now carrying out the research for us, developing a thermal sensor that tests building insulation, furnaces and other high temperature systems to determine the extent of energy loss."

"The professors, a consultant and a graduate student have worked on this project for several months, relying on the university's equipment and facilities. Research that is conducted in the educational milieu is not expensive for us. The infrastructure has already been paid for by the governments. We have only marginal costs. With a small investment, we get the maximum return."

According to Mr. Bouchard, many small and medium-sized businesses are not taking advantage of programs that are designed for their use, such as the National Research Council's Industrial Research Assistance Program, the varied programs and services of Industry, Science and Technology Canada, as well as summer student programs. "Two students, supervised by their professors, will work on one of our projects this summer. A provincial student program finances a large part of their salaries."

Mr. Bergeron explains BITA's guiding philosophy. He says that at the same moment an innovation is conceived, a contact should be made with a company that may be interested in producing and marketing that particular innovation. "More and more, the most interesting innovations are those where the developer is trying to solve a client's problem. If we are successful in teaching innovators to involve their clients from the start of the innovation process, we will have products and services that have a much better chance of succeeding in the marketplace."

Adam Lapointe, a local businessman who is president and director general of SOCCRENT, a business development organization, underlines the importance of a closer link between the research conducted in laboratories and the activities of the business community. "BITA encourages a more concerted effort, similar to what one would find in the research and development divisions of large corporations. They form teams

of people concerned with commercialization and people concerned with technical development. At various stages, they make strategic choices, and in the end, they have a product that responds to their overall business objectives and their needs."

For most members of the board of directors, BITA is still a modest venture that is just beginning to respond to the region's need for economic diversification. The organization focuses on small projects that do not require extensive financial support and that should show positive results in the medium term.

At the same time, those associated with BITA have high hopes for its future because there is an obvious need for the services it provides. "We believe that innovation will be one of the key variables in the next few years," says Mr. Bergeron, "and that each region must learn to be innovative and to work together to find success in the marketplace."

Mr. Thifault concludes that "the support this initiative has received proves once again that the Saguenay/Lac St-Jean region is dynamic and chooses to steer its own destiny."

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FRE Composites

A Composite Sketch

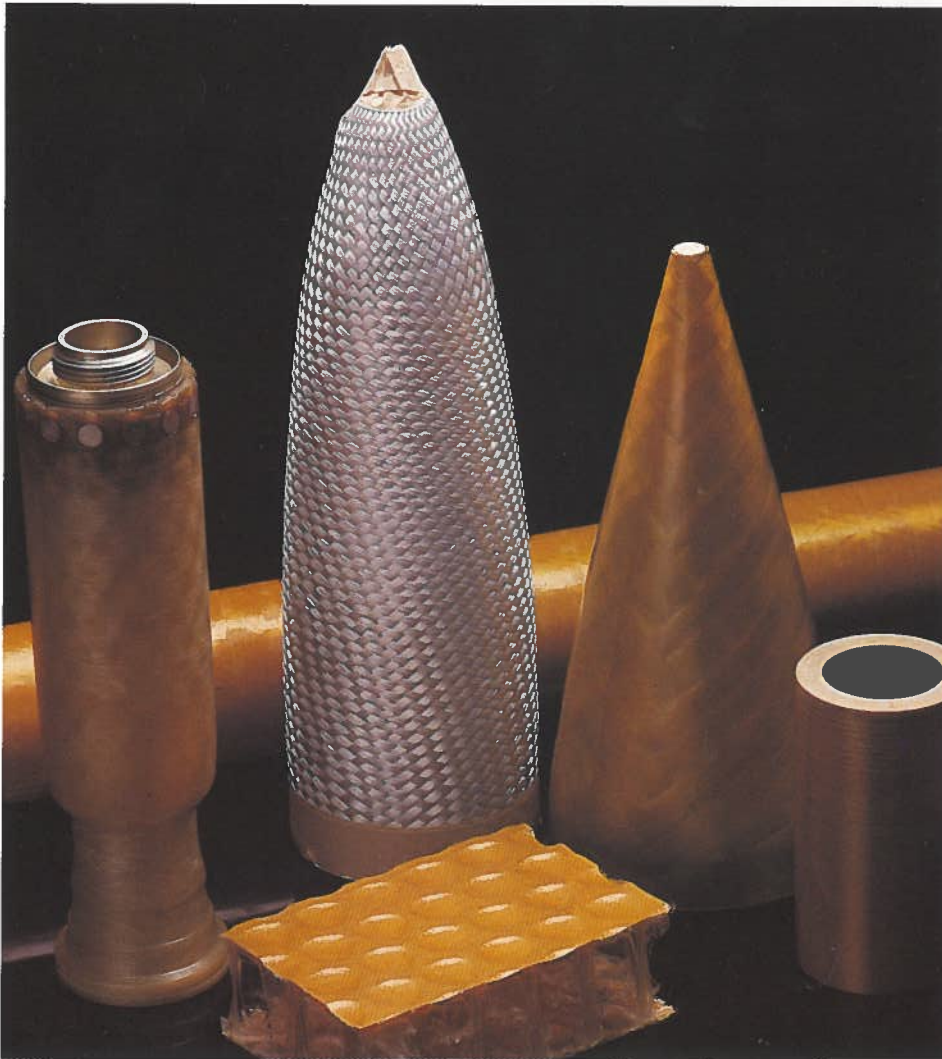
Highly qualified staff keeps company in forefront of composite materials technology.

If someone told you of a company with about 100 employees, that in itself might not interest you. If they went on to say that a third of them are engineers — three or four with a PhD and a half dozen with a Masters — you would probably sit up and take note. By the time they mentioned the company's role in the Canadarm, chances are you'd be all ears.

The company is FRE Composites, and it produces the casing for the components of the Canadarm. This high tech masterpiece, an integral part of American space shuttles, is one of Canada's best known technological achievements. Its many capabilities include grabbing, docking, loading and unloading, and moving payloads around an orbiting space station.

The casing for the Canadarm's components is made from the composite material that gives the company the name FRE, fibre-reinforced epoxy.

Specialized military composite components.



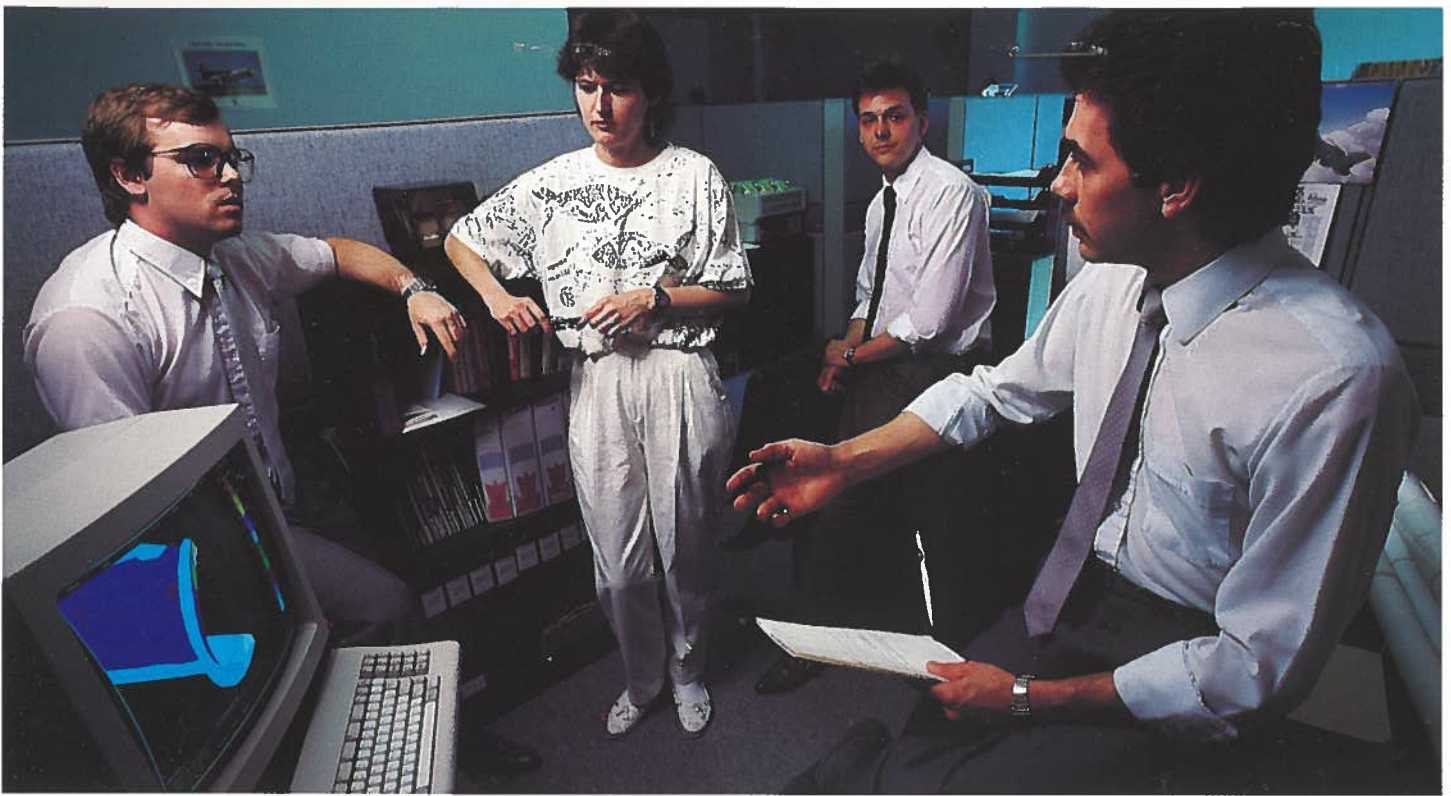
Composites are a category of advanced materials, which are designed to meet specific high performance criteria. Each composite material embeds fibres in a matrix of another material. Varying the type of matrix and fibre, length of fibres, and arrangement of them in the matrix gives each material properties designed to suit its particular use.

Glass is probably the most common of the fibres used in composites. However, FRE "does not deal just in fibreglass," says Claude Demers, a part-owner and director of operations. "We also use carbon fibre, Kevlar fibre...." The company also uses a variety of resin systems, including thermoplastics, polyester and epoxy.

FRE specializes in composites that use a matrix of epoxy, a highly durable synthetic resin. Like all composites, fibre-reinforced epoxy has an extremely high strength-to-weight ratio. Lightness is important to the fuel efficiency of spacecraft, and strength is essential to withstanding the tremendous stress associated with launching. Another key feature of fibre-reinforced epoxy and many composites is that they can endure the extremes of temperature in space.

These properties and others are undoubtedly critical to all of the products FRE has manufactured, including launch tubes for light assault weapons; airframes; tubes enclosing high voltage breakers; underground pipes, supports and other equipment; and high pressure conduits for underground and underwater electrical and telecommunications cables. FRE can tailor its products to meet the exact specifications of customers or design from start to finish based on the customer's initial concept.

