Canada Commerce

April 1985

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The Canada Awards for Excellence

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The Honourable SINCLAIR STEVENS
Minister, Department of Regional Industrial Expansion

The Canada Awards for Excellence provide recognition for outstanding achievements by the business and industrial communities, with the presentation of Awards for Excellence and Awards of Merit. A Canada Award for Excellence gives tribute to the medalist with:

- a formal awards presentation
- public displays of outstanding entries
- promotion of winning entries both nationally and locally
- enhancement of company prestige within the business community
- national recognition through corporate use of awards program symbol and product identification

CANADA RECOGNIZES EXCELLENCE IN THE FOLLOWING CATEGORIES:

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Given for outstanding improvement in productivity.
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Given to the owner/manager of an independently operated firm in Canada for outstanding achievement in a small or mid-sized business venture.
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Given for outstanding achievement in the identification, transfer, adaptation and commercial exploitation of technology.
1984 Winners: The National Research Council with Sciex Inc., Waterloo Centre for Process Development and Envirocon Ltd.

7. INNOVATION
Given for outstanding achievement in the innovative application of a technology to products, processes or services.
1984 Winners: Com Dev Ltd., Standard Tube Canada Ltd.

8. INDUSTRIAL DESIGN
Given for outstanding achievement in the design of a Canadian product.
1984 Winners: Versatile Ltd., GSM Design ltée.

9. ENGINEERING DESIGN
Given for outstanding contribution by design engineer to the development of a new industrial or consumer product.

Entries must be received by May 17th, 1985.

Complete and send in the attached coupon and we will send you a complete information package, including entry forms, **or** call the Awards and Design Directorate at (613) 992-5004, or contact the DRIE regional office.

Fill in completely and check off category of interest.

Mail to:
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Awards and Design Directorate (XEDC)
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THE CANADA AWARDS FOR EXCELLENCE 1985
The national tribute to business and industrial excellence

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Canada

Canada Commerce

The Honourable Sinclair Stevens
Minister of Regional Industrial Expansion

The Honourable Thomas McMillan
Minister of State for Tourism

The Honourable André Bissonnette
Minister of State for Small Businesses

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Business Review

Auto Industry Playing Its Part

Sales of Canadian auto parts to Japanese automobile manufacturers doubled last year to $51.7 million. And they are expected to soar even higher this year as that country expands its plants in the U.S. Last year's purchases included $16.6 million in parts and materials exported to Japan; $17.1 million worth of parts sold to Japanese plants in the U.S.; and $18 million in parts and accessories for Canadian market use.

Ontario Firms Win Achievement Awards

Four Ontario firms have received Achievement Awards from the Ontario government for various phases of business development, as selected by a panel of business executives, industry leaders and officials of the province's Ministry of Industry and Trade.

Canadian Shipbuilding and Engineering Ltd., Collingwood, won the award for managing technological change. This 100-year-old shipyard had boosted productivity and maintained international competitiveness by incorporating computer-aided design and computer-aided manufacturing (CAD/CAM) into its design and production operations.

Linear Technology Ltd., Burlington, received its award for the export of manufactured goods. The company perfected and cornered the world market for a micro-chip used as an amplifier in hearing aids. With sales of $10 million in 1984, it exports 90 per cent of production to Western Europe, Australia and the Far East including Japan.

McLaren Morris and Todd Ltd., Mississauga, won the award for sales in Canada. Founded in 1956, this lithography firm provided early production support for the creators of the Trivial Pursuit board game. In 1984 it produced 5.7 million of the games increasing staff to 245 and sales exceeding $60 million.

Nelson's Dairy Ltd., North York, received the award for product development. In-house research and development pioneered the production of sterilized dairy products with extra-long shelf life. Today it has annual sales of $15 million and a staff of 85, eight of whom are engaged in ongoing R&D.

From Canada With Pride

The 1 200th set of wings built in Canada for McDonnell Douglas twin-jet transports has been delivered to the Long Beach, California, plant of the Douglas Aircraft Company division of McDonnell Douglas Corporation. Chris G. Pappas, left, a Douglas senior buyer, and Walter Jerome, McDonnell Douglas Canada representative, were on hand when the wings, with a total span of 32.8 metres (107 feet, 10 inches), were unloaded from a special rail car and moved to an assembly hangar. The Canadian facility has been building wings for DC-9 and MD-80 twin-jets for more than 20 years and also provides wings for DC-10 and KC-10 tri-jets.

Wind Energy Now Has Its Own Association

Representatives from the Canadian wind energy industry have announced the formation of their own association, the Canadian Wind Energy Association (CanWEA). The new association is designed to represent the wind energy industry to governments, the financial community and the public and to promote the use of wind energy in Canada.

The association's first board of directors includes: Mary Ellen Jones, Calgary; Alex Printzios, Toronto; Vincent Lacy, Toronto; Albert Watts, Quebec; and Malcolm Lodge, P.E.I.

Anyone wishing further information about CanWEA should contact Malcolm Lodge, 49 Pownal Street, Charlottetown, Prince Edward Island, C1A 3W2; Tel: (902) 892-0362.

Space Technology Brought Down to Earth

Spar Aerospace Limited and Inco Ltd. have announced the signing of a memorandum of understanding to jointly develop remotely controlled underground mining equipment. It is anticipated that this agreement will lead to Spar's remote manipulator technology — developed for the Canadarm used on the NASA Space Shuttle — being applied to mining equipment. The goal is to enhance the safety and productivity of Inco's mining operations.

Inco Ltd. is the world's largest producer of nickel with mining operations in Ontario and Manitoba and also in Indonesia. Spar is active in domestic and international advanced technology markets which include a recent satellite communications system for Brazil.

Finding Jobs for Rehabilitated Workers

Ontario's Worker's Compensation Board has introduced a plan to get rehabilitated workers back into the work force sooner. Employment specialists of the board are being introduced to employers through a series of ads in local newspapers across the province. In addition to saving costs in compensation payments, the program will assist injured workers find meaningful employment.

As an inducement to employers, the board provides wages during the assessment period and continues partial wage payment until job training is complete. Slogan for the campaign is "Back a Comeback".

Getting It There At The Right Price

While the southern "Sun Belt" states of the United States are the fastest growing markets for a widening range of goods and services, only those Canadian firms who can get their products there at the right price will be successful. This is the conclusion of a recent External Affairs report, *Simplifying Your Transportation to Southern United States Markets*. This latest study takes a systematic look at the region regarding the relative attractiveness of its markets to the different transportation modes available to access it; the magnitude of costs involved; documentation requirements; and how to reduce overall shipping costs by using U.S. public warehousing facilities and bonded warehousing in free trade zones for offshore re-export.

Copies of the study may be obtained from any DRIE regional office or by using External Affairs' Info Export "Hotline" number 1-800-267-8376.

Conference Round-up

Canada Hosts IEC for First Time

The 50th General Meeting of the International Electrotechnology Commission (IEC) will be held in Montreal, May 20 to June 1. The IEC is a world body that sets international electrical and electronic standards. Combined, the 43 member countries of IEC produce and consume 80 per cent of the world's electrical energy and 90 per cent of all electrical and electronic goods. Besides the Standards Council of Canada, which sponsors the Canadian National Committee of IEC, Canadian involvement in this international work is supported by Canada's electrical and electronics industries, the federal and provincial governments and the Canadian standards community. Further information can be obtained from Clifford Brimmel or Jacques Robitaille, (613) 238-3222.

Seminar On Financing

Robert Prechter, whose award-winning financial record speaks for itself, will be discussing how to capitalize on the next moves in interest rates, precious metals, and the stock market. The presentation is scheduled for an evening near the end of May, in Toronto.

For complete details phone Brian Casselman (collect) at (416) 591-5517.

European Shows

The International Gas Union Conference and Exhibition is to be held in Munich, Germany, June 24 to 27, and the Mining Exhibition at Birmingham and London, England, June 10 to 14. For further information, contact the Export "Hotline" of External Affairs — 1-800-267-8376.

World SMB Conference to be Held in June at Montreal's HEC

From June 16 to 19, at an international conference held at the University of Montreal's École des hautes études commerciales (HEC), some 600 people representing several different countries will discuss the future of small and medium-sized business (SMB).

The Thirtieth World Conference of the International Council for Small Business (ICSB) will be chaired by Robert Bilodeau, a Quebec businessman, and will focus on the role of entrepreneurship in SMB development. The theme of the conference will be "SMBs in the entrepreneurial age".

Participants will discuss: the role of universities in the training of entrepreneurs; risk capital for SMBs; robotics and computerization accessible to SMBs; SMB development in areas outside the major urban centres; SMB management (franchising, exporting, manufacturing under licence, growth, takeovers); and the start-up of businesses in developing countries (concrete cases will be presented by representatives of countries such as Mexico, Brazil, Senegal, the Ivory Coast, India).

The International Council for Small Business, which organizes the annual conference (held in Chicago last year), includes among its members academics, government organizations and business associations from approximately 30 different countries. In Canada, the ICSB has 250 members from various sectors interested in the development of SMBs.

For further information, contact: Jean-Marie Toulouse, International Council of Small Business, 5255 Deselles Avenue, Montreal, Quebec, H3T 1V6; Tel: (514) 343-4605.

Zero Inventory Management

R.L. Hall, author of the book *Zero Inventory* and an authority on Japanese management practices will offer a two-day seminar on the topic at McMaster University, Hamilton on May 30-31. Contact Dr. R.E. Ross, (416) 525-9140 ex. 4636.

Robotics Symposium

A Robotics Symposium in the French language will be held at the CEGEP La Pocatière, Quebec, June 10 to 12. For further information call CEGEP de la Pocatière (418) 856-1525 ex. 379.

Calgary Firm a Leader in Real-Time Ice Surveillance

In Canada, maybe more than in most countries, it is not just of benefit but of vital concern to predict with accuracy the movement of weather patterns and sea-ice.

Star-2, an airborne synthetic aperture radar (SAR) system for commercial all-weather mapping of sea-ice and terrain, is the second high resolution SAR system developed and built to the specifications of Intera Technologies Ltd. of Calgary.

Intera's Star-1, a multi-million dollar, high resolution remote sensing system (installed in an economical Cessna Conquest 441 turboprop aircraft) has, after one year of operation, grossed $6 million in revenue receipts. Its success and high world demand — it has been in use every single day and flown over 2 000 hours in commercial service — have prompted Intera to begin production on the more sophisticated Star-2.

Brian Bullock, president of Intera Technologies Ltd., signs a contract with J. MacDonald, chairman of MacDonald Dettwiler and Associates, to produce real-time processing hardware for Intera's STAR-2.

MacDonald Dettwiler and Associates (MDA) of Vancouver, who manufactured the real-time processing hardware for Star-1, has signed a production agreement with Intera for another of MDA's IRIS radar imaging systems. IRIS, Intera's computer equipment and an executive-size jet aircraft together combine to form the Star-2 package.

The IRIS radar equipment will be housed in a bulbous black radome on the underside of a jet aircraft and will work with Intera's computer equipment inside the plane to produce instant photo-like prints of the terrain below.

Simultaneously, the images produced of the land or sea and ice below the plane can be radioed to base stations like drilling ships or icebreakers so that they can react immediately to changing conditions.

The images derived from radar look like aerial photographs. The major advantage over photography, however, is that radar will produce an image even in the worst possible weather conditions.

Star-2 will retain the high resolution and real-time down link performance specifications of Star-1 but be further refined by increasing processing speed and transmitting power and by the development of an all-digital display and recording system.

The development of a second Star system will strengthen Intera's position as the leader in the field of real-time ice surveillance and accelerate the company's growth in terrain mapping.

The main use of the STAR system in Canada has been in ice monitoring for oil companies operating in the far north. It has also been used in the Northwest Passage to help ships navigate through winter waters.

Technological crossovers and innovations are byproducts of Intera's synergism of theoretical expertise and practical experience.

Concurrently, Bullock has formulated a complementary service for oil and gas companies with the development of a microcomputer software package to assist with decision making in that industry.

Intera salesmen are now looking overseas to sell such services as monitoring oil spills, doing geographical surveys through dense cloud and picking up traces of nuclear waste which have leaked into ground water.

Brian Bullock, the president of Intera Technologies Ltd., joined the company in 1972 as general manager of the fledgling Era Instruments Ltd.

The following year, after the death of the company's founder, he negotiated its sale to a larger company which offered complementary services in petroleum reservoir-engineering and air quality modelling. Its environmental division, based in Houston, Texas, was amalgamated with Era to form Intera Environmental Consultants. In 1977 this company separated from its parent and became employee-owned, as it is today under its new name of Intera Technologies Ltd.

Affiliation with the parent company from 1974 to 1977 allowed Bullock to learn about the requirements and operations of the petroleum industry — information which later was to prove valuable in his assessment of the potential markets for product and service developments within Intera.

In all, Intera's technical expertise covers resource exploration and production support, groundwater and waste site evaluation, weather modification and meteorological services, remote sensing and biophysical studies.

Technological crossovers and innovations are natural byproducts of Intera's synergistic environment of theoretical expertise and practical experience.

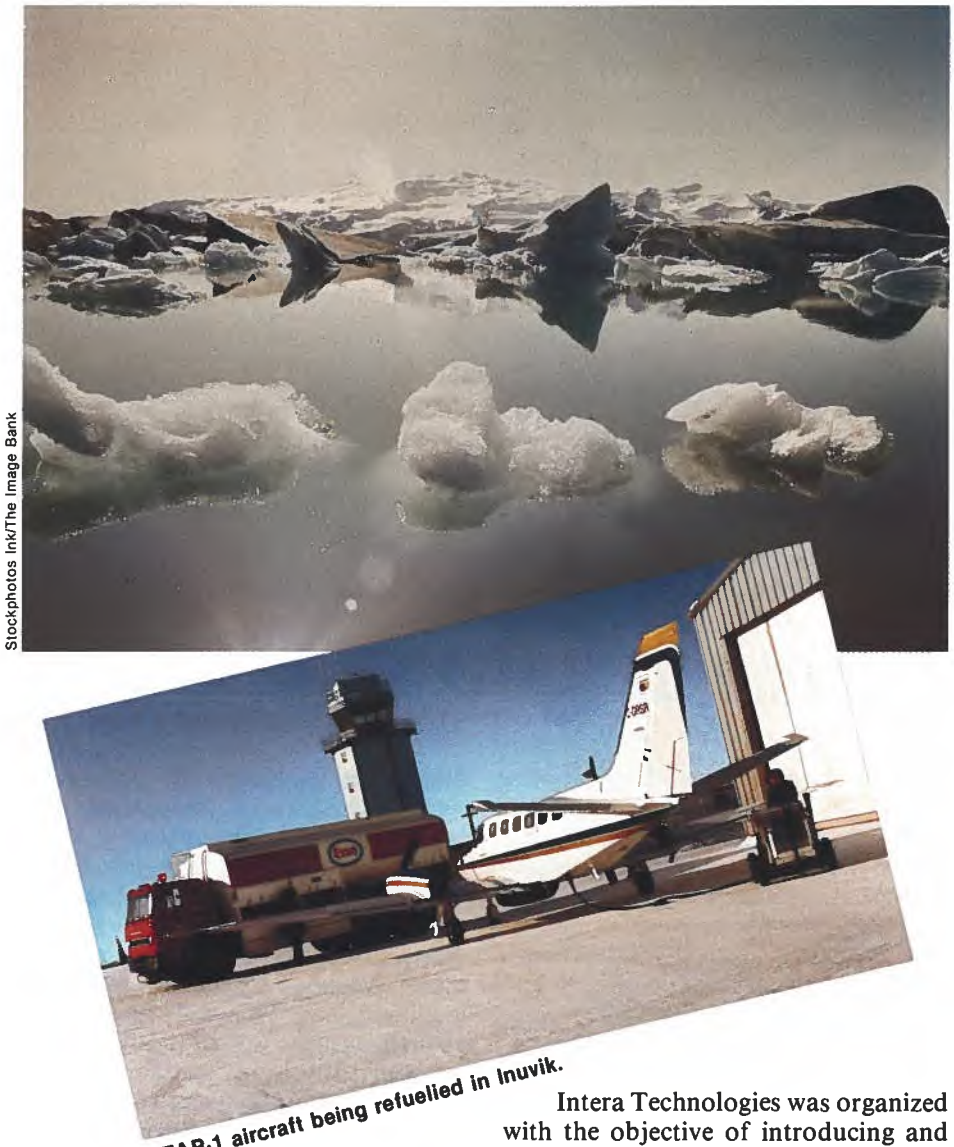
Among these accomplishments:

- Development of the first fully 3-D simulation system for atmospheric diffusion in areas where terrain effects dominate;
- Introduction of advanced, remote sensing techniques to environmental management fields such as biomonitoring;
- Introduction of the first 3-D, fluid properties dependent, coupled groundwater simulator;
- Introduction of the first airborne Synthetic Aperture Radar specifically designed and built for commercial use featuring lightweight, wide swath and digital real-time processing;
- First introduction and application of quantitative uncertainty analysis techniques to hydrogeology and rock mechanics fields.

Bullock acknowledges that his company's growth has been significantly aided by government scientific research agencies which have contracted out work to Intera.

For the past 10 years Intera has been providing aircraft, crews and radar controllers for the Alberta Research Council's cloud seeding program, designed to reduce hail damage to agriculture.

A major advance in Intera's involvement in remote sensing in Canada was made in 1974 when, with Innotech Aviation, the company responded to a request for proposal from the Canada Centre for Remote Sensing (CCRS) for a Transfer to Industry program involving commercialization of remote sensing technologies in Canada. Intera and Innotech are still carrying out this contract which has been renewed twice.



Stockphotos Ink/The Image Bank

STAR-1 aircraft being refuelled in Inuvik.

President Bullock acknowledges that Intera's growth has been significantly aided by government research agency contract work.

Intera Technologies was organized with the objective of introducing and applying advanced technologies to environmental management. Throughout its existence the company has offered high quality work and responsiveness to client needs.

Through research into potential markets identified by his own creative ideas, Brian Bullock has mobilized Intera into a flourishing business. Its success looks most promising.

For further information, please contact:
Intera Technologies Ltd.
1200 - 510 - 5th Street S.W.
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— by Gillian Welbourne
Canada Commerce

Space Age Juice

The raw material: concentrates. The product: some of the best juice in the world. The containers: varied, functional and revolutionary. Customer service: maximum efficiency, prompt delivery, computerized inventory. Reason for the firm's success: entrepreneurial spirit and ongoing research and development. The company: A Lassonde & Fils Inc.

In 1918, Aristide Lassonde opened a small vegetable-packing plant. Today, this small business has become a major holding company, INDUSTRIES LASSONDE INC., grouping the following divisions: A Lassonde & Fils (Rougemont and Oasis juice), les Aliments Mont-Rouge (Mont-Rouge juice), les Produits Ronald (Canton), Vac-O-Nut (nuts and dried fruit) and Lassonde Technologie.

The group employs 300 people full time, including about 10 specialists working in R & D and quality control. The company, which has its head office in Rougemont, uses over 65 per cent of the total Quebec production of industrial apples (90 000 tons according to an August 1984 estimate). With sales of approximately $52 million in 1984, Lassonde & Fils ranks 121st among the top 200 firms controlled by Quebecers.

In 1979, Lassonde & Fils launched three pure fruit juices under the Oasis label. The new product line proved an overwhelming success. It grabbed a significant share of the market as a result of its appealing taste and, above all, its revolutionary new container, imported from Germany. The Lassonde & Fils company holds the exclusive North American rights for this container. Made of laminated cardboard, it is light, easy to handle and can be opened with the tip of a knife.

Currently, the Rougemont and Oasis brands dominate the eastern Canadian market. However, customer needs change and manufacturing techniques must evolve if a company is to stay in the running. Nothing lasts forever. The constant updating of procedures by teams of engineers and technologists makes it possible to improve existing products as well as create new ones.

The Lassonde Technologie subsidiary is responsible for the marketing of the company's revolutionary fruit juice manufacturing technique: the *Clarifruit* procedure. The inventor, Yves Dumont, is vice-president, research and development.

The cost of the activities involved in this innovation: one million dollars. The advantages: increased productivity for all plant operations; more expeditious manufacturing of juice; a process which is automated and energy-efficient; lower labour costs; and a rapid return on investment. Developed in 1977, the system makes it possible to manufacture high-quality juice in 45 minutes. Amount of time saved: six to 16 hours.

Lassonde Technologie holds the exclusive patent for the *Clarifruit* procedure and has already sold rights to concerns in British Columbia, France and South Africa. As for the future, it looks even brighter.

Before explaining the *Clarifruit* procedure, we should mention product packaging. The apple juice, for example, is identified as 100 per cent pure, unsweetened. The illustration on the container consists of a glass of juice behind a shiny red apple, with an orchard in the background. This reminds people that it is apple juice, not apple drink. Lassonde & Fils takes the wants and needs of consumers into account in the marketing of all its products.

The *Clarifruit* procedure makes use of major breakthroughs in recent years with regard to enzymatic juice processing (and flocculating agents). Using an innovative industrial approach, this method incorporates and develops the major principles of traditional clarification — destabilization through enzymatic action; flocculation using gelatin, bentonite and other substances; and separation through flotation. It can also be used in the clarification of other fruit juices (grape, pear and so on) where the flocculation stage precedes particle separation.

The *Clarifruit* technique was developed by an apple juice producer who, for years, had been grappling with daily production problems. A number of technical improvements have been made in this sector over the past 20 years in the extraction of must (crude juice), the use of enzymes and the final filtering process. However, the slowness of the clarification process has long thwarted attempts to improve productivity, something essential to the survival of the industry.

The production of apple juice involves several different stages — the receiving, sorting and washing of the apples; the crushing of the fruit to produce gratings; the pressing of the gratings to extract a 70 to 80 per cent must solution; the clarification of the must; refining; and final processing and packaging (bottling, concentration, storage in vats). Although the other stages are

all important and interrelated, this article will deal exclusively with the must clarification stage.

After it has been extracted, the must undergoes initial refining to eliminate the largest particles (seeds, pieces of fruit). Next, there is a series of operations to clarify and stabilize the must. These include: depectinization (destabilization), flocculation and sedimentation. As a rule, these consecutive operations can take from six to 16 hours and cannot be carried out continuously. Moreover, the entire process uses up a large number of vats and thus creates a serious bottleneck in operations.

The *Clarifruit* flocculation/flotation technique is designed to optimize conventional clarification operations and permits continuous production. Destabilization is induced through the continuous addition to the must of pectic enzymes and amylases, if necessary.

This operation can be controlled and regulated by a viscometer monitoring the condition of the must (pectin content) and other parameters (desired rate of reaction, reaction time, and so on). This very important enzymatic stage must be completed before moving on to the next stage, flocculation. This involves adding various fining agents (gelatin, bentonite and others) in a continuous fashion and allowing the mixture to sit for a few minutes in a flocculation vat so that it will become homogenized.

Finally, there is the separation stage. The coagulated must is put into the cone of the flotation tank along with a certain amount of clarified juice, supersaturated with nitrogen. The mixture depressurizes and tiny bubbles form in the coagulated must, forcing the floc to the surface. The clarified juice can then be collected, in a continuous fashion, from the base of the flotation tank.

Lassonde Technologie makes a pilot flotation unit, with a capacity of 300 litres/hour, available to juice producers wishing to carry out a complete and continuous evaluation of the process at their own plants. *Clarifruit* technicians can help clients benefit from the experience and expertise they have acquired under extremely varied conditions (cider apples, sweet apples, different varieties) in different climates and countries.

In early 1983, realizing how important this new technology could be for the juice industry, A Lassonde & Fils decided to develop and market the process worldwide.

This involved various steps. First came the registration of the *Clarifruit* trademark, for the continuous fruit juice clarification procedure, in most industrialized countries. Next there was the negotiation of contracts with various universities and research centres, both in North America (Laval University, Quebec Industrial Research Centre, National Research Council of Canada) and in Europe (France's ANVAR and INRA), in order to improve and develop the basic procedure so that it could be used under all conditions (varieties). And finally, construction of three pilot *Clarifruit* units had to be arranged, each able to process 300 litres of juice an hour without interruption. These extremely mobile devices make it possible to evaluate the process at the pre-industrial level in the user's own plant.

The rapid growth of A Lassonde & Fils Inc. is attributable, at least in part, to the path charted and followed over the past few years by Pierre-Paul Lassonde, chairman of the board, and Jean-Paul Barré, president and general manager. As they see it, the firm's success is based on its willingness to take calculated risks, its entrepreneurial spirit, and the use of skilled staff and state-of-the-art equipment and technology.

For further information, contact:
LASSONDE TECHNOLOGIE INC,
170 5th Avenue
Rougemont, Quebec
J0L 1M0
Tel: (514) 878-1057
Telex: 05-832553

Advantages of Clarifruit

- A continuous processing system, resulting in improved productivity for all plant operations;
- Reduction in the use of filtering agents (Kieselguhr) (DE) (over 90 per cent savings in comparison with the total filtration of coagulated must);
- Possibility of partial or full automation of clarification process;
- Improved product quality (faster process);
- Increased production in comparison with conventional procedure (2 to 5 per cent);
- Energy efficiency;
- Lower labour costs (automated system);
- Simplicity, hardiness and reliability of the device (heavy-duty equipment, conventional pumps);
- Considerable flexibility (variable capacity);
- Optimal use of fining agents (prevents overfining or excessive use of enzymes);
- Rapid return on investment.