Since the company's customers include industrial giants like General Dynamics, Spar Aerospace, Bell Telephone and Oerlikon, some of its products are manufactured on a very large scale. FRE has produced 3 million launching tubes for anti-tank rockets, or M-72s, to use the military designation. In addition, it is the only North American supplier of launching tubes for the Stinger weapons system.



Despite the volume of production, very high standards are imposed, and quality assurance is vital. Accordingly, products are subjected to a series of torture tests designed to reveal any imperfections. They undergo stretch, compression, sheer strength and fatigue testing. Penetrating gamma rays uncover even the most minute flaws.

Composite components produced by FRE must meet a wide range of standards and specifications: Military Standards, Underwriters Laboratories, the Canadian Standards Association, the National Electrical Manufacturers Association, the American Petroleum Institute, and the American Society for Testing and Materials.

The company now known as FRE was for many years a division of General Electric, and its main facility in St-André Est, Quebec, has been operating since 1956. It was originally established to produce fibreglass radar domes.

In the late 1960s, the focus shifted to developing the technology for filament winding, a process whereby continuous fibre strands are braided and glued together for use in composites. In the early 1970s, the engineers at St-André combined the filament-winding machine with a computer to automate the production process. Today, all production lines are fully automated.

A team of General Electric managers purchased their company's composites business in April 1988 and gave it the name it bears today. FRE is now Canada's largest producer of filament-wound products.

The company is still based in St-André, where about 85 employees are engaged in research and development (R&D) and manufacturing. Another

10 employees are engaged solely in production in Lakewood, New Jersey. In Edmonton, 6 or 7 more employees are involved in R&D. FRE's president and its vice-president of finance and marketing have offices in Ottawa.

Without giving away any trade secrets, it is safe to say that FRE owes its success and vitality to the experience and stability of its work force: the two go hand-in-hand. That is what enables the company to handle complete projects, from initial product design right through to production. The ability to handle complex projects is enhanced by computer-aided manufacturing, an integrated manufacturing management system and project management software.

Mr. Demers says FRE expects to do \$20 million worth of business this year — about half going to the United States, with the remainder divided more or less equally between customers in Canada and the rest of the world.

Using state-of-the-art materials, under the strict control of highly advanced sensors, FRE meets the highly demanding standards of defence, aerospace, electrical and telecommunications industries. The company has come of age, and as the 21st century draws nearer, the demand for its products and services will surely increase.

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FRE employees conferring at the St-André office.

Prescription for Success: Top Quality at a Reasonable Cost

A Scarborough firm's commitment to providing top quality products at reasonable prices has made it number one among Canadian generic drug companies in terms of prescriptions dispensed.

Novopharm Ltd. has been ably guided to the top spot by Leslie L. Dan, its founder, president and owner. Mr. Dan's pharmacy training followed by an MBA gave him the expertise to build this specialized company, and ability and determination did the rest.

His company has worked hard to inform health care professionals, from neighbourhood pharmacists to those practising in hospitals, about the range of products offered and to establish good working relationships with them. "Producing high quality products which are recognized by the profession has been the key to success," he says.

Mrs. Brenda Drinkwater, the company's vice-president, agrees that the emphasis on quality pays off. While Health and Welfare Canada establishes standards of compliance for products marketed in Canada, manufacturers are free to impose additional standards. "Novopharm's international presence has made it necessary to meet the regulatory standards of many nations," she says.

With its subsidiary companies, Novopharm employs close to 800 people. It has annual sales in excess of \$100 million, 10 percent of which represents exports. "Our products are very widely distributed and well accepted," explains the founder of the 25-year-old company. Novopharm products are exported to Europe, the Middle East, the Caribbean, Central America and the Pacific Rim. Outside of Canada, the U.S. represents the largest single market.

Novopharm expanded earlier this year, bringing its total manufacturing space to over 4 600 m². The new facilities include corporate offices, a packaging area, quality control laboratories and a distribution centre. Regional warehouses are located in Montreal, Winnipeg, Calgary and Vancouver. A subsidiary, Novopharm, Inc., was established in Chicago in 1987.

The company's products include tablets, capsules, suspensions, ointments, creams and liquids. It manufactures in excess of 2.5 billion tablets and capsules per year. While Novopharm's greatest strength is in antibiotics, it continues to launch major new generic products in all therapeutic categories.

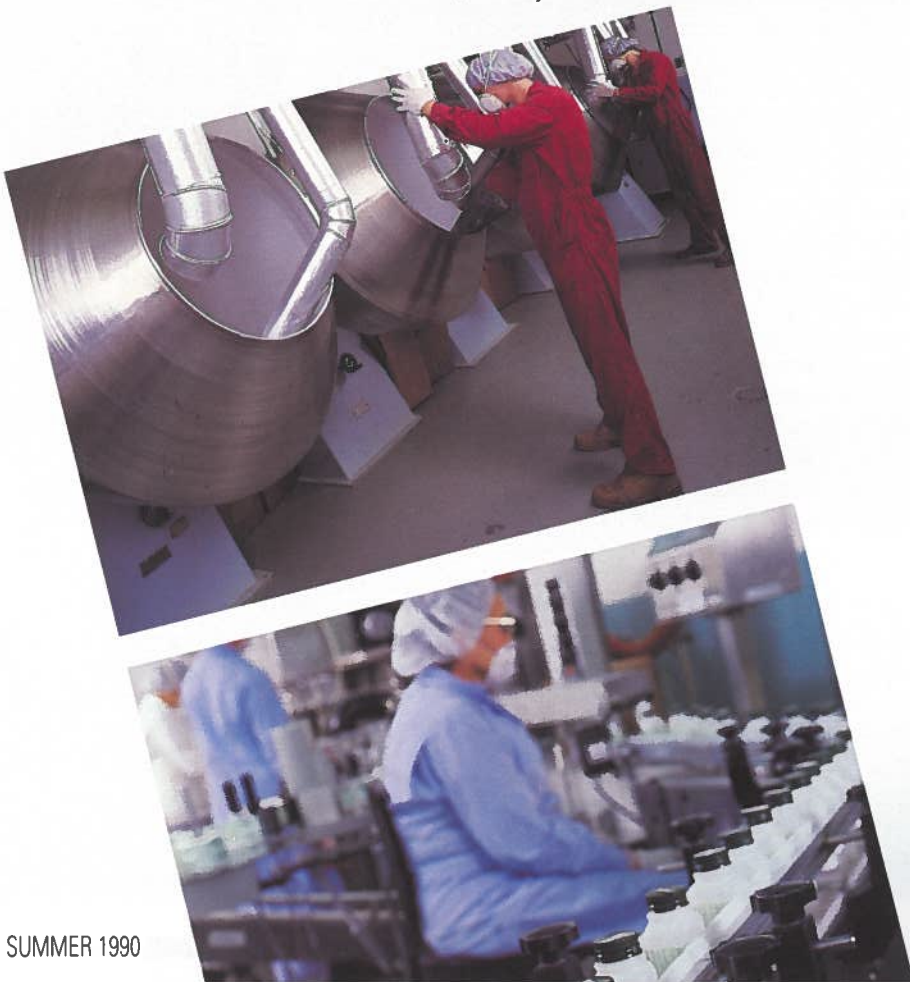
Drugs available to consumers can be the innovator's brand name drug, sometimes protected by patent, or the branded generic or generic variety. In each case, however, the chemical structure of the active ingredients is the same.

Initially, a company invests in research, and develops and tests a drug which is then marketed under a trade name. The brand is granted a period of marketplace monopoly ranging from seven to ten years. After that time, a generic company can market it under a compulsory licence, with a royalty paid to the brand name company or without royalty if the patent has expired. Generic products offer a competitively priced alternative to corresponding brand name products.

Branded generics are those that identify the manufacturing pharmaceutical company in their product name, such as Novamoxin, Novopharm's brand of the antibiotic amoxicillin. Because of the company's stature in the marketplace, these generics are dispensed with confidence.

Top:
Tablet-coaters working at
sugar-coating pans.

Bottom:
This continuous-processing
powder suspension line
handles up to 3 600 bottles
per hour.





This MG capsulating machine can produce up to 100 000 capsules per hour.

Other keys to the company's success are its ability to identify and quickly develop for market proven products whose trade mark has lapsed and to its emphasis on using the very best technologies available. "Novopharm has very sophisticated and extensive quality control laboratories and research facilities," says Mr. Dan.

State-of-the-art laboratory equipment is used to analyze raw materials, work in process and finished products. High pressure liquid chromatographs, ultraviolet and infra-red spectrophotometers, particle size analyzers and polarographs are among the instruments used.

On the production side, high speed manufacturing and packaging technologies make the facility "efficient and up-to-date," says Mr. Dan. Manufacturing equipment includes fully automatic high speed tablet presses; high speed automatic capsule-filling equipment; modern film and sugar-coating facilities with side-vented pans and automatic spray systems; and high speed packaging and labelling lines.

Novopharm has garnered enough business volume to support development of innovative products. The company is now involved in the basic research required to develop new drugs.

"Innovation can cover many aspects of drug development, from new delivery systems and new uses for existing medications to new chemical entities," says Mrs. Drinkwater. "The most profitable innovations are generally those that lead to therapeutic breakthroughs."

Between 1969 and 1987, companies had the right to obtain a compulsory licence to copy patented drugs as soon as a patent was granted. In practice, the patent-holding company had several years of exclusivity because of the time it took to develop the generic product, market it and gear up production.

This changed in December of 1987, when Bill C-22 gave companies that develop drugs fixed periods of market exclusivity. The exclusive right to market a drug free from generic competition is provided for seven years against the use of licences to manufacture and ten years against the use of licences to import the medicine. All periods of exclusivity are effective from the date of the first Notice of Compliance certifying that the drug meets the safety and efficacy requirements of the *Food and Drug Act*.

Mrs. Drinkwater does not expect the Canada-U.S. Free Trade Agreement (FTA) to have a major effect on the pharmaceutical industry. The principal element of the FTA affecting the industry is the elimination of tariffs over five years for the majority of active ingredients and ten years for finished dosage products.

According to a 1988 profile of the pharmaceuticals and medicines industry carried out by Industry, Science and Technology Canada, the FTA is only expected to have a modest impact on competitiveness, given the extensive degree of government regulation in Canada and elsewhere.

One of Novopharm's most interesting corporate policies is aimed at helping individuals in need. Mr. Dan explains: "Our corporate policy is to send large amounts of medicine free of charge to Third World countries, to be distributed through charitable organizations by visiting doctors and nurses."

He says he began to do this five years ago because "there was a need for it." This aid is carried out through the Canadian Medicine Aid Programme (CAN-MAP), an independent organization initiated by Novopharm. It is supported by Canadian pharmaceutical companies, physicians and pharmacists.

Medicine is supplied to 35 countries, including Armenia, Bolivia, Ethiopia, the Sudan, Jamaica and Pakistan. Many people in these countries suffer from tropical diseases, and stomach ailments are a common complaint.

A recent CAN-MAP newsletter states that the lack of essential drugs is a situation which "should not be tolerated.... In the spirit of social equality and justice, we as health professionals can make a great contribution towards realizing the World Health Organization's goal of 'health for all by the year 2000.'"

Meanwhile, in his Scarborough plant, Mr. Dan guides Novopharm along a path that provides consumers with high quality products at competitive prices.

And the future? "The future lies in more innovation."

Contact:

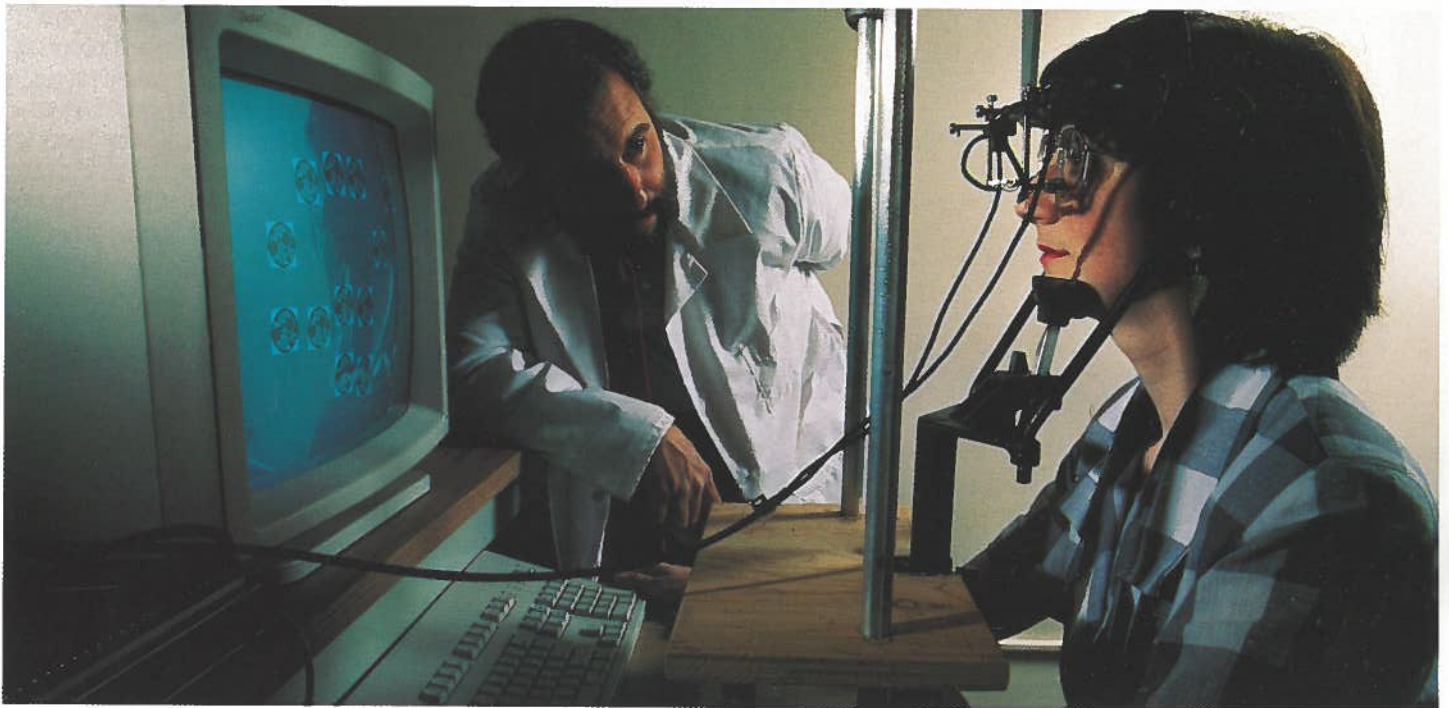
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PERCEPTECH:

Vision-Testing Software Looks Good

Calgary research scientists Dr. Kimron Shapiro and Dr. Jane Raymond have brought vision testing into the electronic age. Their computer software — PERCEPTECH — does the work of the eye chart used for vision testing for more than a century, providing the same information in less than half the time and with greater accuracy.



Drs. Kimron Shapiro and Jane Raymond working in their lab.

Where most vision testing is concerned, little has changed since 1862, when Dutch ophthalmologist Herman Snellen developed a system familiar to generations of patients as the wall chart with the large E at the top and descending rows of smaller and smaller letters.

A century and a quarter later, Snellen's test for visual acuity — the ability of the eyes to resolve fine detail — is still the starting point for virtually all vision testing. It is used daily to screen applicants for driver's licences, to determine workers' compensation eligibility or legal blindness, and, most important, to determine whether any patient needs lenses to correct normal vision problems. The test is used by public health nurses in public schools, by ophthalmologists as part of complete

vision assessment, and by optometrists and dispensing opticians for prescribing corrective lenses.

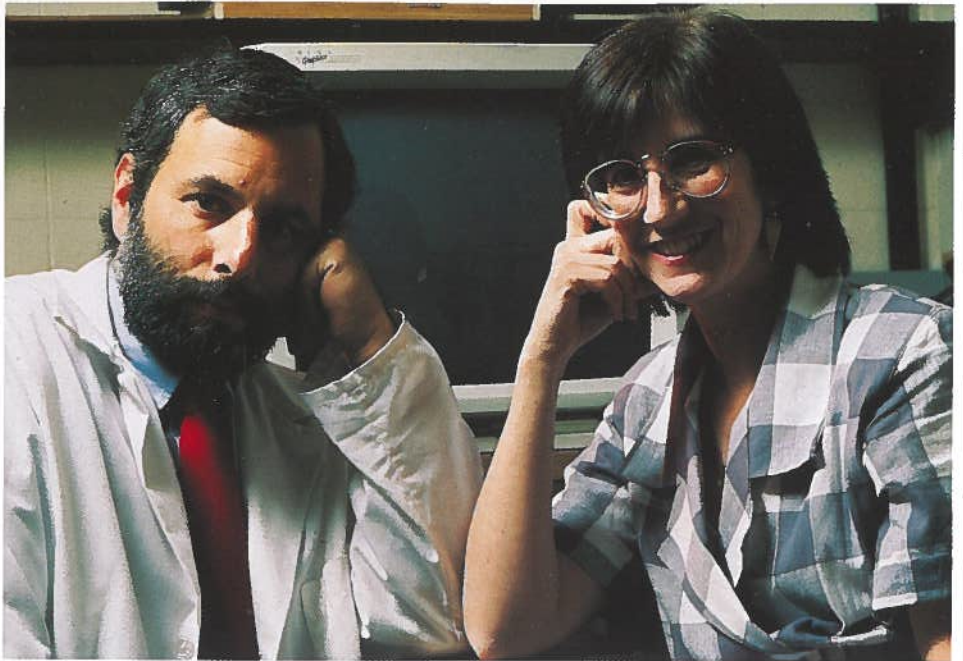
If you ever had your eyes tested, you know how the standard test works. You identify letters on a chart, or projected onto a wall. From the big E at the top of the chart to the smallest letters at the bottom, the smaller the letters you can see from a given distance, the better your visual acuity is said to be. The test is usually done with the patient 20 feet from the chart, since that is "optical infinity." (Since the imperial measure of 20 feet is an international standard in vision testing, this article does not use metric measures.) At that distance, the eyes are focused for far vision, i.e., from 20 feet to infinity.

While the traditional method has clearly stood the test of time, it has inherent problems. Administering the test is tedious and time-consuming, and requires highly trained, expensive personnel. Patients, especially children, may find it hard to concentrate on the repetitious detail of the chart. Because the tests are administered by individuals, under a variety of conditions, the results may be unreliable. And it is hard to adapt the test to fit the variety of settings where vision testing must be done.

Imagine that you are a public health nurse, and picture the scene as you arrive at a school to administer eye tests to several hundred primary school children. You have asked for a room at least 20 feet long, but the only room available is much smaller. So you set up the test in the hall. The lighting is inadequate, and there is constant noise and traffic while you work. Other kids are passing and calling out to the kids



Dr. Shapiro instructing his daughter Abbie as she tries out PERCEPTECH.



taking the test, and some are walking through the middle of it. Although you spend even longer with each child than usual, you have good reason to wonder whether your results are reliable.

Enter Drs. Shapiro and Raymond, associate professors at the University of Calgary, and PERCEPTECH, which they have designed to overcome the shortcomings of traditional vision testing. With the right program, the researchers thought, a microcomputer could present each letter of a vision test, record the patient's responses, and at the end of the test compute the patient's level of visual acuity. Computer functions could also be used to help keep a young child's attention focused on the test, and make it easier to set up and administer.

The test they have developed runs on off-the-shelf commercial microcomputers, takes less than half the time needed for eye chart vision screening, and the results are more reliable. Dr. Shapiro: "When the test is administered in the traditional way, the person administering it has to keep track of each letter." But for a computer, it's no problem. "This is where computers excel," he says. "They can simply keep track of what they have presented, and what needs to be presented, in order to produce a correct determination."

There is a striking change in the scenario for our harried public health officer doing school vision testing. "It is really very simple," says Dr. Shapiro. "The only hardware necessary is the computer itself and the joystick, which is standard equipment for video games. So if the testing has to move from school to school, the test administrator can just pick up the computer, which is quite portable.

"When they arrive at a new location, setting up is nothing more than plugging in the computer, putting in the software and getting it started, connecting the joystick, which is a plug-in connection in the back, and the test comes up on the screen. The administrator selects a few options, and the test is set to go for the first child. As soon as the first child is finished taking the test, it comes up again asking for information about the name and age and so on of the next child, and that's about all there is to it."

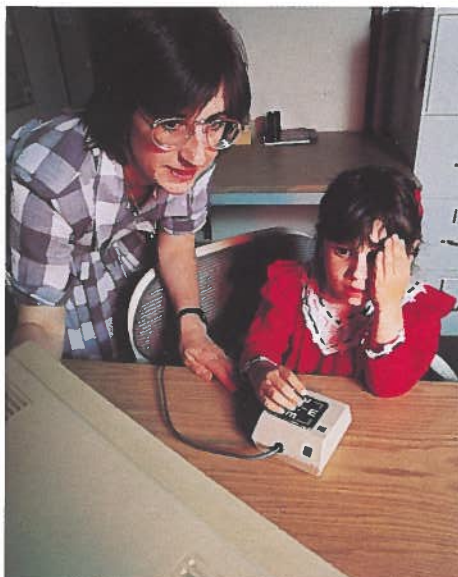
The system also provides a solution to the space problem. "The computer can automatically scale the size of the letters down to match the number of feet the patient is standing from the screen, anywhere from 10 feet, which is about the closest the test should be administered, up to 20 feet."