— by Pierre Simard
Canada Commerce

High Technology Comes to Cornwall, Ontario

From sonar systems for Arctic navigation through receivers for home satellite television viewing to software programs for one of the world's most popular computer systems — high-tech diversity has come to Cornwall, Ontario.

Six independent advanced technology companies now exist where there used to be one. Millions of dollars in orders are now flooding in for various products. More than a hundred new jobs have been created. New technology continues to be developed, and new markets continue to be identified on a global basis.

Silicon Valley in California and more recent developments in Ottawa-Carleton's Silicon Valley North have demonstrated that high-tech companies, and more specifically high-tech entrepreneurs, often leave themselves in very vulnerable positions by dropping too many eggs into one technological basket. The initial demand for one product can and often does ensure exponential growth for a few months to a few years, but the steep incline of that growth curve forces many management and marketing decisions to be made under extreme pressure.

The pressure to stay out in front, to beat the competition, and to serve the needs of a growing list of customers can paint companies into a corner, one that's difficult to get out of when other manufacturers begin to catch up, the competitive advantage is lost and markets begin to shrink.

The Cornwall scenario is proving that high-tech inventors and entrepreneurs, given access to the right kind of business management, financial planning and marketing expertise, can take ideas and quickly turn them into research prototypes which can be manufactured locally on an assembly line. Cornwall is also proving that small cities and towns plagued by one industry or blue collar labels can, given capable business leadership, host a healthy mix of low, medium, and high technology companies.

Scannar's MAQ sonar for commercial fishing use.

This story officially begins in early 1983 with the arrival of three financial partners in Cornwall. After studying the market and evaluating the technology being produced, they decided to invest more than a million dollars and take over controlling interest in Scannar Industries, an underwater technology company which was manufacturing a sonar system for commercial fishing and military markets. Scannar had developed the world's first digital, self-diagnostic sonar employing high speed digital circuits and micro-processor control.

The Cornwall example proves that small cities, given capable business leadership, can be hosts to a healthy, mix of low, medium and high technology companies.

The three partners, David Hart, Hermann Rupprecht and Peter Appleton, brought with them not only investment capital but, more importantly, over 50 years of combined financial management, marketing and entrepreneurial business experience.

The next chapter in this story begins with the entry of a classic high-tech entrepreneur. Bill Robson, a mechanical engineer, had been an employee of Scannar, leading the life of sonar designer by day and self-employed industrial instrumentation designer by night. In 1980, he left the underwater technology company and pushed ahead with what had been a basement operation. Cornwall Electro Products, now known as Sepcor Engineering Inc., was manufacturing a voltage monitor for the industrial marketplace.

Robson's enterprise was a qualified success but he lacked capital for further research and development, and business expansion. He was an inventor, an idea man who needed funds and sound financial planning in order to use those funds most effectively.

Re-enter the financial partners. Hart, Rupprecht and Appleton were able to offer, in much the same way an incubator centre does, the management skill needed to develop a more far-reaching business plan.

At the same time as this association was beginning to take shape, two other

companies also working in the industrial instrumentation field came up for sale. They were purchased, located in Cornwalk and placed under the technical control of Robson.

Now, what was one company had become four.

Since the re-organization of these three industrial instrumentation firms, more than $350 000 have been spent in research and development.

Another company called Sentor Industries Inc., using ultra sonics, has developed a flow monitoring technology for use by heavy industries working with petroleum, chemicals and waste water management systems. Orders for the product have gone up by more than 600 per cent over the past year, reaching almost the three-quarters-of-a-million-dollar mark.

The third company, Scalar Electronix Inc., in addition to a full line of weighing products, has developed an electronic scale built specifically to meet the needs and design specifications for a recently tendered $10 million Canada Post Corporation contract. The resulting product is a one-of-a-kind technology, ahead of any scale now employed by major post offices of the western world.

Scalar's GENIE, as it is called, is the ultimate in programmed microelectronics for weighing. Extensive research and development has given birth to a technical concept which takes advantage of microprocessor technologies and, based on an already proven format of system customization through the use of standard components, creates an advanced computerized weighing system capable of adaptation to any weighing application in any industry.

Strength through diversity offers the entrepreneur or entrepreneurs the chance to take risks, to back new inventions, the Scannar experiment in Cornwall shows.

The American, British and French post offices are very interested in this new state-of-the-art concept. Scalar Electronix is looking at this contract with Canada Post as a major jumping off point for the company. The chance to supply a major Canadian Crown corporation with new and up-graded equipment will lend unlimited credibility to the company and help the industrial instrumentation firm compete more aggressively on the world stage . . . particularly in large and lucrative markets like the one south of the border.

Strength through diversity offers the entrepreneur or entrepreneurs the chance to take risks, to back new inventions. Some will be winners, some will be losers. One tries to minimize the losses and maximize the gains.

GENIE, Scalar Electronix' innovative microelectronics postal weighing equipment.

The next chapter of this Cornwall high technology story involves the backing of a winner. Hart, Rupprecht and Appleton were introduced to Daniel Bernesi in the spring of 1984. He had a plan to build a better receiver for the home satellite television market. He was convinced he could put together a product which would compete with, if not better, existing systems in the industry.

A working prototype was taken to a consumer electronics trade show in Chicago, in June. Industry observers quickly embraced the new product and the three partners decided to back the inventor. To date, close to a million dollars have been invested in research and development for the satellite television receiver. Scannar Satellite Systems, as it is called, now finds itself, after visiting other American trade shows, with orders for more than $5 million worth of the product. The new spin-off company is confident it can grab a 10 per cent share of the high end market for home satellite television receivers during its first full year of production.

As it turned out, the three partners and the satellite receiver inventor could not have found a better time to join forces. A whole new era in home satellite television was signalled by the recent passing of new legislation in Washington, in October. Both the American Senate and the House of Representatives endorsed a new cable bill which reaffirms the legality of home earth stations. Similar changes have also been made recently in Canada by the CRTC.

This opens the door to what is destined to be a billion dollar plus industry for the next half decade. There are 30 000 000 potential households across the continent (mainly American) which have no cable and are frustrated by poor reception and the small number of channels available. Many consumers, experts feel, have stayed away from this technology because they were worried about its legal implications. It is felt these worries will now be put aside and the industry will explode.

Synergism is another healthy by-product of close working relationships in an advanced technology environment. Anytime a group of business people, inventors and idea people spend time together in the same community a vital exchange takes place. Often that

exchange results in the development of new products and technology, or even new enterprises altogether.

The relationship between computer specialist Peter Gervais (a Cornwall neighbour of Bill Robson's) and the three financial partners began with a consulting contract at Scannar Industries. Gervais wrote software programs for use in the development of new sonar designs. During his four-month stay he got to know Hart, Rupprecht and Appleton and began investigating the market potential for a new software package. His study proved favourable and the result, given adequate investment capital, was the start of a new company called Uniport Systems Inc., founded in September.

Uniport has since developed a series of software programs, called WorDraw, for use with the UNIX operating system. The programs have a general purpose application with word processing and typesetting capabilities, and are structured specifically to meet the demands of computer aided design and drafting (CAD). The American company AT&T is interested in the software for its new line of mini-computers and there are many other hardware manufacturers using the UNIX operating system which could also become distributors of the Uniport package. Preliminary feedback has been very positive and the company is optimistic it can carve out a healthy niche in what is predicted to be a multi-million dollar market.

Sentor's portable doppler flow meter.

Another member of the Scannar group of companies, Sentor has developed flow monitoring equipment such as this ultrasonic level monitor.

Meanwhile, Scannar Industries, the company initially invested in by the three partners, is busy putting the finishing touches on a new five-year research and development plan . . . a plan which will see the company doing everything from developing sonar for Arctic navigation and offshore drilling to entering new fields of study such as satellite oceanography and marine biotechnology.

In short, the arrival of these three partners into Cornwall has taken one company and, by association with other keen minds and the mixing of business and technical skill, expanded it and created five other independent enterprises. There is a synergy growing among them that comes from the sharing of intellectual, financial and technical resources.

Collectively, these companies now employ over a hundred, a number which will more than double during the next year as manufacturing gears up. In total, these companies have orders for upwards of eight million dollars worth of product, and markets which stretch from Canada, through the United States, Japan, Australia, Europe, and around the world.

The strength of this group of advanced technology companies is in its diversity. This Cornwall example demonstrates how three partners, instead of building one large corporate block, have opted for a cellular or de-centralized approach. This allows each individual company to remain relatively small, agile and capable of responding quickly to changing market demands. It also allows individual experts to fully exploit their own fields. Jobs get done faster and more efficiently. There is no one, large, slow moving bureaucracy through which everything must be processed.

The reality, too, is that small companies and entrepreneurial minds specialize in generating ideas not business plans. They can benefit from the business management skill available to them. There is a guiding hand there to help these start-up companies find their market niche and get up to speed.

Statistics prove 80 per cent of new companies go under during their first five years of operation. They may have plans for a much better mouse trap etched plainly on their drafting tables, but without the ability to draw up a solid business plan they lack the firm foundation needed to build upon.

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Native Business Women on the Move

The year 1985 may well go down as *The Year of the Aboriginal Business Woman.*

That was the unanimous consensus voiced by some 200 Native business women in Winnipeg recently for the first national Aboriginal Business Women's Workshop (ABWW) ever held in Canada.

Said Winnipeg restaurateur Mary Richard, workshop chairperson and member of the ABWW steering committee, "This event may be the first time Aboriginal business women in any country gathered on a national basis."

A highlight was the formation of the Aboriginal Women's Business Development Corporation, Canada's first national business institution owned and controlled by Native women.

This autonomous institutional enterprise is headed by British Columbia business owner Susan Tatoosh who was elected founding president by the 11-member Board of Directors.

The purpose of the corporation is to direct and improve entrepreneurial opportunities for Native women, said Tatoosh. This will be done by providing a wide range of services including business training sessions in the communities for potential women entrepreneurs.

Other services will include financial and technical assistance, research, consultation and advice, loans to establish viable and appropriate women-owned businesses and a networking organization to provide Native women the collective experiences of successful business women.

Tatoosh is part-owner of a British Columbia construction firm, an executive with several other Native companies and a member of the advisory board of the $345 million federal Native Economic Development Program (NEDP).

Other members of the Aboriginal Women's Business Development Corporation executive are: journalist Thelma Chalifoux of Edmonton, vice-president; Barbara Wyss, an economic development officer from British Columbia, secretary; and Saskatchewan retail entrepreneur Lorna Standing Ready, treasurer.

Board members are: Gail Stacey-Moore of Quebec; Barbara Bruce of Manitoba; Elsie Wingeno of Alberta; Judy Gingell of Yukon; Shirley Bear of New Brunswick; Pat George of Quebec; and Linda Maloney of Nova Scotia.

The highly successful Aboriginal Business Women's Workshop drew praise from all delegates.

Mary Simon, president of the Inuit-owned multi-million dollar Makivik Corporation of Quebec and a theme speaker at the workshop, said it provided the first opportunity for Native business women to exchange experiences and other helpful information in a national context.

Susan Tatoosh, opening speaker at the workshop, said it was not only a great morale booster to those in attendance but would have subsequent beneficial impact on Native women in communities across the country.

Mary Richard, Mary Simon and Susan Tatoosh are all members of the Advisory Board of the Native Economic Development Program (NEDP) which provided $83 500 to finance the workshop. Mary Simon is vice-chairman of the Advisory Board.

"The $83 500 NEDP contribution to the workshop is a very worthwhile investment that will pay dividends to Native business women and to Native economic self-reliance for many years to come," workshop chairperson Mary Richard said.

The Native business women who played major roles in the Aboriginal Women's Business Workshop, left to right: Elsie Crate, workshop administrator; Winnipeg restaurateur Mary Richard; and Doris Young, workshop co-ordinator.

National conference and workshop was a follow-up to a nation-wide Task Force on Native Women and Economic Development in 1984.

Shirley Maracle addresses the recent Aboriginal Women's Business Workshop.

Certainly, there was no absence of economic self-reliance at the workshop which heard success story after success story from entrepreneur delegates and resource personnel.

There was hairstylist shop owner Linda Maloney of Truro, Nova Scotia; Friendship Centre executive director Shirley O'Connor of Sioux Lookout, Ontario; Winnipeg lawyer-business woman Marion (Ironquill) Meadmore; crafts shop owner-operator Bernadette Lockhart from the Dene Community of Snowdrift in the lower Mackenzie Valley of the Northwest Territories; fashion designer Charlaine Starlight from the Sarcee Reservation near Calgary; fellow-Albertan Shirley Maracle who owns a three-store specialty products chain in Edmonton; model agency owner Blanche MacDonald of Vancouver; and . . . the list goes on.