Instead of the traditional wall chart, which uses letters of the alphabet, PERCEPTECH uses a more modern variant, the tumbling or "illiterate" E. With only four commands — up, down, left, right — patients can indicate their responses by using the joystick, while keeping their eyes focused on the screen. Another virtue of the "illiterate" E is that it can be used to test a subject who does not know how to read at all, or reads a language — Inuktitut or Chinese, for instance — that does not use the Roman alphabet, on which most European alphabets are based.

Learning how to administer the test takes a matter of minutes. Dr. Shapiro: "We've written a manual, and a person who has never used a computer before might have to spend 15 minutes or so understanding how to put the disk in, how to turn the computer on, and so on. Then it's just a matter of following the manual the first time through and selecting a couple of options from menus that appear on the screen, and away you go."

There is a good reason why PERCEPTECH performs more reliably when testing children. When the motivational enhancement option is selected, the computer actually plays a game with the child being tested.

"I suppose the two largest options," Dr. Shapiro explains, "are whether a person wants the test to be automatically administered or whether they want to manually administer it. We have set an option so that if the person finds a difficult patient to test, or the person is using the test for the first time, and wants to be able to match up the use of their test to the way they have traditionally administered the wall chart, they can do the thing completely manually. They can select which E they want to present, which size, and then they can input whether the person got it correct or incorrect themselves."



Results of tests using PERCEPTECH can be correlated directly with results of traditionally administered tests. Test data are automatically stored, and can be retrieved or searched for trends by any commercially available data base program. Connection to a modem would make it possible for remote communities to send data to a common data base in a larger city, to add to a province-wide or state-wide information bank, for example.

How accurate is PERCEPTECH? Drs. Shapiro and Raymond performed extensive clinical trials testing with PERCEPTECH on approximately 500 children in the Calgary area, ranging in age from 3 to 13. Many were tested with both PERCEPTECH and the traditional test. The results, when the latter was precisely administered, were "virtually identical," according to Dr. Shapiro. But other comparisons between the testing methods are striking.

For example, the traditional test required an average of 5.4 minutes per child; PERCEPTECH took less than 2 minutes per child, a time saving of more than 65 percent. Multiply that for a city the size of Calgary (population 650 000), where approximately 7 000 grade one students are tested each year, and the time saved is nearly 400 hours per year (10 full-time work weeks, or 2 1/2 full-time work *months*) for a public health officer in school vision testing alone.

Drs. Shapiro and Raymond originally designed PERCEPTECH for use in their laboratory, where visual acuity tests were required of every person who agreed to participate in experiments on sensory and perceptual function. Their original test was designed to operate on any off-the-shelf Apple Macintosh computer; it is now being implemented on an IBM-PC as well. All options can be selected from a menu and can be changed easily to suit a particular test administrator's needs. Since the computer administers and scores the test, no professional training is required.

PERCEPTECH's inventors are looking at other commonly performed visual tests to see if it is feasible to incorporate them into the present hardware and software. And a hearing screening device, which could be used in either a clinical or a public health setting, has been prototyped and is nearly ready for clinical trials.

The rights to PERCEPTECH are held by University Technologies International (UTI) Inc., a university-owned technology transfer company which provides services to faculty. The company is handling the commercialization of this invention and is interested in promoting it to a number of distributors across North America and Europe. In this case, UTI acts as a link between researchers and the marketplace. Its role is to identify a company that might want to market the new technology commercially, and set up a licensing agreement.

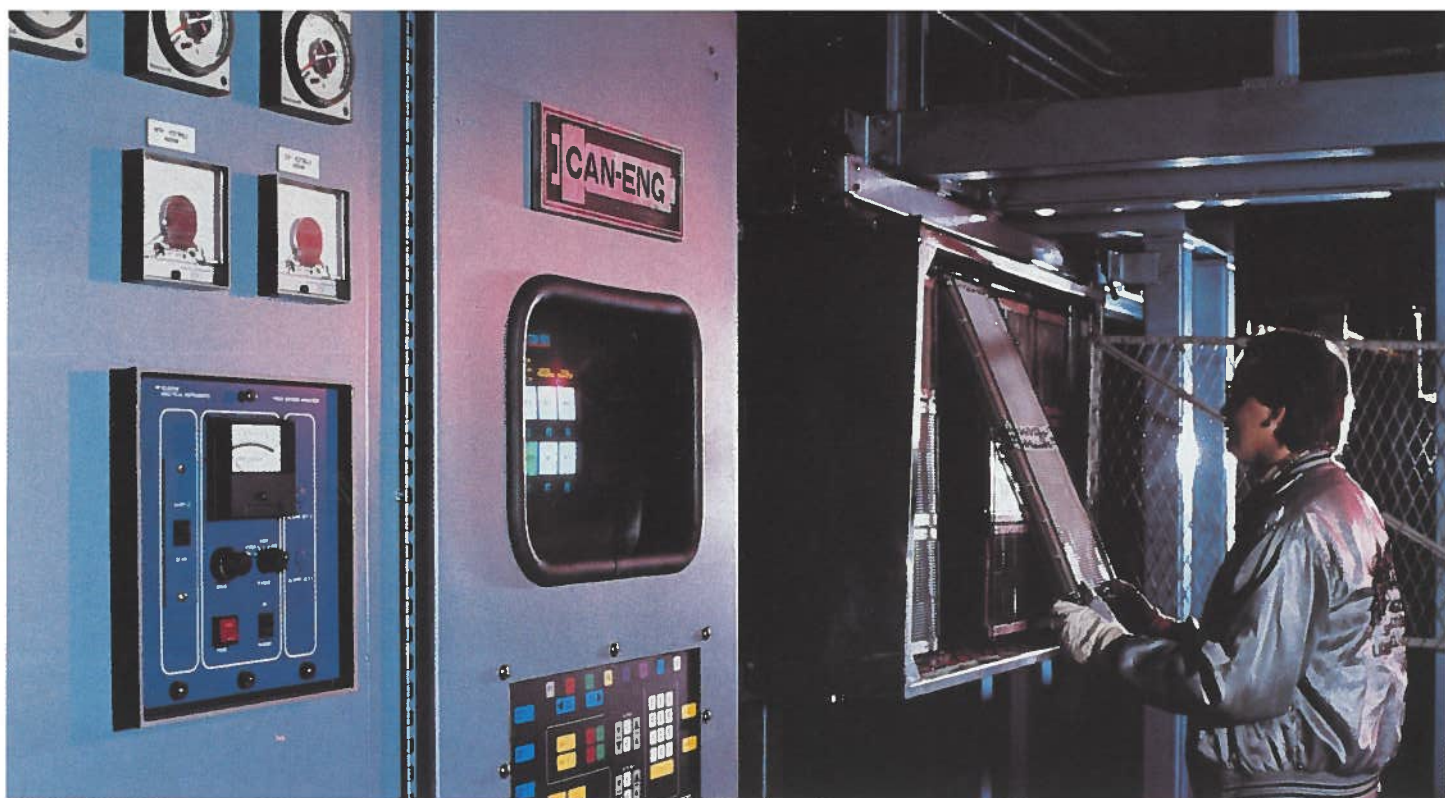
Contact:

University Technologies International

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Fax: (403) 292-6139



Can-Eng:

In Hot Pursuit of International Markets

Research and development (R&D) isn't an add-on or a frill for a firm wanting to be a world leader in designing and manufacturing equipment for heat process technology. "Without it, we'd be like many competitors using old technology to build dinosaurs," says Wally Bamford, president of Can-Eng Manufacturing Ltd.

The Niagara Falls, Ontario, firm relies on its in-house staff of five professional engineers to develop and expand on new designs and applications for a wide range of industrial furnaces and related equipment. Its 3 700-m² plant is the largest in Canada devoted solely to furnace manufacturing. The plant employs more than 50 people and has enjoyed rapid growth in recent years with the latest figures showing annual sales of about \$10 million.

Can-Eng has produced more than 3 000 pieces of industrial heat-treating equipment in its 25-year history. The majority of furnaces have been custom-designed for individual customers' heat-processing requirements. The furnaces heat industrial materials to different temperatures to enhance properties such as toughness and hardness. Furnaces are used primarily for metals, but many applications now include ceramics, carbon fibres and glass.

Mr. Bamford explains that the principles of heat treating metals have been known for centuries. So what's driven Can-Eng, which was founded in 1964, to become Canada's largest industrial furnace supplier? It is the constant emphasis on updating technology to meet clients' demands for product quality, safety, low operational costs and flexibility.

Innovating new technology is a two-phase process for Can-Eng. The first phase involves developing the equipment for customers' specialized needs; the second and often harder phase involves convincing customers of the improvement over old technology.

The company's efforts over the past decade in designing and adapting fluidized bed furnaces, which now make up 10 percent of sales, serve as an example of how each step of the procedure works.

A fluidized bed furnace is simple in design and operation. The bed itself is actually a container filled with dry, microscopic particles of equal size. When air is passed up evenly through the container, the particles separate and begin to move. The bed looks like a container of boiling liquid, and the particles flow to uniformly surround any object immersed in it. When a source of heat is added, the fluidized bed becomes a furnace.

The basic technology for fluidized beds was developed in the late 1960s in Europe. In 1979, Can-Eng bought the North American rights to British patents for the fluidized bed technology and, with major improvements, adapted it to meet the needs of North American clients. This was accomplished with the help of the Enterprise Development Program, an Industry, Science and Technology Canada (ISTC) initiative now limited to companies in the resource regions of Quebec.

Can-Eng engineers used computer-assisted design to modify the British designs while its sales force sought orders or technology exchange partnerships. Since 1979, the firm has spent \$1.5 million on R&D to develop its state-of-the-art fluidized bed furnace design.

In 1984, Can-Eng went on to develop a prototype of a new kind of rotary fluidized bed furnace, assisted by another federal industry department grant. This \$200 000 grant was awarded through the Industrial and Regional Development Program (IRDP), which funded the development and application of new technologies in order to improve the competitive position of Canadian industry. Although ISTC is still very much involved in promoting technology development, IRDP assistance is no longer offered. Can-Eng developed this prototype with export markets in mind.

The ability to change atmospheres in the fluidized bed furnace from air to nitrogen, hydrogen or other blends of gases in two minutes offers the optimum in process flexibility. "The rapid heat-up, efficient energy utilization and the capability to shut down while not in use all add up to lower operational costs than those of alternative furnace equipment," explains Mr. Bamford. A single furnace can perform multiple heat treatments, such as clean hardening, carburizing, nitriding and ferritic nitrocarburizing with temperatures from 80°C to 1 090°C.

"The second phase (of innovation) was perhaps more difficult because the technology was so new," says Mr. Bamford. Clients were more at ease with customary technology. "They took a lot of convincing. Marketing staff had to do their homework to make the improvements better received."

One strategy used by Can-Eng to overcome this hurdle was to run a customer's sample through the fluidized bed process line permanently set up in-house to demonstrate the equipment. This hands-on approach helped make the technology more user-friendly. Another factor assisting the market penetration of this technology is its environmental friendliness. Fluidized bed furnaces offer a safe, pollution-free alternative to the older salt bath furnaces for heat treating metals.

Many salts are now classified as hazardous materials. "To properly dispose of them after use entails special packaging, transporting, licensing, servicing in landfills or destroying them, and documentation, which contributes to escalating costs and risks," contends Mr. Bamford.

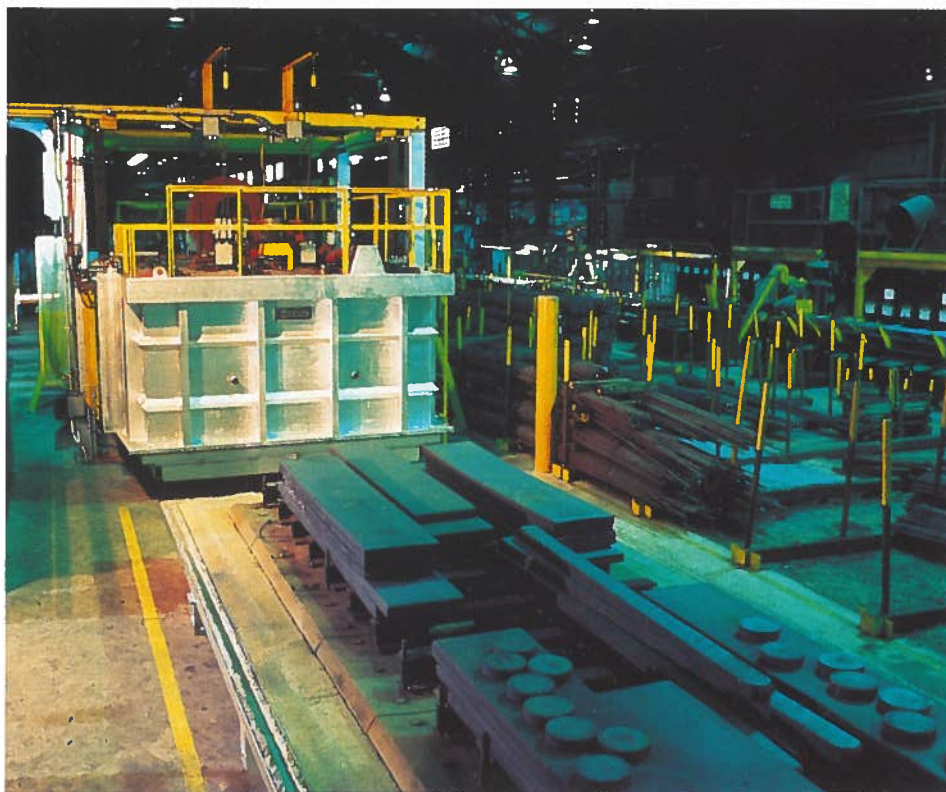
The fluidized bed material is inert, non-toxic, non-corrosive, recyclable and requires no special handling.

Can-Eng also owns furnace manufacturing facilities in the U.S. Its industrial furnaces have been exported under licence agreements to Japan, Brazil, the United Kingdom, Germany, Korea, Taiwan and Mexico.

The Canada-U.S. Free Trade Agreement is expected "to open doors," says Mr. Bamford, as Can-Eng seeks additional technology transfers with foreign companies that recognize the size of the North American market and need local skills and a local sales network. Today some 40 to 50 percent of Can-Eng's exports are to the U.S.

Looking ahead to additional opportunities in technology transfer, Can-Eng is continuing its R&D efforts in other product lines. One such line is energy-efficient furnaces with better insulation and improved use of waste heat. Mr. Bamford estimates his firm's total expenditures on R&D during the past five years at \$3 million or about 8 percent of sales. "Not all of this comes from Can-Eng," he adds. "Some of this is paid for by customers and some comes from government."

In addition to grants mentioned previously, in October 1987, Can-Eng



Protective atmosphere annealing of steel tools.



Washer parts traveling through an electrically heated porcelain enamelling furnace.

obtained a grant through the Program for Export Market Development (PEMD), which is offered by External Affairs and International Trade Canada and implemented jointly with ISTC. PEMD helped Can-Eng to license technology for unique mesh belt carburizing furnaces owned by KYK of Japan and to market and build this equipment in the U.S. and Canada. Can-Eng

now has 13 representatives in the U.S. marketing its equipment lines.

The list of target markets shot up in May 1990 when a 12-month co-operative agreement was concluded with Smit Ovens of the Netherlands, the world's leading manufacturer of lehr ovens for container glass and TV picture tube production. Can-Eng's Canadian-designed technology for

vitreous furnaces for the porcelain-enamelling industry will be marketed by Smit throughout Western Europe, Eastern Europe and the Soviet Union. In return, Can-Eng will represent Smit in the expanding U.S. market for high-definition television (HDTV). "Success in this area could well turn into a joint venture in both North America and Europe between the two firms within a year," Mr. Bamford predicts.

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JETRO: Bringing the Far East a Little Closer

Canadian companies that would like to do business with Japan take note. With offices in Toronto, Montreal and Vancouver, the Japan External Trade Organization (JETRO) can help you make it happen.

JETRO promotes two-way trade, technical and personnel exchanges, joint ventures, licensing agreements, and investments in both countries. And for the second year in a row, it joined forces with Industry, Science and Technology Canada (ISTC) in a special project that brings innovative Japanese technologies to the attention of Canadian companies. It's called the Special Project for International Technology Tie-Ups in High-Tech Related Industries.

This year, 300 Japanese companies each provided information on a product or range of products that might be of interest to overseas counterparts. The list was distributed to almost 3 000 companies included in ISTC's Business Opportunities Sourcing System (BOSS), a data bank profiling over 25 000 Canadian manufacturing and service firms.

(For more information on BOSS, call ISTC collect at (613) 954-5031.)

The technologies listed cover a wide range of industrial sectors, from pulp and paper and chemicals to robotics and factory automation. Eleven examples are found in this issue's Business Opportunities list on pages 19 and 20.

As was the case in 1989, about 10 percent of the companies that received the list contacted JETRO for more information. The organization keeps a detailed profile of each Japanese company on file. If the Canadian company is still interested, the next step is to make direct contact with their Japanese counterpart.

A joint environmental technology seminar late last year provided another example of collaboration between JETRO and ISTC. This event focused on Japan's latest approaches to issues like reducing pollution from utility industries and advances in waste incineration technology.

JETRO, which is affiliated with Japan's Ministry of Trade and Industry, was established in 1958 primarily to introduce the country's products to the world. Since that is hardly necessary today, it also focuses on helping foreign companies identify and exploit market opportunities in Japan.

Contact:

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LeBlanc & Royle Telcom Inc.

The Sky's the Limit

With almost \$100 million in 1989 sales from communications towers that can reach over 600 m skyward, it's a wonder that LeBlanc & Royle Telcom Inc. doesn't have a higher public profile.

That's probably because the Oakville-based company works behind the scenes, at transmitter sites that serve the radio, TV and two-way communications industries. L&R president Paul Dickie admits that his company is "on the periphery" of telecommunications. "We're a necessary evil," he chuckles. "You have to have a tower to get your antenna up in the air."

The range of broadcasting and other communications signals would be extremely limited without towers. They are the heart of L&R's business and essential to most transmitter sites. The company designs, manufactures, installs and maintains them.

Nevertheless, one of the things that sets L&R apart from its competitors is the ability to provide more than just towers. The company offers *all* of the products and services clients need to get their operations up and running — turnkey systems.

The early days of the cellular phone industry in Canada provided L&R with plenty of turnkey system business. Site service work included finding locations; obtaining permits; clearing land; building access roads, fences and small buildings; arranging hydro; etc.

Cellular phones transmit signals to antennas at so-called cell sites. From there, signals can be relayed to other cell sites or into the public telephone system en route to the unit receiving the call. In cities, cell sites tend to be atop high-rise buildings; along highways and in outlying areas, cell sites usually need towers.

Cellular and other two-way communications systems currently constitute L&R's strongest area. One of the biggest projects currently under way is building 117 transmitter sites for a new Ontario Provincial Police mobile communications system.

While new TV and radio towers aren't sprouting as frequently as they were when the company began in the 1960s, broadcasters are still a major market. Replacing and upgrading equipment is a big part of that business. "It's kind of like moving up from an old car to a new one," says Mr. Dickie.

An AM radio station may need new components to broadcast in stereo. Since the quality and strength of signal from FM and TV stations are primarily a factor of transmitter power and antenna height, they often want to move to higher towers.

TV and FM broadcasters account for the highest towers in the telecommunications business — up to 625 m. While they each use only one tower that broadcasts in all directions, AM radio stations require an array of towers that aren't as high. The largest AM towers made by L&R are about 160 m tall.

The other key market for L&R is microwave communications. Microwave systems use high frequency signals that have dramatically increased the range and quality of long distance communications since they were first introduced commercially in the late 1940s. They are used extensively for long distance communications applications that include telephone systems; private voice communication systems, particularly in remote areas; data systems; and network television.

Many of L&R's microwave projects involve mobile communications systems or systems that link sites scattered across a remote area. Clients have included Unitel Communications (formerly CNCP Telecommunications), British Columbia Telephone, Maritime Telegraph & Telephone, and Alberta Government Telephones.

Unlike much broader radio waves, microwaves are measured in metres or centimetres. Since they travel in an uninterrupted line from one point to another, antennas must be mounted on towers to avoid obstruction.

They must "see" one another. And because the earth's surface is curved, there is a limit to how far apart they can be. Microwave towers are usually about 100 m tall and 50 km apart.

While all communications towers must be designed to withstand the particular wind, ice and snow conditions specific to their location, microwave towers must be more rigid than AM, FM or TV towers of equivalent height. If they weren't, the narrow wave that must "see" the next antenna could easily be deflected off course.



OPP telecommunications tower, Metcalfe, Ontario.

OPP telecommunications tower, Kanata, Ontario.

Computer-aided design and engineering are critical elements of L&R's business. While off-the-shelf models meet the needs of some clients, many towers are custom made. In addition to meeting stability and performance requirements, designers and engineers must strive to optimize use of steel and other materials to keep costs down.

Imagine the cost of these materials, which went into a tower of approximately 500 m that serves the needs of five TV stations and two FM broadcasters: half a million kg of manufactured steel, almost 10 000 m of galvanized bridge strand cable and 35 000 galvanized bolts.

L&R itself posts some pretty impressive numbers too. Mr. Dickie says that its growth rates in recent years have hovered around 35 percent and that its market share in Canada is about 50 percent. The company has extensive holdings in Canada and the U.S. as well as about 40 percent of one company based in Australia and another in Singapore. A 1989 *Financial Post Magazine* survey placed L&R among the top 100 privately owned companies in Canada.