The national conference and workshop of Native business women in Winnipeg was a follow-up of a national Task Force on Native Women and Economic Development held in the summer of 1984. Sponsored and financed by the NEDP and chaired by Mary Richard, the task force held hearings in 22 urban centres across Canada.

The four-member, all-Native task force also included NEDP board members Susan Tatoosh, Bill Lee of Winnipeg and Wakefield, Quebec, and Bill Lyall of Cambridge Bay, Northwest Territories.

"What we learned at the task force hearings from Native women were the problems and concerns facing Native women in their efforts to become full partners in the business and economic life in Canada," commented Richard.

"We knew the problems. The Winnipeg workshop concerned itself with seeking solutions."

Some of the answers were provided by successful Native business women at the workshop who related their experiences at the general sessions and answered the many questions.

Delegates were designated to one of the several workshops which dealt in depth with problems of how to start a business, financing, managerial advice, personnel supervision and other pertinent matters.

The national workshop was sponsored by the Indian and Métis Senior Citizens Group of Winnipeg, an organization much respected and appreciated by the Native community of Winnipeg and Manitoba for acting as a catalyst to many projects over the years.

For further information on the Aboriginal Women's Business Development Corporation, please contact:
Susan Tatoosh
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V3L 1E2
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Simon Brascoupé, Native Culture Empressario

Simon Brascoupé must be the only public servant in Canada who has original works of art in Ottawa's Museum of Man, in the Smithsonian Institution, in New York's Museum of the American Indian and in the Native American Center for the Living Arts in Niagara Falls, New York.

A member of the River Desert Band of Algonquin Indians in Maniwaki, Quebec, this exceptional young Canadian Indian seems entirely unable to dissipate the constant flow of artistic energy that streams into his mind while he sits behind his desk at Indian and Northern Affairs Canada. Officially, he is reviewing cultural programs and policy as manager, Special Projects, for the federal department's Indian Art Centre.

Involved with promoting Indian arts and crafts, his work focuses on drawing attention to the rich cultural heritage of contemporary native Indian artists and crafts people.

Brascoupé admits he is "more entrepreneurial than other artists" and has set up a workshop in the garage of his Ottawa home to produce unique stencilled woodcuts.

Besides exhibiting all over Canada and the United States, he thrives on a life of constant activity. He lectures; produces films and co-ordinates film festivals and art exhibitions; travels incessantly on business and pleasure; gives brunches and garden parties with his wife, Sheila Pocock; goes to powwows with his family; attends international conferences; and helps younger artists get started on their careers.

As Brascoupé says, "My family, my native community and my art are what concern me most."

Not a traditional Woodland artist (this group includes Algonquin, Iroquois, Mohawk and Malecite Indians), not a "rock-pine-water" landscape painter nor even a Surrealist, in his career Simon Brascoupé nonetheless chronicles the awakening of a sensitive soul to the world's beauties, not only of nature but of man's triumphs, many of them in the distant past.

His engaging limited edition prints depicting Indian legends, rock art carvings and the universe are a direct challenge to the Woodland Indian tradition. He has, in fact, developed his own private symbolism.

"Any time a human being scratches lines, you've created your own private language," he says. It isn't surprising, therefore, to find that Brascoupé is extremely interested in petroglyphs or "Indian rock art".

Simon Brascoupé and one of his original woodcuts.

An originai woodcut by Simon Brascoupé.

Sites can be found all over North America but the one which has made a lasting impression on this complex young man is located in the Kawartha Lake area north of Toronto, known as the Peterborough petroglyphs. Brascoupé says that these rock carvings were carved into the surface of exposed crystalline limestone sometime between 1000 and 1500 A.D. by Algonquin Indians.

"The book *Sacred Art of the Algonkians* by Joan M. Vastokas and Romas K. Vastokas explains the mystery of these petroglyphs," he says.

"People don't come in contact with Indians unless they live near a reservation. So the movie mythology of the Indian — a feathered headdress, a club in one hand, a bow and arrow in the other, and usually semi-nude — prevails."

Brascoupé has been involved in furthering an understanding of Indian art and culture for more than 10 years. His work at the Department of Regional Industrial Expansion (DRIE) several years ago was aimed at helping to make public servants more aware of Native history, culture and the issues important to Native people.

"My interest — and one of the major contributions I made — was the Native Awareness Workshop I ran for public servants." Brascoupe's workshops were not restricted to DRIE, however, but ran at External Affairs, Supply and Services and Transport Canada.

"I also do a lot of work with children." Interviewed recently for *Canada Commerce*, he was about to fly to Atlanta to make plans for a children's workshop in conjunction with a major exhibition of Native American art, *We Are the Seventh Generation*, sponsored by the city of Altanta. It is a city-wide presentation of contemporary Native American art from across the United States and Canada.

One of four organizers of the exhibition, in addition to conducting the children's workshop Brascoupé is involved with arranging a display of Quebec Indian crafts, organizing a film program and satellite events such as puppetry, Indian photographs, poetry readings, the carving of a totem pole by British Columbian Haida Indians.

Simon Brascoupé is playing a central role in the creation of the Indian art world as we know it today. Beside exhibiting, lecturing and demonstrating his work in various museums, he writes for Native newspapers and was art director for the *Turtle*, a quarterly magazine published by the Native American Center for the Living Arts.

As he says, "People are looking for imagery that is contemporary and easy to understand — imagery without shamanism, without a lot of symbolism — so that even if they don't understand the legends, they can still appreciate the art."

Brascoupé is producing works of art that appeal both to Native people and non-Natives. And, in fostering an understanding of Native history and beliefs, he is truly transcending the two cultures.

— by Susan Hallett
Special to *Canada Commerce*

Canadian Lights Turn On Texas

Canadian lighting is causing a glow in Texas, at least if the success of a Montreal company is any indication.

One of Canada's largest lighting manufacturers, L'Image, Inc. has embarked on an ambitious plan to enter the United States market with high-profile, innovative and high quality product lines. Its first, successful venture was its recently opened showroom in the Dallas, Texas, Home Furnishings Mart.

"Design, innovation and good old fashioned quality are the biggest factors behind our success at our showroom opening in Dallas," says Edward Lenkov, L'Image president.

"We certainly expected a warm welcome," he adds, "but the degree of success we had took even us by surprise. It seems everyone there was captivated by our designs and I confess we had a hard time keeping up with demand."

Chief among the attractions was an exclusive L'Image Collection in solid brass and bevelled glass, noted for the high quality of its craftsmanship — and for its reasonable price.

"Design, innovation and . . . quality are the biggest factors behind our success at our showroom opening in Dallas," says L'Image President Edward Lenkov.

"Orders have been extremely brisk," comments Michael Prazoff, the company's vice-president, "and this is almost unprecedented for such a recent entry in the industry."

Several other lines were introduced at the Dallas show including the art-deco inspired Dakota Collection which drew appreciative comments from knowledgeable designers.

Exclusive to L'Image, the Dakota line compares favourably with the most recent innovations from world design centres of London and Milan, according to Lenkov.

Another popular line introduced at Dallas was the Coach Collection which consists of solid brass outdoor lanterns fitted with clear or champagne bevelled glass. These elegant lanterns, in traditional styles, were favorites of many visitors to the L'Image showroom.

"I think what makes us unique," muses Lenkov, "is the breadth of our product lines. We're able to satisfy the traditionalist concerned with quality and elegance and, at the same time, we can stimulate many designers who want the most exhilarating contemporary designs."

Before embarking on their Dallas venture, L'Image officials conducted an in-depth survey of the American lighting market and industry in general. This included visits to more than 30 major cities and markets, attending trade shows, joining industry associations, meetings with numerous potential customers, sales personnel and other manufacturers.

A major finding was that, from a design and innovative aspect, the industry in general has remained at about the same level for the past 10 years. Compared to the enormous size of the market ($1.7 billion), the number of companies which have shown design leadership was noticeably small, Edward Lenkov noted.

Its Dallas debut behind it, L'Image is now set to consolidate its strong initial entry into the American market by participating in many other trade shows, aiming at independent Level A lighting showrooms and electrical distributors throughout the U.S.

A strong distribution network is already in place with experienced and reliable representatives.

"We're active in the sale of our products," says Lenkov. "We have specially designed programs for new product introductions and merchandising plus advertising support. Our catalogues, in particular, are receiving a great deal of notice and provide spectacular showcases for our products wherever they are used."

According to Lenkov, few North American companies can rival the 11-year growth rate of L'Image. The formula for success is often elusive but hard work and an uncompromising corporate philosophy stressing design innovation and quality make vital contributions.

It was in 1973 that Edward and Abe Lenkov incorporated a company which they named Clevemont and which was a direct predecessor of L'Image. At the time, Clevemont was a joint venture between the two Canadians and a large American multinational corporation.

Once Clevemont was well established and thriving, the Lenkovs decided to go it alone. In less than a year they had purchased all the outstanding shares of the company, parting amicably with their American partners. At the same time, they acquired a lighting company that was then operated solely as a distribution warehouse for Canadian clients.

Workers create L'Image lighting.

The Lenkovs shared one goal — to become a wholly manufacturing lighting company and, armed with that determination, set about turning their dream into a flourishing reality.

Within two years, the young company was transformed into an exclusively manufacturing Canadian concern. The premises were expanded twice during those two years of growth and the staff grew by 400 per cent.

Since then, growth has been swift, steady and uninterrupted. In 1984 the company inaugurated a showroom and warehouse distribution centre in Toronto to serve the huge Ontario and western Canadian market.

L'Image is now engaged in another expansion program, moving its 5 760 square metre (62 000 square foot) plant to specially constructed premises with double the present area. Incorporated into the new plant will be some of the most advanced research and development and showroom facilities available.

"We are very pleased with our progress," admits Edward Lenkov, "and happy that our American friends have given us such a friendly welcome. We now hope to be able to return the favour and to contribute, with our energy and determination, to the American lighting industry."

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L'Image Showroom at Dallas.

Pete Miller/The Image Bank

Japanese Market — Open to Quality Food

In Japan, where the affluent population is prepared to spend $2 for a single apple, $100 for a necktie and $500 for a purse, quality foods from Canada (for example, Nova Scotia blueberries) are becoming increasingly popular.

Japan is the second wealthiest nation in the world. Its 120 million people have a sizable amount of disposable income which they spend lavishly on expensive products and services.

Because of the country's geography and population, it is impossible for most people to own homes and the vast array of material goods that usually fill them. Freed from the need to finance costly mortgages, the Japanese direct their buying power to the purchase of food, clothing, entertainment and travel.

Hence the Japanese interest in Nova Scotia's blueberries.

Difficult Market

Some find Japan a difficult market compared to the domestic market. The demand for perfection can be overwhelming to those not prepared to put in a great deal of effort.

J.E. Struthers, vice-president of the Canada/Japan Trade Centre, says that the "yeah, but" business operator will miss opportunities. "What you have to keep in mind," he says, "is that, when it comes to pricing, outrageous is reasonable."

The Japanese, he notes, spend 32 cents of every dollar on food, compared to the Americans, the richest consumers in the world, who spend 17 cents.

Japanese Preferences

According to Struthers, when Japanese consumers go shopping for food, the factors they look for, in descending order of preference, are appearance/image, flavour, texture, nutrition and price.

Some 2 270 000 kilograms (five million pounds) of frozen blueberries have been shipped from Nova Scotia since 1980. The Japanese have turned these into food products that are exquisitely prepared and packaged.

What the Japanese do to Nova Scotia blueberries is a lesson in how to transform food into art. Milk chocolates with blueberry and brandy filling; blueberry cream sauce; blueberry juice; blueberry cookies; blueberry chewing gum — these are some of the treats that Japanese product development experts have created.

"Fashionable Fruit"

On a recent visit to Nova Scotia, Japanese Blueberry Queen Masako Hayshi told reporters that blueberries were becoming a "fashionable fruit". Hayshi, who had never seen blueberries fresh from the field, said they were popular because they have a "western feeling".

The Japanese, it seems, are not concerned if the product is foreign or domestic so long as it meets their high standards of quality. In fact, the foreign product may have the advantage of élite appeal.

Doing business with the Japanese has changed a great deal lately. Worries about when to keep your shoes on are no longer a consideration. Japan is westernizing rapidly and most companies have American-trained staff who are able to speak fluent English and are also quite comfortable with North American ways.

Special Affinity

Still, Gordon Kinsman, of the Nova Scotia Department of Agriculture, says a special affinity exists between Japanese and Nova Scotian business people. There is apparently a kind of "down home" quality in the way the Japanese operate.

"Like Nova Scotians, the Japanese businessmen place great stock in building a business relationship based on personal trust. They have deep, traditional roots, like us," says Kinsman.

Efforts to enter the Japanese market cannot be on a short-term basis or intermittent. Successful exporters know that a strong and ongoing relationship provides sound export business in the highly attractive and potentially profitable Japanese marketplace.

Help Available

For those who may be overawed at the prospect of a venture of this kind, there are a number of private sector and government organizations set up to lend assistance.

A good first step would be to contact a federal government trade officer in the nearest Regional Office of the Department of Regional Industrial Expansion.

— by Winnifred Desjardins
DRIE Nova Scotia

CANADIAN COMPANIES & PRODUCTS

Companies wishing to take advantage of this feature may do so without charge simply by sending sufficient material on product or service for no more than 100 words and a glossy black and white photograph to Canadian Companies & Products, ***Canada Commerce*** (BCOM), Department of Regional Industrial Expansion, Ottawa, Ontario K1A 0H5. As ***Canada Commerce*** is produced in both official languages, please send material in both languages if it is available.

Fluidized Bed Furnace Solves Heat Treating Problems

Can-Eng Manufacturing Ltd. of Niagara Falls, Canada's leading manufacturer of industrial heat treating furnaces, has gained wide acceptance of its fluidized bed furnace. The fluidized bed, made up of dry inert particles, takes on fluid-like properties when heated and is safer and cleaner than conventional heat treating equipment.

The electrically heated or gas fired furnace combines quality production, ease-of-operation and economy due to the furnace's exceptional gas flow control which allows it to harden, carburize, anneal and temper to very precise specifications. The work zone ranges in size from a 123 mm diameter by 305 mm deep toolroom model to a 915 mm by 1 830 mm (eight by 12 inches and 36 by 72 inches) production furnace.

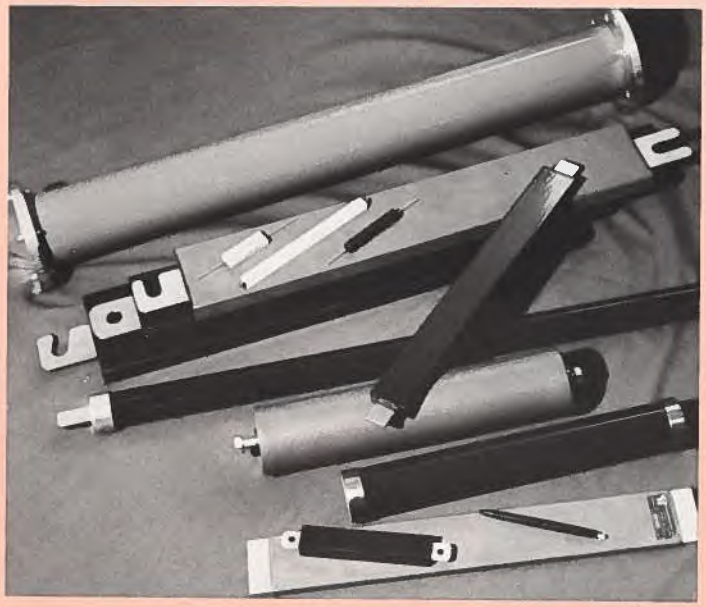
Eye Measuring Device Uses Ultrasound

Radionics Medical Inc. of Scarborough, Ontario, has introduced its new Oculometer 4100. This advanced ultrasound biometer incorporates a sophisticated microprocessor which enables accurate determination of the axial length of the eye as well as the interior chamber depth and lens thickness. Pattern recognition software assures that measurements are taken only when proper visual axis alignment is achieved. Software is also included to enable the calculation of appropriate intraocular lens implant power to achieve desired post-operative refraction. A digital printer is included with the system for hard copy recordings. A brochure is available describing the unique features of the Oculometer 4100 which include fully automatic frame freeze, unique trigger point markers and operator selection of phakie, aphakie or pseudophakic biometry.

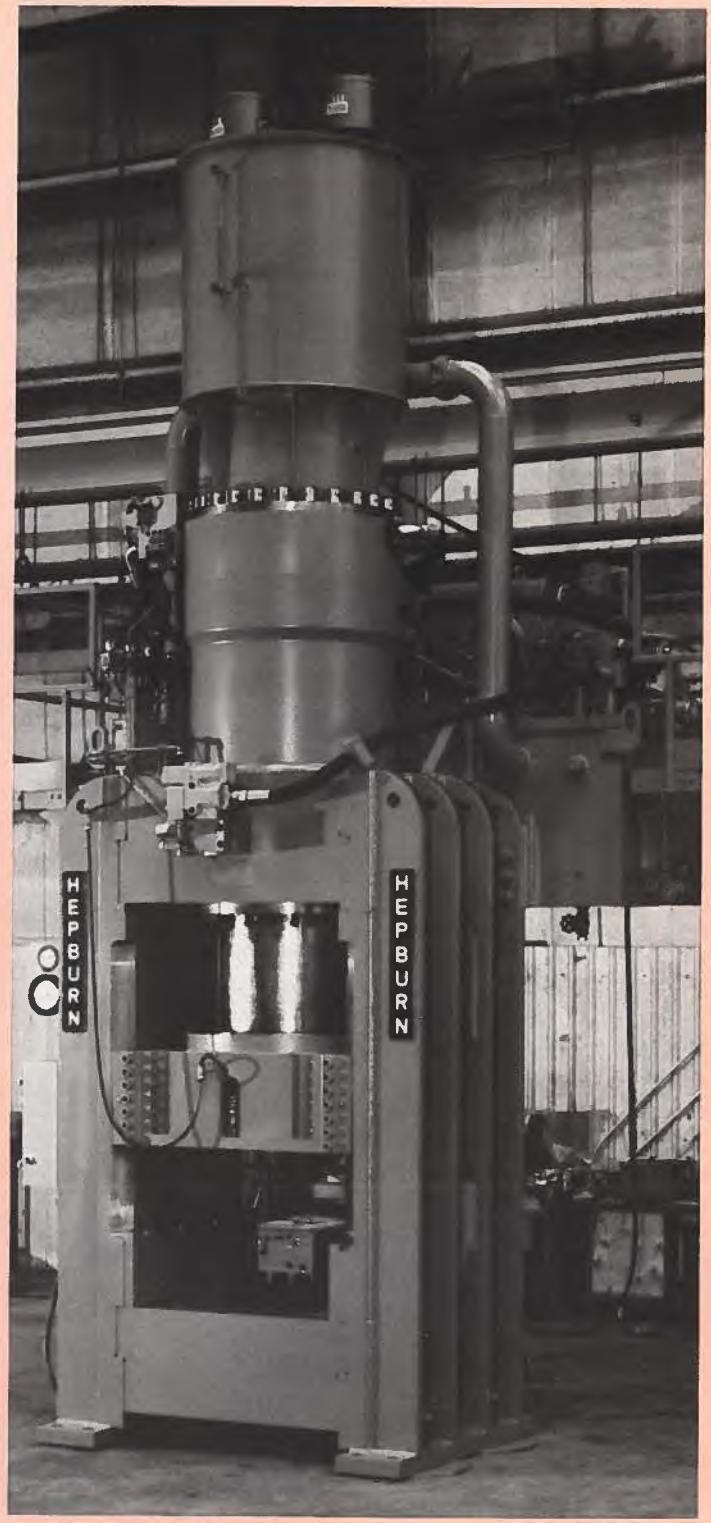
High Voltage Impulse Resistors Introduced
Interworld Electronics & Computor Industries Ltd., of North Vancouver, British Columbia, has just brought out a new line of HV impulse resistors for utilities, transformer manufacturers, research facilities and the HV industry.

The resistors are anti-inductivity wire wound, vacuum sealed in resin with high withstand voltage and high load capacity (up to 60 kj)

Applications include use with impulse generators; measuring resistors for impulse voltage dividers, impulse current shunts, damped capacity voltage dividers and recurrent surge generators.

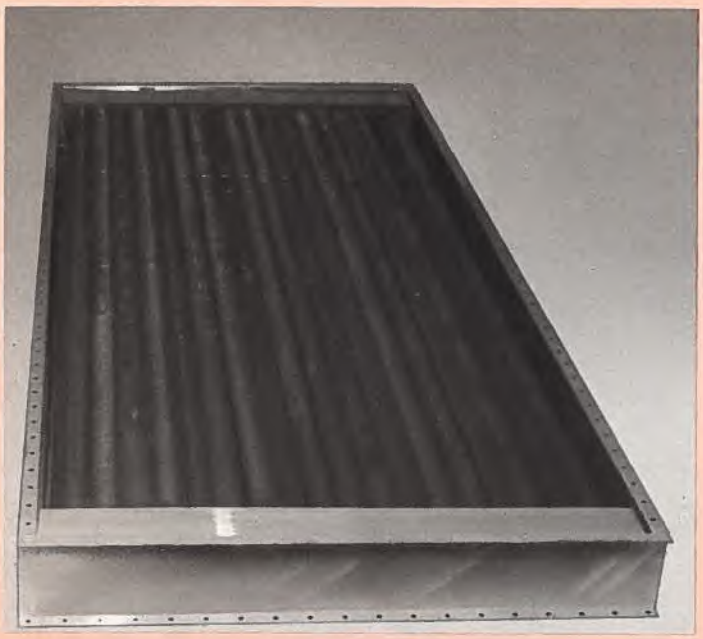


Canada's Axe Manufacturer Adds to Line
H.R. Radomski & Co. of Toronto, has added 1.1, 1.6 and 2 kilogram axes (2.5, 3.5 and 4 pound) to its line of high quality tools, which includes wrecking bars, flat bars and pry bars, under its "Ardex" trade name. The company's axes meet all Canadian government established specifications for safety and Canadian content is between 75 and 100 per cent on all products.



High-Speed Pulp Baling Press
Model 1200 HS-2 pulp baling press presented by John T. Hepburn, Limited of Toronto. This 1 200-ton capacity hydraulic press is the latest and highest speed addition to John T. Hepburn's line of pulp baling presses and uses proprietary designs including a special multiple staging arrangement to achieve its exceptionally high speed.

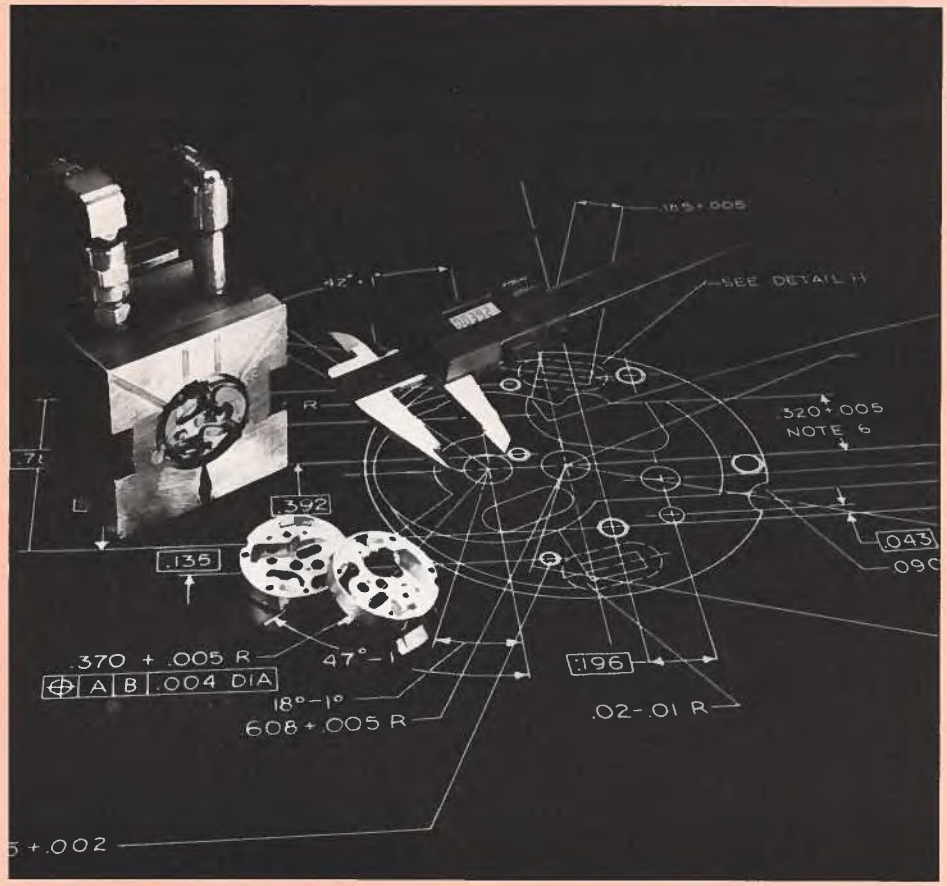
The press was designed for automatic operation controlled by a programmable logic controller. It was completely shop tested prior to shipment to a major southern pulp and paper mill as part of a new automated bale finishing line.