Its best known subsidiaries in Canada include Larcam Communications, a manufacturer of TV broadcast transmitters; Norcom Communications, which provides cable TV in northwestern Ontario and operates a CTV affiliate station in Kenora; and SR Telecom of Montreal, a major world supplier of rural telephone systems. When subsidiaries are included, L&R has about 1 000 employees.

Will business continue to boom? At first glance, L&R's future would appear to be clouded by satellite and fibre optics technologies, which are making inroads in long distance communications — once the exclusive domain of microwave systems. While the microwave business relies directly on towers, fibre optics cable is buried underground, and satellite dishes need only point skyward. However, Mr. Dickie is quick to point out that microwave has advantages.

Fibre optics systems have tremendous capacity, which may exceed foreseeable requirements. While a high traffic corridor like Toronto to Montreal may justify the use of fibre optics, many others do not. Similarly, a satellite may be the most practical medium for inter-continental telephone service and not for shorter distances.



Mr. Dickie is confident that microwave systems still have their place in Canada. He points out that Telecom Canada, an association of the country's major telecommunications companies, is increasing the capacity of its microwave networks to meet increasing demand, particularly in long distance data communications.

Developing countries where communications must cross remote areas with rugged terrain are often best served by a microwave system. The thread-like strands of glass that make up a fibre optics cable must actually stretch across whatever distance the network serves. Microwave systems require a physical structure only every 50 km or so.

Security is another advantage of microwave cited by Mr. Dickie. A single satellite is essential to a whole communications network as is every centimetre of fibre optics cable. He maintains that a microwave system, with its built-in back-ups and widespread solid structures, is less susceptible to accidental or deliberate damage that could knock out a whole network.

Microwave systems are often particularly appropriate outside major North American and European markets. One of SR Telecom's recent projects provides a good example. "The company was involved in putting the first telephone in each of a number of towns in Turkey," says Mr. Dickie. "You don't need a fibre optics system for that; you want the lightest microwave capacity you can have."

L&R has provided equipment and services to over 60 countries on five continents over the years, and projects outside North America accounted for about \$5 million of its 1989 sales (excluding SR Telecom sales). While North American sales are about 20 times that amount and the market is steady, Mr. Dickie sees markets outside North America as the company's main growth area over the next 20 years or so.

He says that L&R's capacity to install turnkey systems is the key to these distant markets. "People don't want to buy a tower, an antenna, an installation...they want to buy a solution, like an operating AM station, microwave system, a complete outside plant for a television station." He contrasts this with his competitors, who "just want to sell the tower and install it."

Employee ownership also sets L&R apart from its competitors. Some 45 percent of employees are shareholders. Mr. Dickie believes this has much to do with the company's philosophy and its success. "We believe we must take care of the company first, and if we can make it go, it will take care of us."

Contact:

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Fax: (416) 844-8837

NETWORK

Sources of Technology-based Business Opportunities



PUBLICATIONS

Techno Japan

This periodical is aimed at overseas specialists in key industrial and government positions who track Japanese and other international economic and industrial trends. It is an authoritative source of information on the most recent technological advances in virtually all industries.

Contact: Fuji Technology Press Ltd., 7F Daini Bunsei Building, 11-7 Toranomon 1-Chome, Minato-ku TOKYO 105 Japan;
Tel.: 03-508-0051;
Fax: 03-592-0648.

Technology Access Report

This monthly newsletter covers the development, management and transfer of technology. It includes information on technology offers and requests, foreign research, workshops, meetings, and alliances and consortia.

Contact: P.O. Box 778, INVERNESS, California, U.S.A., 94937;
Tel.: (415) 669-7236;
Fax: (415) 663-9410.

DATA BASES

BEST

The British Expertise in Science and Technology (BEST) data base provides detailed information on scientific and technical expertise in the U.K. It includes information on current research, patents, and the work history of scientists and engineers.

Contact: Cargermill Inc., 1629 Thames Street, BALTIMORE, Maryland, U.S.A.;
Tel.: (301) 955-4717;
Fax: (301) 955-7755.

Newsnet

This on-line data base consists of timely, detailed inside information on companies, products, technologies and trends covering over 35 industries and professions. It includes over 320 business newsletters, 10 worldwide news-wires, business profiles, stock and commodity quotes, and company and industry reviews.

Contact: Customer Service, 945 Haverford Road, BRYN MAWR, Pennsylvania, U.S.A., 19010;
Tel.: (215) 527-8030.

CONSULTANTS

Incoterm

This firm specializes in the management of international business and offers comprehensive professional services, including marketing, export management and international technology transfer. Work is in English, French, Arabic and Spanish.

Contact: Room 240, 2144 King Street West, SHERBROOKE, Que.;
Tel.: (819) 822-1555;
Fax: (819) 822-1524.

Intercon Research Association Inc.

This company's consulting work involves technology transfer projects in the most advanced and promising areas of new technology development. Its clients include business and government organizations in Europe, the U.S., Japan and other countries.

Contact: 1219 Howard Street, EVANSTON, Illinois, U.S.A., 60202;
Tel.: (312) 491-6700; Telex: 289408.

Praxis Management Ltd.

This company specializes in arranging government funding. Other services include technology-related importing, exporting, offshore representation, management and marketing.

Contact: Suite 216, 3700 Gilmore Way, BURNABY, B.C., V5G 4M1;
Tel.: (604) 439-0100.

LARGE COMPANIES

Cominco Engineering Services Ltd.

This subsidiary of a large Canadian natural resources company supplies engineering, process technology and operating services to mining, metallurgical and process industries worldwide. A number of technologies developed for the parent firm are marketed.

Contact: 100-1200 73rd Avenue, VANCOUVER, B.C., V6P 6G5;
Tel.: (604) 264-5500.

ORGANIZATIONS

Echo

Echo is a non-profit organization that offers access to unique, multilingual data bases that include information on primarily European research projects, reports and organizations.

Contact: Echo Customer Service CP 23673, L-1023 LUXEMBOURG;
Tel.: +352-48.80.41;
Fax: +352-48.80.40.

Electronics Network of Alberta

This non-profit high technology centre is dedicated to diversifying industry through electronics technology transfer. It encompasses microelectronics, telecommunications, lasers, machine intelligence, robotics and computing.

Contact: 801-90 Sparks Street, OTTAWA, Ont., K1P 5B4;
Tel.: (613) 237-2615;
Fax: (613) 563-9934.

Technology Development Group

This group specializes in transforming technology into marketable products. Services include prototype and process design, development, testing, calibration, market analysis, etc.

Contact: Southern Alberta Institute of Technology, 1301-16 Avenue Northwest, CALGARY, Alta., T2M 1L4;
Tel.: (403) 284-8791.

Business Opportunities

The following offers of and requests for technology are based on information supplied by the contact listed for each one.

Summary

Canada

Absorbent Liner for Impermeable Clothing
Adaptive Interference Cancellor
Electrical Flechette Spin Rig for Wind Tunnel Testing
Fishing Gear
Method of Measuring the Firmness of Meat
Noise Reduction Technique to Improve Signal-to-noise Ratio in a Signal Reflected from a Target
Pressure Anaesthesia and Needle-guiding Device
Reversible Arming and Firing Mechanism
Smoke Composition
Snare Block Cutter
Sorbent Tube Thermal Injection Apparatus
Waterproof Sweat-transmitting Fabric

Italy

Concrete Building Products

Japan

Dimension/Vibration Measuring Unit
Fire-proof Fibre
Flow Meters, Crack Inspectors, Thickness Gauges
High-performance, Corrosion-resistant, Abrasion-resistant Metal Surface Treatment Technology (Clean S Treatment)
Hybridization System
Moisture Meter
Optical-fibre Thermometer
Rosin-cored Solder, Solder Cream
Sludge Dryer and Incinerator
Ultra-high Metal Vacuum Valves
Ultra-violet Water-assisted Disinfectant

Spain

Optical Printer
Ultrasonic Iron-Dryer

Switzerland

Transport and Ventilation Fan

Soviet Union

Biotechnology of Industrial Sewage Treatment in Gas-chemical Complexes
Device for Detecting Defects in Main Pipeline Insulation Coating
Extra-reliable Direct Flow Valve
High Temperature Adhesive
Liquid Spray-gun
Polisvetan-polymeric Material for Covering Greenhouses
Process for Microbial Production of Threo-D-isocitric Acid (Monopotassium Salt)
Technology to Produce Gerolact, an Acidified Milk Product

Offers

Canada

More information on the following ten technologies is available from the next contact listed.

Absorbent Liner for Impermeable Clothing, 9475

This two-layer liner can be worn under liquid-impermeable protective clothing to prevent the accumulation of perspiration on or near the skin. It lets perspiration vapour out and keeps it out when it changes into liquid. The inner layer of material is vapour-permeable but liquid-impermeable. This layer is laminated to an outer layer that easily absorbs vapour and liquid. Its major application is in clothing intended to be worn in military and industrial environments contaminated by chemical, biological or nuclear hazards.

Adaptive Interference Cancellor, 9198

This filtering device is designed to suppress the detrimental effect of ground clutter on the operation of a polarimetric radar-retroreflector navigation system. Ground clutter present on the cross-polarized channel is correlated with that which appears on the like-polarized channel, and this relationship is exploited to get an estimate of the clutter on the cross-polarized channel. The estimate is then subtracted from the cross-polarized signal received from the retroreflector, thereby greatly enhancing signal-to-clutter ratio. The filter can be implemented in analogue or digital form.

Electrical Flechette Spin Rig for Wind Tunnel Testing, 9390

This spin rig is designed for accelerating flechette models to the desired spin rate for testing, particularly but not exclusively, in an in-draft wind tunnel. It is easier to use than an air turbine, which is also inconvenient for testing small diameter models (approximately two cm).

Method of Measuring the Firmness of Meat, 9382

This method, which uses a ratio of rebound to compression, could be used to design and construct devices that measure the firmness and texture of meat, fish fillets and other food products.

Noise Reduction Technique to Improve Signal-to-noise Ratio in a Signal Reflected from a Target, 9489

This ultrasonic or electromagnetic signal processing technique is more powerful and simpler to implement than frequency diversity signal processing techniques or variations thereof, which are used for radar applications, non-destructive evaluation, digital image processing and medical imaging. With this technique, the signal is analyzed using binary orthogonal functions. Therefore, signal processing can be done with less hardware and faster than ordinary methods.

Pressure Anaesthesia and Needle-guiding Device, 9354

This device can be used in conjunction with another dental instrument, such as a dental mirror, by means of a common handle. An incorporated channel safely and easily guides a needle to the end of the device, where pressure anaesthesia is temporarily applied in order to inject a local anaesthetic.

Reversible Arming and Firing Mechanism, 9025

This mechanism is used in a buoyant pyrotechnic marine marker that is safer and easier to arm than conventional markers.