New Coils Developed for Extreme Weather Conditions

Industrial Mechanical Specialties Ltd. (IMS) of Toronto, has introduced its all-welded steel coils and unit heaters with steel or aluminum fins constructed of schedule 40 steel pipe and headers. All connections are schedule 80 steel pipe. The coils are enclosed in 12 gauge steel casings with drilled flanges for duct mounting.

The "non-freeze" coils have been designed to heat make-up air for industry under extreme winter conditions. IMS industrial unit heaters include as standard features fan guards, adjustable louvres and heavy-duty industrial type motors which are permanently lubricated. Coils and unit heaters can be provided in stainless or galvanized steel.



Zinc Diecasting a Specialty

Export Scovill Ltd. of Montreal offers more than 30 years experience in developing and producing top quality zinc-alloy diecastings. Precision miniature parts are diecast for a wide range of specialized industries including photographic equipment, timing and security devices, automotive parts, lighting and ordinance, to name only a few.

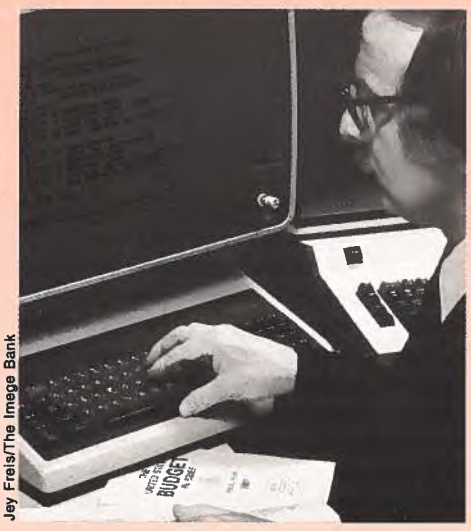
A continuous research and development program ensures total flexibility and up to date technology, technology which often results in multiple parts being combined into one part.

Quality control procedures meet all ordinance and defence standards and are applied to all items produced.

New Software Program Calculates Mortgage Tables

Different Products Ltd. of Burlington, Ontario, has just introduced MORGIJ2, a compiled computer program designed to calculate interest and balances for conventional fixed rate mortgages. The program is menu-driven and does not require any knowledge of financial formulas.

The program, which requires 128k of Random Access Memory, will do all calculations, comparisons and tables for either Canadian or American mortgages. It will print regular payment schedules, including dates, for weekly, bi-weekly and monthly mortgages and provide quick comparison of rates and relative savings to 17 decimal place accuracy on all calculations.



Jey Freis/The Image Bank

Fortress Allatt Launches Two New Pavers
Fortress Allatt Ltd., of Toronto has introduced a new generation of asphalt paving machines — the 550P and 650P. The new models will replace the SP-50D and C-300 pavers, which are currently building roads in over 50 countries throughout the world. Both the 550P and 650P are powered by 40 hp diesel engines and feature a hydrostatic drive system and steel belted crawler tracks. Both machines may be equipped with optional extendible screeds which extend to 2.59 m (8 ft. 6 in.) on the 550 and 4.27 m (14 ft.) on the 650. Tested throughout 1984 by 16 contractors, the machines have received an enthusiastic response.

For further information about the companies, products and services listed, please contact:

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Interworld Electronics & Computer Industries Ltd.
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Industrial Mechanical Specialties Ltd.
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Cable: ALLTRACT TOR.

Canada's Aerial Fire Fighters

Aerial fire fighting (or "fire bombing") and spraying is an important and growing business for Canada. Manufacturing companies and aircraft operators co-operate in checking the depredation of fires and insects across the nation and in many foreign countries.

"Fire bombing" is partly art and partly science. While delivery of the load on target depends on the skill of the pilot, he has to have the right equipment.

Field Aviation of Toronto was a pioneer in the design and fabrication of aerial fire fighting systems as far back as 1960. Field's first conversion was a twin-engined, amphibious Canso (a World War II patrol aircraft known in the United States as a PBY and in Europe as Catalina). Knox Hawkshaw, vice-president, engineering, of Field, explains that his company incorporated two 1 800-litre (400-gal.) tanks into the hull of the Canso and designed a retractable probe which enabled the tanks to be filled in 15 seconds while skimming the water surface.

The test flights were successful and sales were made to the provinces of Newfoundland and Quebec. Approximately 50 Cansos were converted and, after tens of thousands of water drops, the aircraft have established a reputation for dependability in operations across Canada and in the U.S., France, Chile and Norway.

Encouraged by this success and using the same basic water scooping and release system, Field designed and manufactured systems for the Otter, Twin Otter and Turbo-Beaver, all built by The de Havilland Aircraft of Canada. These aircraft, about 50 in all, were purchased by the governments of Ontario and Manitoba.

A series of improvements were designed by Field to provide increased productivity by allowing the aircraft to use smaller lakes. Variable distribution was introduced to match the size of the drop to fire intensity and drop patterns were controlled to improve distribution.

During the 1970s Field developed systems to allow the injection of foam-suppressant chemicals into the water load. Also introduced for the Twin Otter was a membrane tank system which could be cut open to permit the instantaneous drop of a load.

Oil fire extinguished by a Canadair CL-215.

Twin-engined Tracker aircraft, built by de Havilland, were converted by Field into water-bombers and six of these versatile, rugged aircraft are operated by the province of Saskatchewan.

Further improvements are "in the works" to allow the Canso to pick up a full load in a shorter distance and a new release system promises to yield significant improvements in drop patterns.

Field supplied Canso conversions to Captain "Moose" Murdock, an ex-RCAF pilot, who founded Avalon Aviation in 1971. Many of the techniques, safety routines and water scooping methods developed by Captain Murdock have become standards around the world. In 1980 Avalon was acquired by the Powell Corporation which also owns Georgian Bay Airways.

The corporation now encompasses 24 aircraft (including nine Cansos) and 65 employees, offering a comprehensive charter and scheduled flying service along with a specialty in aerial forest fire detection and fire fighting support. Avalon has operated its fleet of Cansos across Canada and in Chile, the U.S. and Norway.

A de Havilland Twin-Otter, converted by Field Aviation, in Newfoundland.

The converted Cansos are versatile aircraft which, although designed primarily for fire fighting, can also carry 20 passengers or a combination of passengers and freight to a maximum of 3 629 kg (8 000 lb.). As a liquid transporter it can haul 2 900 litres (638 gal.) of diesel oil, aviation fuel, kerosene, etc., for 1 126 km (700 miles) and return without refueling. The water tanks of the aircraft can also be used to carry various spraying compounds and oil slick suppressants.

Avalon's Cansos are well equipped to operate under instrument flying rules and have the complete navigation and communications equipment considered necessary for a prompt response to an emergency situation anywhere in the world.

Typical of the smaller Canadian operator is Norfolk Aerial Spraying of Fredericton whose main business is spraying the spruce bud worm in New Brunswick.

Norfolk is a pioneer in the use of the Dromader, a rugged, single-engine aircraft built in Poland, which is also used for aerial fire fighting. The company has been favourably impressed by the excellent performance, reliability and low maintenance cost of the Dromader and now operates 11 of them in addition to four World War II Avengers. The Dromader, or a newly-developed larger version, is available in Canada either from Norfolk or from Airtech Canada, located in Peterborough, Ontario.

It is not practicable for Norfolk to take its single-engined aircraft overseas but the company does offer the necessary skills to establish aerial spraying and fire fighting services anywhere in the world.

On the west coast, giant, four-engined Mars flying boats, owned by the forest industry, are among the many aircraft used to fight forest fires.

The Flying Fireman Ltd. operates seven Canso water bombers and three Cessna T337G "Bird Dogs" (used for spotting fires and controlling air traffic in fire fighting operations) from its base at Victoria International Airport on Vancouver Island. Flying Fireman has worked in Ontario and all the western provinces and covered emergencies in the states of Colorado, Michigan and Washington.

The company's expertise in rebuilding and repairing Cansos recently attracted a commission from Los Angeles real estate developer Robert Franks to convert an ex-RCAF Canso into a flying yacht. This $2 million conversion includes an elaborate bedroom-cum-bar beneath the two clear bubbles in the aft fuselage plus two bathrooms, all tastefully fitted out in leather, wool and suede.

Conair Aviation Ltd., located at Abbotsford, British Columbia, operates the largest private air tanker fleet in the world, supported by a comprehensive engineering and fabrication organization which modifies all its own aircraft. Aircraft are also modified by Conair for sale to other operators.

Flying Firemen Canso converted to a flying yacht.

A co-founder of Conair in 1969 and now its president, Les Kerr, has developed the company into a sophisticated international operation with 45 aircraft and 150 employees. Frontier Helicopters, a wholly-owned subsidiary, has 13 helicopters and 23 employees.

An internationally recognized leader in the fire bombing and spraying industry, Conair has built up its reputation through close attention to the needs of every customer.

Conair operates the world's largest fleet of private air tankers supported by engineering and fabricating.

The twin-engine Firecat, originally a Tracker maritime patrol aircraft built by Gruman in the U.S., is a typical Conair conversion. The Tracker is stripped of over 1 400 kg (3 086 lb.) of equipment which is replaced with a tank system having a useful volume of 3 296 litres (725 gallons) and a re-designed cockpit.

The Firecat was so effective in Conair service that the French Sécurité Civile ordered three conversions in 1982 and satisfaction was demonstrated by the subsequent purchase of five more Firecats. The province of Saskatchewan operates one Firecat and Conair's own fleet totals seven which will increase to nine in 1985. Additional Trackers have been acquired and are held in reserve against future needs.

Most impressive of the Conair fleet is the four-engined DC-6B of which Conair has nine. An advanced system for this aircraft was evaluated during 1983 by the United States Forest Service at Missoula, Montana. Demonstration of the 11 365 litre (2 500 gal.), 12-compartment tank systems with doors that open in 0.15 second indicated that the effective length of the fire retardant line could be improved by 230 per cent when compared with an earlier eight-compartment system.

Later in 1983, after winning a contract in competition with 20 other companies, Conair flew a DC-6B to Australia to participate in a scientific evaluation of fire fighting techniques by the Australian Commonwealth Scientific and Industrial Research Organization. The long flight of the Conair DC-6B from Canada was justified, in the words of Project Manager Phil Chaney, "because it is the most versatile aircraft to demonstrate different drop patterns".

The systems developed by Conair

are also suitable for the application of oil dispersants and this capability was called upon in 1979 by the Mexican company, Petroleos Mexicanos, to control a potentially disastrous oil spill from an erupting well in the Gulf of Mexico.

During a six-month period, until the well was capped, three DC-6Bs flew more than 500 sorties applying 6 million litres (1.3 million gallons) of dispersant. Conair managed the total operation, establishing navigational and operational procedures which ensured safety and efficiency although spraying was carried out from only 15 metres (50 feet) above the water.

Conair has exported equipment to the United States, France, the Middle East, Mexico and Australia. Special tasks have been undertaken in aerial survey, photography, salmonid enhancement, fertilization and mosquito control. Two Fokker F-27 aircraft, owned by the oil company ARAMCO and converted by Conair, are now stationed in Saudi Arabia on oil spill stand-by in addition to their regular passenger and freight duties.

In order to round out the specialized service offered by Conair, Frontier Helicopters Ltd. was purchased in 1979. Frontier caters to the helicopter needs of the mining and forestry industry and also affords Conair the opportunity to pursue several innovative concepts which offer promise of improving aerial fire suppression techniques.

Frontier Helicopters Bell 205 with a Conair-designed and built fire bombing tank and remote fill system.

One such device is the Sky Genie rappelling gear, developed in co-operation with the British Columbia Forest Service. The Sky Genie allows rapid personal access for initial attacks on forest fires; for building heliports in inaccessible areas; and a variety of other applications where aircraft are unable to land.

Conair has also designed fire fighting equipment incorporating a self-loading tank for the Bell 205 helicopter and three systems have recently been sold to Australia.

Specialty Aircraft Sales Ltd. of Edmonton has recently introduced the Sea Thrush, a single-engine float plane adapted from a successful U.S. agricultural aircraft. Recognizing the need for a new, rugged, economical, fire fighting seaplane, Andy Toma, president of Specialty Aircraft, commissioned Canadian Aircraft Products Ltd. of Vancouver to undertake engineering and fabrication work. The floats were purchased from Bristol Aerospace in Winnipeg. A custom-designed telescoping probe facilitates water pick-up at high speeds and in varying water conditions.

The simple "gravity drop" system releases water or chemicals from a 1 514 litre (400 gallon) tank. A unique feature of the Sea Thrush is the ability to jettison its load during take-off adding a welcome measure of safety to operations from small lakes, at high altitudes and in hot weather conditions.

A Sea Thrush with a Pratt and Whitney R-1430 radial engine is available in Vancouver for demonstration. The aircraft is also offered in a Turbo Thrush version equipped with a Pratt and Whitney Canada PT-6 turbo-propellor installation.

Specialty Aircraft Sales' Sea Thrush.

One of the few amphibious aircraft manufactured since World War II and the only one designed specifically for aerial fire fighting is the Canadair CL-215.

Since production of this versatile twin-engined aircraft commenced at the Montreal plant of Canadair Limited in 1969, 77 have been delivered to Quebec, Ontario, Manitoba, Greece, France, Spain, Yugoslavia, Italy, Thailand and Venezuela. Negotiations for the last three completed CL-215s are in progress and they will probably be delivered by the time this article is published.

Production has recommenced with a batch of 50 aircraft, 21 of which are intended for export and 29 as the major element of a co-operative effort by the Canadian federal and provincial governments to reduce the ravages of fires across the nation.

The Canadair CL-215.

Designed for aerial fire fighting, the versatile CL-215 twin-engine craft has seen use around the world.

When fire fighting, the CL-215 carries 5 455 litres (1 200 gallons) of suppressant in two internal tanks. The tanks can be filled in less than 10 seconds by scooping water through two retractable probes as the aircraft skims over the surface of any suitable body of water. Alternatively, the tanks can be loaded on the ground in less than two minutes through adaptors located on either side of the fuselage.

The CL-215 can fight fires for up to four hours before re-fueling is required and Canadair claims, with pride, that a CL-215 made 255 water drops on fires in a single day.

Although one of the great advantages of operating the CL-215 is its ability to scoop water, a commodity which is essentially free, some dry regions require the use of chemical retardants. For those operators without nearby lakes, rivers or seas, or for those who simply prefer to use chemical retardants, Canadair has developed a special automatic on-board mixing system for short-term retardants.

This is a significant break-through because, in the past, the retardants had to be mixed on land prior to being pumped into the aircraft tanks, a costly and time consuming procedure. The most notable benefit, however, is the saving in time because the CL-215 can mix the retardants while scooping and does not have to return to a land base for reloading.

The CL-215 was designed to withstand the tremendous aerodynamic forces encountered in fighting fires, particularly in mountainous regions, and its superior visibility enables the pilots to place consistently accurate drops. The cockpit is designed to minimize crew fatigue while allowing safe operations over extended periods of time, even under the most adverse conditions.

Although fire fighting aircraft are traditionally involved in combating forest fires, Canadair has developed a unique system for fighting petroleum fires. Wherever oil is extracted, refined or transported, there exists the potential for oil fires which can be extremely costly, often taking place in dense industrial areas.

Flying Firemen fleet at Victoria Airport, B.C.

Should such fires be accessible, whether at a refinery, tank farm, pipe line, tanker or drilling rig, aircraft offer a number of advantages over other methods of control. These include speed of reaction, weight of attack and accuracy. Accuracy is particularly significant in remote locations and heavily congested areas where attacking the fire by other means may be difficult, if not impossible.

Canadair has conducted tests with the CL-215 which demonstrate the feasibility of controlling surface oil fires by dropping a foam mixture from the aircraft. In this series of tests, "light water", an aqueous film-forming foam, was used.

This synthetic liquid was mixed with water and dropped on the fire by the CL-215. Two major effects took place. In addition to forming a white foam which spread over the surface of the burning fuel, the mixture released an aqueous solution which sealed the oil surface, thereby inhibiting the release of vapour and preventing re-ignition of the fire.

However, the CL-215 is not restricted to a fire fighting role. The Royal Thai Navy, for example, uses the CL-215 for coastal patrol and CVG Ferrominera Orinoco in Venezuela transports up to 26 employees to a dredge in the Orinoco River without prejudicing its most important fire fighting capability.

Experiments in France using the CL-215 to spray self-energizing dispersants on marine oil slicks led to an integrated spray system installed on Yugloslavian aircraft without interfering with their fire fighting capability. The spray system can also be used for the application of pesticides.

Canada has wide design, manufacturing and operational experience with aerial fire fighting and the associated fields of pesticide spraying and pollution control. This competence is available to meet virtually any need anywhere in the world.

For further information regarding aerial fire fighting please contact any of the following companies:

Airtech Canada
P.O. Box 415
Peterborough Municipal Airport
Peterborough, Ontario
K9J 6Z3
Telephone: (705) 743-9483
Telex: 06-962912

Avalon Aviation
A Division of Powell Corporation
55 Great North Road
Parry Sound, Ontario
P2A 2N9
Telephone: (705) 378-2414
Telex: (021) 06-875753

Canadair Limited
P.O. Box 6087
Station A
Montreal, Quebec
H3C 3G9
Telephone: (514) 744-1511
Telex: 05-826747

Conair Aviation Ltd.
Abbotsford Airport
P.O. Box 220
Abbotsford, British Columbia
V2S 4N9
Telephone: (604) 853-1171
Telex: 04-363529

Two Trackers converted by Conair for France's Sécurité Civil.


A Conair DC-6B fighting fires in the Northwest Territories.

Field Aviation Company Limited
Toronto International Airport
P.O. Box 6023
Toronto AMF, Ontario
L5P 1B9
Telephone: (416) 676-9030
Telex: 06-968530

Norfolk Aerial Spraying Ltd.
P.O. Box 19, Site 15
RR #1, Fredericton
New Brunswick
E3B 4X2
Telephone: (506) 357-2000

Specialty Aircraft Sales (1984) Ltd.
Suite 306
9924 - 106 Street
Edmonton, Alberta
T5K 1C4
Telephone: (403) 420-6649
Telex: 0373696 (ALLSTATEGR EDM)

The Flying Fireman Ltd.
Victoria International Airport
P.O. Box 2280
Sidney, British Columbia
V8L 3S8
Telephone: (604) 656-5521

— by Bernard Shaw
Electronics & Aerospace Branch
DRIE

World's Longest Submarine Cable

With the touch of a finger a person in St. John's, Newfoundland, can now speak directly to someone in Sydney, Australia, through the miracle of modern telecommunications.

One of the largest telecommunications projects of its kind ever undertaken — the ANZCAN submarine cable — was inaugurated recently in simultaneous celebrations in Vancouver, Fiji, Australia, New Zealand and England.

The 15 000 kilometre, $500 million cable links Canada with Hawaii, Fiji, Norfolk Island, Australia and New Zealand. The facility is owned and operated by a consortium of 22 telecommunications carriers of which Teleglobe Canada is the second largest investor with a 13 per cent interest. The other major partners in the project are the Overseas Communications Commission of Australia, the largest investor with 41.6 per cent, and the New Zealand Post Office with 12.5 per cent.

The cable leaves Sydney, Australia, crosses the Tasman Sea to Norfolk Island with a branch to Takapuna, New Zealand, and then goes on to Fiji, Hawaii and finally to the Port Alberni, British Columbia, Cable Station from which messages are then relayed to the Vancouver International Centre in Burnaby.

In the planning stages since 1978, the ANZCAN cable has been engineered for a 25-year life and is expected to last into the 21st century. It can carry 1 840 voice circuits and increases by four times the telephone capacity between Australia, the Pacific Basin and North America. It also provides extra routing capacity to Europe.

The official opening of the facility came four years to the day after the Royal New Zealand Navy's hydrographic survey ship *Monowai* left Auckland on the first leg of a five-month journey to survey the proposed route. The survey was co-ordinated and managed by Teleglobe Canada on behalf of the ANZCAN partners.

The route finally chosen by the project's engineers avoided as much as possible the areas where the cable could be damaged by fishing trawlers, ship's anchors or earthquakes.

SCARAB submersible, used the assist in repair and buriai of cabies such as ANZCAN.

Canadian content in the project is valued at $60 million of which some $20 million is for processed copper, polyethylene, steel and multiplex equipment for direct use in the system. The remaining $40 million is for indirect offsets such as high technology equipment, manufactured materials and semi-processed materials. Expenditures by Teleglobe in Canada amount to approximately $6 million for architects, buildings and equipment.

In addition, transit traffic is expected to bring considerable revenues to Canada's domestic telecommunications carriers and the trans-Canada system has been augmented with additional facilities providing significant contracts to Canadian suppliers.

A major part of Teleglobe's involvement has been the construction of its new $8.7 million Vancouver International Centre in Burnaby, British Columbia, officially inaugurated on the same day as the ANZCAN cable.

This ultra-sophisticated telecommunications switching and transmission facility is the western interface between the telecommunications network in Canada and the international network.

The centre is equipped with a DMSD-300 digital telephone exchange, manufactured by Northern Telecom Canada, as well as transmission equipment developed and built by Vancouver-based Microtel Limited. It is linked to the Port Alberni Cable Station, the Canadian landing point of the ANZCAN cable on Vancouver Island, by a microwave network newly constructed by B.C. Telephone.

Canadian content of the ANZCAN project is valued at $60 million. Teleglobe has spent approximately $6 million in this country.

Teleglobe Canada is Canada's international telecommunications carrier and owns and operates cable and satellite facilities to provide a complete range of international telecommunications services. These include telephone, telegram, telex, data transmission, radio and television broadcast services as well as new specialized services such as international teleconferencing and private satellite business services.

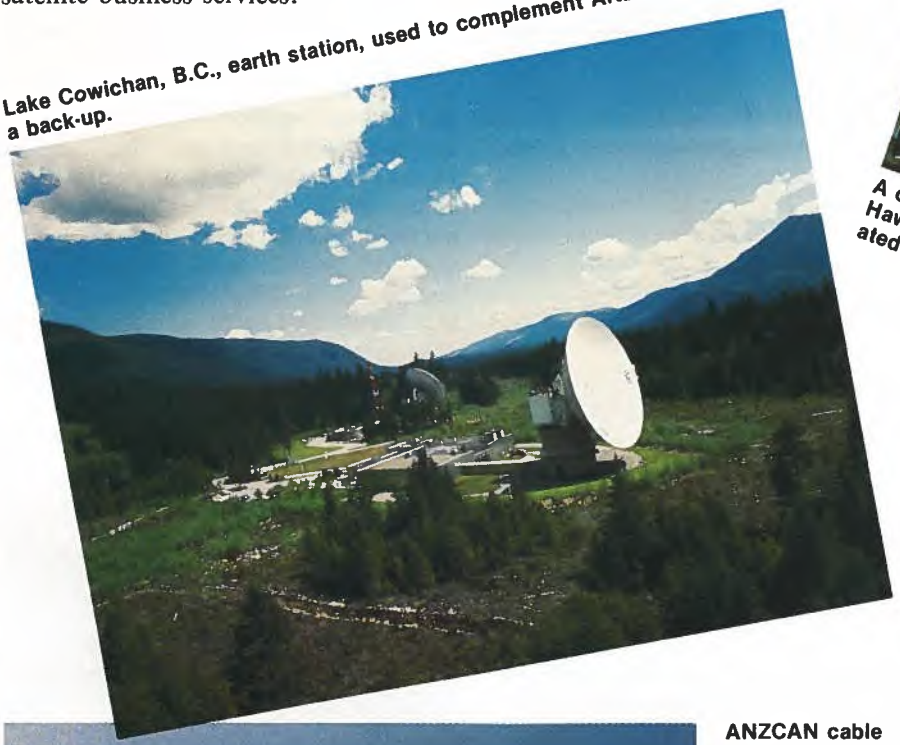
Inauguration of the new ANZCAN cable system was highlighted by a televised inaugural message from Her Majesty Queen Elizabeth II and a ceremonial telephone call between the Honourable Tom Siddon, Canadian Minister of State for Science and Technology, and the Honourable Michael Duffy, Australian Minister of Communications.

Speaking at the inaugural ceremony, Teleglobe Canada President Jean-Claude Delorme pointed out that "the ANZCAN project has been a huge collaborative effort benefiting Canada in many ways".