Smoke Composition, 8989

This new method of producing voluminous white smoke for use in search-and-rescue markers tends to be more stable and reliable than previous ones. It also makes manufacturing less hazardous.

Sorbent Tube Thermal Injection Apparatus, 8177

This apparatus is designed to transfer a gaseous sample from a sorbent tube to a gas chromatograph or other analytical instrument. It allows the direct introduction of sorbent tube samples, thus eliminating the time-consuming solvent elution step.

Waterproof Sweat-Transmitting Fabric, 9474

This composite fabric provides thermal insulation while keeping water out and letting perspiration pass through. A water-impermeable insulating material is sandwiched between two layers of a wicking fabric, which are connected to each other by wicking threads that pass through the insulating material. The outer wicking layer may also be covered by material that is water-impermeable but water-vapour-permeable. The major application for this fabric is boots and clothing intended for use in cold and wet conditions.

Contact: Canadian Patents and Development Limited, 275 Slater Street, OTTAWA, Ont. K1A 0R3; Tel.: (613) 990-6100; Fax: (613) 990-8528. (Please quote the reference number listed for each offer.)

Fishing Gear

A Canadian company has developed and patented a fishing lure with adjustable colour and action and a depth-adjustable diving planer. These products will save fishermen time and money. The owners would like to find a company to manufacture and market these products under a licensing arrangement.

Contact: Herold Schock, Innovative Research & Development Co., 310-810 West Broadway, VANCOUVER B.C. V5Z 4C9; Tel.: (604) 879-9075.

Snare Block Cutter

This product provides a safe, easy method of cutting blocks of butter, cheese, ice cream or soap into even sections for moulding, packaging, shredding or grating. Patents, which are pending, are available for licensing.

Contact: O'loannis Pericles Giannakos, P.O. Box 7367, Station E, CALGARY, Alta. T3C 3M2; Tel.: (403) 229-2001; Fax: (403) 265-7424.

Italy

Concrete Building Products

Production and distribution rights to concrete pipes, sewage stations, drain boxes, and street and garden furniture are available through a licensing arrangement. Licences have already been granted to seven European countries.

Contact: The Italian Trade Commission, 624-736 Granville Street, VANCOUVER, B.C. V6Z 1H2; Tel.: (604) 685-8451; Fax: (604) 685-9758.

Japan

The following 11 offers of technology have been selected from those being circulated under the Special Project for International Tie-ups in High-Tech Related Industries. This joint project of Industry, Science and Technology Canada and the Japan External Trade Organization is described on page 13. More information on each offer is available from the next contact listed.

Dimension/Vibration Measuring Unit, 029

This optical-fibre, non-contact unit is capable of measuring displacement of several microns. It operates at the world's highest stability level.

Fire-proof Fibre, 275

This product is lightweight, durable, flame-proof, heat-resistant and chemical-resistant. The KG type can withstand temperatures of up to 2 760°C.

Flow Meters, Crack Inspectors, Thickness Gauges, 034

With the sensor installed on the outside of various types of piping, these ultrasonic units can measure flow rate and other piping characteristics.

High-performance, Corrosion-resistant, Abrasion-resistant Metal Surface Treatment Technology (Clean S Treatment), 270

This technology consists of coating metals with special alloys to increase service life greatly.

Hybridization System, 185

This system transforms and polymerizes fine powder with still finer powder to create state-of-the-art material. It combines many dry organic and inorganic substances (including metals).

Moisture Meter, 166

This is a small multi-purpose, high frequency, dielectric-constant meter. Users can make measurements without subjecting the measured object to the ambient conditions.

Optical-fibre Thermometer, 051

This new type of thermometer is ideal for temperature measurements of high frequency generators and high voltage equipment.

Rosin-cored Solder, Solder Cream, 220

These types of solder contain an activating agent dispersed completely equally. They scatter less and provide better insulation than conventional solder, and produce no bad odors. Since solder cream produces no solder balls, it is suitable for high density surface mounting.

Sludge Dryer and Incinerator, 050

This is an up-to-date, non-polluting and highly reliable system.

Ultra-high Metal Vacuum Valves, 138

These highly reliable valves can withstand an ultra-high vacuum (10^{-8} Torr or above). They are used for semiconductor manufacturing plants, nuclear fusion devices and accelerators.

Ultraviolet Water-assisted Disinfectant, 082

Since this product uses ultraviolet light, water quality is maintained. It disinfects all types of fluids and can be used to obtain ultra-pure water for the manufacture of semiconductors.

Contact: Melinda Pica, c/o Japan External Trade Organization, Suite 700, 151 Bloor Street West, TORONTO, Ont. M5S 1T7; Tel.: (416) 962-5050; Fax: (416) 962-1124. (Please quote the reference number listed for each offer.)

Spain

More information on the following two offers can be obtained from the next contact listed.

Optical Printer

This fast, versatile, high resolution printer creates images by means of light reflection, transmission or projection. It can print text, graphics and photos in black and white or colour, reduced or enlarged. The printer can also be used as a fax receiver, plotter and photocopier. A functional prototype is being developed, and patent rights are offered for sale.

Ultrasonic Iron-Dryer

This cordless product dries as it irons and can be used on very wet clothes. It consists of an oscillator and a low cost ceramic transducer adapted to the surface of a traditional iron. Advantages include a built-in rechargeable battery, safety (since it does not produce heat), low energy consumption and the fact that it is ready for use as soon as it is turned on. A prototype is being developed, and patent rights are offered for sale.

Contact: Salvador Lanzas Galvache, Director, Sinetics R&D Eng., Espirea, 4. - 28042 MADRID, Spain; Tel.: 91 7424668.

Switzerland

Transport and Ventilation Fan

This product, which can be fabricated in a variety of metals, alloys (including stainless steel) and plastics, is more energy efficient than conventional centrifugal fans with spiral housings. It can be installed in any position, even upside-down. The right to manufacture is available for purchase or licensing.

Contact: Mr. Johann Arnold, Mühlemattweg 3, 6374 BUOCHS, Switzerland; Tel.: (41) 64 41 52.

Soviet Union

More information on the following eight licensing offers is available from the next contact listed.

Biotechnology of Industrial Sewage Treatment in Gas-chemical Complexes, BX0006

This process effectively treats and recycles considerable amounts of industrial sewage and reclaims organic pollutants. Specialized bacterial cultures decompose organic pollutants and serve as raw material for biomass production.

Device for Detecting Defects in Main Pipeline Insulation Coating, BX000

This highly accurate device consists of a modulator mounted on the cathode protection unit. Using the modulator connected to the unit cathode output network, cathode protection current is modulated. It creates potential difference on the surface of the insulation coating. The device is used mainly in manual and mechanized modes of pipeline checking.

Extra-reliable Direct Flow Valve, BX0064

This valve, which is used in vacuum pumps, freon compressors and other compressors, has a locking strip that interacts with non-locking elements. This soft-fitting locking strip improves tightness and durability. Ease of repair is another advantage.

Requests

High Temperature Adhesive, JB1061

This adhesive is used with carbonic and ceramic articles that must withstand temperatures of up to 1 800°C for long periods of time. These articles include linings and heaters in electric vacuum furnaces, heat exchangers, engine parts, etc. The adhesive, which is composed of organic resin and inorganic filling, is highly resistant to water and acid corrosion.

Liquid Spray-gun, JB1059

This pistol-shaped device sprays liquids without using air. The liquids are conveyed under pressure from the pump unit and sprayed through a nozzle, which regulates the jet length and angle as well as dispersion and quantity of liquid. It is mainly intended for applying anti-sticking sand and protective coatings.

Polisvetan-polymeric Material for Covering Greenhouses, BX0098

This material reduces the growing season for various greenhouse vegetables. It is made of a polymer and at least one compound of f-element, which absorbs ultraviolet light and transforms it by fluorescence to emit rays in the orange-red range of the spectrum.

Process for Microbial Production of Threo-D-isocitric Acid, BX0021

The main advantage of this process over the conventional method of extracting the acid from the leaves of the *Sedum spectabile* plant is that it is considerably simpler. The acid, which is widely used in biochemical and medical research, is produced using a strain of yeast called *Candida lipolytica*.

Technology to Produce Gerolact, BX0030

Gerolact is a milk-based tonic for the elderly intended to improve their health and prolong active lives. Ingredients include valuable amino acids, calcium, essential fatty acids, vitamins, whey proteins, bacterial acidifiers, etc.

Contact: Dr. Dvorkovitz & Associates, P.O. Box 1748, ORMOND BEACH, Florida, U.S.A., 32075; Tel.: (904) 677-7033 or Mr. Valery Ignatov, President, V.O. Licensintorg-Dept. O.K.P., 11 Minskaya Str., 121108 MOSCOW, U.S.S.R.; Tel.: 41 14 15; Telex: 411415.

Summary

Asia and Middle East

Dehydration of Fruits, Concentrated Fruit Juice
Dental and Surgical Instruments, Scissors
Dental Impression Material (Powders)
Flour Milling Technology
Food Grade Citric Acid from Any Raw Material Other than Molasses
Nickel Cap for Dry Cell Batteries
Pulp and Paper
Surgical and Examination Gloves, Surface Acoustic Wave Devices (Saw Filters), Extruded Protein-texturized Plant Protein Chunks, Granules and Flakes
Tomato Paste, Ketchup and Soup

United States

Ink Jet Technology
Niche Mechanical, Electromechanical Products

Industrial Co-operation

Italy

Generators and Cement Mixers
Shoemaking and Tannery Machines
Spiral Staircases, Doors and Window Frames

Asia and Middle East

Companies making the following nine requests will consider joint ventures, licensing, sub-contracting, turnkey projects, the purchase of machinery and equipment, etc.

Dehydration of Fruits, Concentrated Fruit Juice

Contact: M.I. Rauf, Managing Director, City Carriers Limited, No. 57, Galle Road, P.O. Box 239, COLOMBO 4, Sri Lanka; Tel.: 585131-6; 55-2898; Telex: CAB: CITY CARRY.

Dental and Surgical Instruments, Scissors

Contact: Tasneem Qureshi, Tinbhoj Traders of Pakistan, Block 3, Plot A & B Industrial Estate, P.O. Box 1238, SIALKOT, Pakistan; Tel.: 0432-66492; Telex: 46298 RYOZO PK (ATTN: QURESHI).

Dental Impression Material (Powders)

Contact: Firmo M. Tripon, Room 303, Ramagi Building, 1081 Pedro Gil, Paco, ZIP 1007, P.O. Box 2544, METRO MANILA, Philippines; Tel.: 522-0471; 586302; Telex: 65656 LEOCEN PN.

Flour Milling Technology

Contact: Satinder Kumar Gupta, Milling Technologist, Bharat Flour Mills, PATHANKOT 145 001, India; Tel.: 20192.

Food Grade Citric Acid from Any Raw Material Other than Molasses

Contact: B.D. Binani, Maheshwari Distributors, 204 Usha Kiran Apts., 25 Haudin Road, BANGALORE 560 042, India; Tel.: 577989; Telex: 845-2298 IFTE IN (Ref.M19).

Nickel Cap for Dry Cell Batteries

Contact: Syed Ziaul Hossain, Plas-Tech Engineers, House 25, Road 19, Section 4, UTTARA MODEL TOWN, Dhaka, Bangladesh; Tel.: 690173.

Industrial Co-operation

Pulp and Paper

Contact: R. Jelvani, Sepahan Kaghaz Co., P.O. Box 1887, ISFAHAN 81, Iran; Tel.: 031 80687; Telex: 312495 TXCB IR.

Surgical and Examination Gloves, Surface Acoustic Wave Devices (Saw Filters), Extruded Protein-texturized Plant Protein Chunks, Granules and Flakes

Contact: Sanjevv Sikka, Sika Interplant Systems Ltd., 3, Gangadhar Chetty Road, Ulsoor, BANGALORE 560 042, India; Tel.: 572439, 574598; Telex: 0845-2744 SIKA IN; CAB: SIKATEK.

Tomato Paste, Ketchup and Soup

Contact: S.L. Kedia, Nepal Sagarmatha Traders, P.O. Box 929, Kalimati, KATHMANDU, Nepal; Tel.: 211479; Telex: 2261 EMBEE NP.

United States

More information on the following two requests is available from the next contact listed.

Ink Jet Technology, TSI/JRC/3581

A manufacturer of marking equipment and related inks used in the packaging industry is seeking new ink jet technology for printing small characters (1.5 to 12.5 mm) on flexible packaging materials. Equipment based on continuous jet, drip-on-demand, bubble jet or other technology systems is of interest. Developments in either ink or equipment could meet criteria that include reliability, suitability for harsh environments, speed, versatility, etc. Licensing, joint venture and other arrangements will be considered.

Niche Mechanical/Electromechanical Products, TSI/RHS/762

A company active in computer-numerically controlled machining, precision grinding, welding, electro-mechanical assembly and heat treating would like to acquire new products complementary to its manufacturing and marketing capabilities. It has extensive experience in the following industries: gear, packaging, military, marine, farm, off-road and automotive equipment, construction tool, spray painting, etc. Licensing, joint venture and other arrangements will be considered.

Contact: John Morehead, Technology Search International Inc., 500 East Higgins Road, ELK GROVE VILLAGE, Illinois, U.S.A., 60007-1437; Tel.: (708) 593-2111; Fax: (708) 593-2182. (Please quote the reference number listed for each request.)

Italy

More information on the following three items can be obtained from the next contact listed.

Generators and Cement Mixers

The manufacturers would like to collaborate with a Canadian company in the same business or a related business.

Shoemaking and Tannery Machines

The manufacturers wish to enter into a joint venture or similar arrangement to exchange information and technology.

Spiral Staircases, Doors and Window Frames

The manufacturer wishes to arrange a joint venture with a Canadian counterpart.

Contact: The Italian Trade Commission, 624-736 Granville Street, VANCOUVER, B.C. V6Z 1H2; Tel.: (604) 685-8451; Fax: (604) 685-9758.

Special Events

Summary

Canada

CANADIAN WESTERN AGRIBITION
Regina — November 1990

EPTECH 90 (HIGH TECHNOLOGY
ELECTRONICS)
Quebec City and Halifax — September 1990

ENVIRONMENT TRADE SHOW AND CONGRESS
Toronto — December 1990

FOOD AND BEVERAGE EXHIBITION
(PROCESSING)
and
CANADIAN FOOD INGREDIENTS EXPOSITION
Toronto — October 1990

23RD INTERNATIONAL DAIRY CONGRESS AND
EXPOSITION 1990
Montreal — October 1990

INTERNATIONAL WINE AND FOOD FESTIVAL
Ottawa — November 1990

Bahrain

ARABBUILD 90
and
MIDDLE EAST RISK CONTROL 90
Bahrain — November 1990

France

INTERNATIONAL CHILD CARE SHOW
Paris — September 1990

SILMO (OPTICAL EQUIPMENT)
Paris — October 1990

Saudi Arabia

SAUDIFOOD 91
Riyadh — January 1991

Spain

INTERNATIONAL FURNITURE FAIR
Valencia — September 1990

INTERREGIONAL TECHNOLOGICAL
CO-OPERATION IN EUROPE: CURRENT
TRENDS AND INDUSTRIAL PERSPECTIVES
FOR THE 1990s
Madrid — October 1990

United States

LICENSING EXECUTIVES SOCIETY, INC.
U.S.A./CANADA ANNUAL MEETING
New Orleans — October 1990

West Germany

IMEGA 90 (FOOD AND CATERING)
Munich — September 1990

SYSTEC 90 (INDUSTRIAL COMPUTER
APPLICATIONS)
Munich — October 1990

Canada

CANADIAN WESTERN AGRIBITION

Exhibition Park, Regina
November 24-30, 1990
Contact: Vanessa Headford, Canada Centre
Building, Box 3535, REGINA, Sask., S4P 3J8;
Tel.: (306) 565-0565; Fax: (306) 757-9963.

EPTECH 90 (HIGH TECHNOLOGY ELECTRONICS)

Holiday Inn Quebec Centre-Ville, Quebec City
September 18, 1990
Contact: Mediacion, Suite 301, 785 Plymouth
Avenue, MONTREAL, Que., H4P 1B3;
Tel.: (514) 739-7766.

and

Holiday Inn Halifax Centre
September 20, 1990
Contact: Show Co-ordinator, Lakeview
Publications Inc., Suite 27, 1200 Aerowood
Drive, MISSISSAUGA, Ont., L4W 2S7;
Tel.: (416) 624-8100; Fax: (416) 624-1760.

ENVIRONMENT TRADE SHOW AND CONGRESS

Metro Toronto Convention Centre
December 4-5, 1990
Contact: Stephanie Grant, Professional Show
and Association Management, Suite 302, 4920
Dundas Street West, TORONTO, Ont., M9A 1B6;
Tel.: (416) 234-1240; Fax: (416) 234-1695.

FOOD AND BEVERAGE EXHIBITION (PROCESSING) and CANADIAN FOOD INGREDIENTS EXPOSITION

Metro Toronto Convention Centre
October 22-24, 1990
Contact: Barry Winfield, Professional Show
and Association Management, Suite 302,
4290 Dundas Street West, Toronto, Ont., M9A 1B6;
Tel.: (416) 234-1240; Fax: (416) 234-1695.

23RD INTERNATIONAL DAIRY CONGRESS AND EXPOSITION 1990

Montreal Convention Centre
October 7-12, 1990

Contact: Richard Stern, Executive Director, P.O. Box 2143, Station D, OTTAWA, Ont., K1P 5W3; Tel.: (613) 238-4116; Fax: (613) 238-6247.

INTERNATIONAL WINE AND FOOD FESTIVAL

Congress Centre, Ottawa
November 2-4, 1990

Contact: Halina Player or Hubert de Gonneville, Show Organizers, Gourmex Expositions International, 255 Clemow Avenue, OTTAWA, Ont., K1S 2B5; Tel.: (613) 236-9931.

Bahrain

ARABBUILD 90 and MIDDLE EAST RISK CONTROL 90

Exhibition Centre, Bahrain
November 12-15, 1990

Contact: Unilink, Unit 41, 50 Weybright Court, AGINCOURT, Ont., M1S 5A8; Tel.: (416) 291-6359; Fax: (416) 291-0025.

France

INTERNATIONAL CHILD CARE SHOW

Porte de Versailles, Paris
September 1-4, 1990
and

SILMO (OPTICAL EQUIPMENT)

Porte de Versailles, Paris
October 26-29, 1990

Contact: Promosalons, Suite 503, 1200 Bay Street, TORONTO, Ont., M5R 2A5; Tel.: (416) 929-2562.

Saudi Arabia

SAUDIFOOD 91

Riyadh Exhibition Centre
January 19-23, 1991

Contact: Paul March, Overseas Exhibition Services Ltd., 11 Manchester Square, LONDON, W1M 5AB; Tel.: 071-486 1951; Fax: 071-486 8773

Spain

INTERNATIONAL FURNITURE FAIR

Valencia
September 25-30, 1990

Contact: F. Mateu de Ros, Feria Muestrario Internacional, Apartado 476, 46080, VALENCIA, Spain; Tel.: 386-1100; Fax: (6) 363-6111.

23rd International Dairy Congress and Exposition, Montreal October 7-12, 1990

Over 2 000 dairy industry representatives from over 50 countries will meet to address scientific, economic and technical issues and to seek out business opportunities at the 23rd International Dairy Congress. It will be the first time the congress has ever been held in North America.

The event, which is now held every four years, is sponsored by the International Dairy Federation, a non-profit organization that promotes problem-solving through international co-operation. Industry experts will give some 200 presentations on topics such as the following:

The Environment

- dairy herd waste disposal
- soil and water conservation
- packaging
- effluent reduction

New Technologies

- biotechnology (enhancing growth, production, flavour, etc.)
- reproductive technologies
- accelerated cheese ripening

Business

- pricing
- advertising
- marketing

Human Health

- nutrition
- calcium absorption
- product quality
- residues and contaminants in milk

Miscellaneous

- milk from buffalo, sheep and goats
- keeping cows healthy
- developing countries

In conjunction with the congress, Exposition 1990 will feature the products and services of over 150 international companies. All delegates to the congress who register before September 1 may attend the exposition at no additional charge.

Contact:

See Special Events listing in column on far left.



INTERREGIONAL TECHNOLOGICAL CO-OPERATION IN EUROPE: CURRENT TRENDS AND INDUSTRIAL PERSPECTIVES FOR THE 1990s

Palacia de Congresos, Madrid
October 23-24, 1990

Contact: TII, 3, rue des Capucins, L-1313 LUXEMBOURG; Tel.: 352 - 46 30 35; Fax: 352 - 46 21 85.

United States

LICENSING EXECUTIVES SOCIETY, INC. U.S.A./CANADA ANNUAL MEETING

Marriott Hotel, New Orleans
October 22-24, 1990

Contact: Jack Stuart Ott, 1444 West 10th Street, CLEVELAND, Ohio, 44113; Tel.: (216) 241-3940.

West Germany

IMEGA 90 (FOOD AND CATERING)

Munich Trade Fair Centre
September 15-20, 1990
and

SYSTEC 90 (INDUSTRIAL COMPUTER APPLICATIONS)

Munich Trade Fair Centre
October 22-26, 1990

Contact: Münchener Messe- und Ausstellungsgesellschaft mbH, Messegelände, Postfach 12 10 09, D-8000 MÜNCHEN 12; Tel.: (089) 51 07-0; Fax: (089) 51 07-506.

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Fax: (416) 973-8714

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Fax: (204) 983-2187

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Fax: (306) 975-5334

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Fax: (604) 666-8330

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