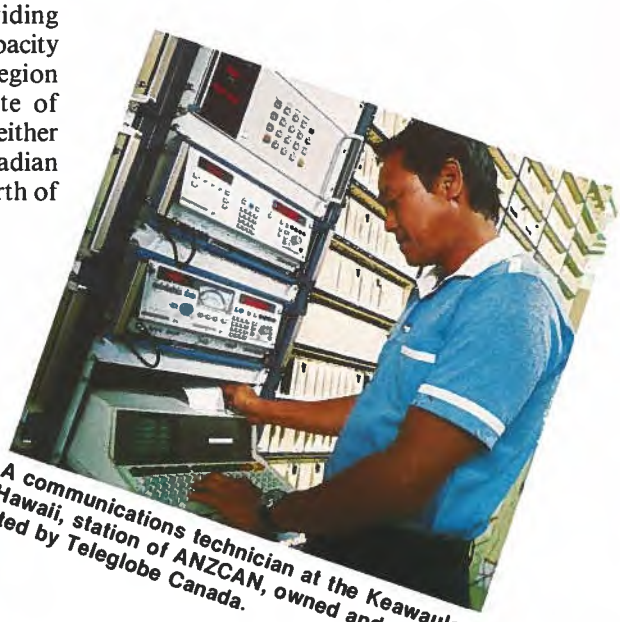
He added that, besides providing "improved telecommunications capacity with countries in the Pacific region where traffic is growing at a rate of 8 per cent per year, ANZCAN has either directly or indirectly provided Canadian industry with some $60 million worth of business".

With ANZCAN well inaugurated, Teleglobe Canada is now participating in a new trans-Atlantic fibre-optic cable, in concert with other partners, for 1988. A Teleglobe spokesperson pointed out that submarine cables continue to complement satellite systems.

Additional international investors in the ANZCAN cable project are British Telecommunications; Cable and Wireless of Britain; Fiji International Telecommunications Limited; Ministère des Postes, des Télécommunications et de la Télédiffusion of France; Deutsche Bundespost of West Germany; Posts and Telegraphs of Ireland; Italcable of Italy; Kokusai Denshin Denwa of Japan; the Public Utilities Department of Papua New Guinea; The Philippines Long Distance Telephone Company; the Entreprise des postes, téléphones et télégraphes of Switzerland; plus such international American carriers as FTC Communications Inc., the Hawaiian Telephone Company, ITT World Communications Inc., MCI International, RCA Global Communications Inc., Transpacific Communications Inc., TRT Telecommunications Corporation and Western Union Telegraph Company.



Lake Cowichan, B.C., earth station, used to complement ANZCAN and as a back-up.



A communications technician at the Keawaula, Hawaii, station of ANZCAN, owned and operated by Teleglobe Canada.

ANZCAN cable being floated ashore at Keawaula, Hawaii.

For further information, contact;
Brian Townsley — Montreal (514) 289-7489
Grace Lake — Toronto (416) 364-8882
Phil van Leeuwen — Montreal (514) 289-7490

Enerflex-designed and produced gas compressor station for New Zealand shown being broken down into modules and packaged for shipping.

Across Canada

Imagination Provides Competitive Edge

When Enerflex Systems Ltd. of Calgary needed a competitive edge to clinch an export deal, management used some imagination to cut overall costs. The result was large enough savings on delivery and installation costs that Enerflex landed the contract against stiff international competition.

Enerflex designs and builds gas compressor stations. Founded in 1980 by President John Aldred to build portable compressor stations for sale or lease to gas gathering and transmission operators, Enerflex entered the export market in 1983. The first deal was for a $1.35 million shipment of compressors needed by the Natural Gas Corporation of New Zealand to overcome problems on its North Island main gas line.

In Canada, when gas transmission problems (usually caused by low pressure and high gas volume) develop on pipelines, the lines are upgraded or new ones are built. Compressors are generally installed at source or gathering points on a pipeline network, or as boosters on long-distance transmission lines.

New Zealand pipelines, however, are difficult and expensive to build because the terrain is rough and all the components have to be imported. The New Zealanders find it more economical to overcome problems by installing compressors every few hundred miles along a line to boost the pressure.

"I had the contacts in New Zealand from when I worked at another company," says Aldred. "But it was an international tender with a lot of bidders. We got it by being creative and cutting costs to the client of equipment delivery and installation."

The deal was approached as an engineering problem, he explains. The company wasn't about to cut corners by trimming and shaving the quality of its equipment, but Aldred wanted that deal. He and his engineers examined the entire problem and found a solution.

Shipping costs were brought down by building the equipment in modules that can be handled by standard shipping methods, rather than as oversized cargo. A second saving grew out of the modular design. On-site installation costs were reduced dramatically because the system needed much less assembly and connecting work than conventional compressor systems.

Enerflex's success with the first system gave it an edge when New Zealand Natural Gas Corporation called for bids on another project — a $500 000 compressor station for a remote portion of New Zealand's mountainous North Island.

The design has to be, essentially, two full compressors — the main one and 100 per cent back up — because the installation would be in a remote area, rarely visited, monitored from a management base 320 kilometres (200 miles) away by sophisticated telemetry and computronics. The compressor station also had to be easy to transport within New Zealand and easily assembled.

"We took our first attempt at modularization one step further," explains Aldred, chuckling over a project he found fascinating, fun and challenging. "We built the entire station to break down into easily handled modules. Essentially, the client has to put the parts on site, put tab A into slot B, a building over it and go to work."

Doug Pelzer was the Enerflex engineer who supervised design and construction of the equipment. As he explains it, the system is fully modular, with six skids plus some interconnecting piping, and laid out as a complete compressor station on the shop floor before being dismantled for shipping. As a result, a bare minimum of field connections were required to the station.

"The major on-site work at this installation is connecting the telemetry and computer control equipment at a few centralized locations," says Pelzer, himself equally as enthusiastic about the

modular concept as his employer. "We reduced the on-site work load, starting from assembly of the compressor station itself, to a matter of days."

The on-site work-time reduction is critical, a cost factor that can run from 50 to 100 per cent of the actual purchase price of a compression station. Conventional systems require up to three months of installation work, including site preparation and laying a concrete stabilizing bed. The station is bolted to the bed and cemented in to minimize equipment damage or shifting due to engine and compression unit vibration.

"On top of all that work," Pelzer says, "you have a whole lot of expensive equipment cemented into the ground that just stays there once the field is played out."

The difference with the Enerflex portable system, he explains, is that it's built on concrete-filled steel skids that provide their own stabilization mass, simplify transportation and only require on-site gravel pads or piling foundations for installation.

A problem unique to New Zealand — earthquakes — led to an installation design in which a concrete bed was laid to provide added stability to the equipment bed.

Pelzer estimates the savings on the shipping costs were in the tens of thousands of dollars. He couldn't give an exact figure because they're paid by the client, but believes the saving was on the order of 10 per cent.

New Zealand-bound gas compressor station can be operated and monitored remotely by telemetry.

He estimated installation cost savings were in the order of 50 per cent and suggests that a fair assessment of the client's final costs, as of the day the compressor station is turned on, will be approximately 25 per cent below what they would have been for a conventional design.

This is despite the equipment costing an estimated five to 10 per cent more than the next lowest bid due to the comprehensive scope of material and labour supply.

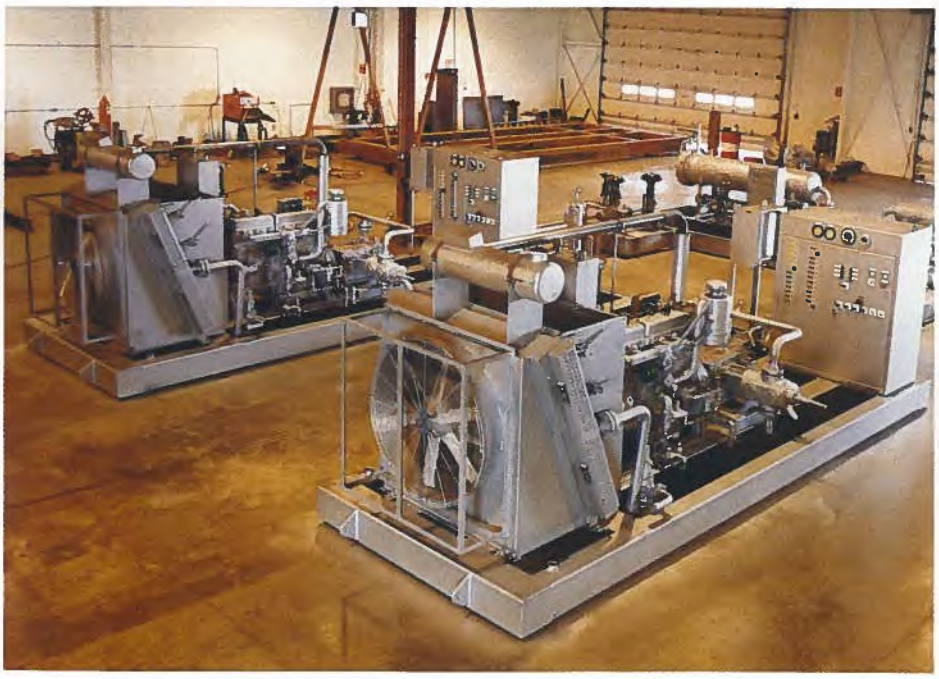
One of the net benefits of these projects to Enerflex is that the company has been catapulted into the forefront of modular design for compressor stations.

Modularization has been a common practice in oil refinery and gas processing plant design but, as Pelzer explains, "no one applied it to gas compression because it never had to be done before".

Being at the forefront of the design concept in a particular field gives Enerflex an edge the company president accepts without any quibbles.

"We're looking at other international projects and bidding on them," says Aldred. "My long-term goal is to see 25 per cent of our sales from overseas. So we're putting together our game plan."

It's a simple game plan — to be the leader in modular design and guarantee cost-conscious importers the highest quality of the lowest price.



Overall view of compressor station assembled for testing in Enerflex's Calgary shop.

For further information, contact:
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— DRIE Calgary

Ports Canada

Vancouver, Gateway to the Pacific

Picture windows lining three walls of the elegant, 27th-floor executive offices of the Vancouver Port Corporation provide a sweeping view of Burrard Inlet — Vancouver's inner harbour — from the Lions Gate Bridge linking Stanley Park with North Vancouver eastward to the Second Narrows Bridge.

Directly below this Granville Square aerie, workmen swarm over the sail-capped Canada Place while just to the east a sea-bus glides into its terminal at the foot of Granville Street.

Ocean boats move slowly along the shipping channels through a small armada of scows and work boats (and the occasional float plane flitting in or out) while a score or more vessels lie tied to piers along both shores of the inlet, loading and unloading cargoes ranging from a containerized Mercedes-Benz to mini-mountains of bright yellow sulphur.

Seated on a sofa in one corner of the office, Port Corporation Vice-Chairman Cecil Cosulich is trying to explain to a visitor the complexity and diversity of the port.

"When my children were small," he said, "we'd often take them out on Sundays in the outboard boat and make a circle tour around the harbour. That was their favorite kind of a day because there was always something new. A ship from a different country. Ships loading grain one time, containers or lumber the next. Depending on the dock, just about anything you can name.

"It's a constantly changing scene."

Canada's largest port in terms of tonnage handled (59 297 000 tonnes in 1984), Vancouver is the crucial link between the grain, minerals and lumber producers of western Canada and markets around the world.

"The responsibilities of the port," says Cosulich, "are extremely wide because, if you live in Saskatchewan, *this* is your port; or, if you live in Alberta, *this* is your port.

"And, of course," he chuckles, "if you live in Vancouver, you consider you own the whole thing."

Looking westward along Burrard Inlet to the City of Vancouver skyline.

This possessiveness on the part of Vancouverites is entirely normal as the city's superb natural harbour is its dominant economic and social force. Economic studies show that one in every 11 jobs in the area is directly or indirectly created by port activities which generate an estimated $5 billion annually in economic activity in the Greater Vancouver area.

Increasingly, real estate values are tied to their proximity to, or view of, the harbour and English Bay and the city's proliferating marinas are jam-packed with everything from dinghies to millionaires' ocean-going yachts.

Today's towering skyline would have been unimaginable to Spanish pilot Don José Maria Narvaez when he anchored off the southern entrance to Burrard Inlet in 1791, the first European to cast eyes on the finest stand of Douglas Fir on the entire Pacific Coast.

After bestowing short-lived Spanish names on a few prominent landmarks and making some sketchy notations on his charts, Narvaez sailed off, booting his chance to be the first white to sail the Pacific northwest's finest natural landlocked harbour.

This honour was to fall, only a year later, to the Royal Navy's Captain George Vancouver who (although he seems to have overlooked the nearby mouth of the Fraser River) sailed through the narrows into the inlet which he named after his friend and fellow officer, Sir Harry Burrard.

After three years exploring and charting the region, Vancouver sailed away and Burrard Inlet reverted to its primeval state, with only an occasional fur trader dropping in to do business with the Squamish Indians of the area.

As happened so frequently in western North America during the 19th century, gold signalled the end of this tranquility.

This time, it was the discovery of fabulous placer deposits along the bars of the Fraser River in 1858 that brought a flood of hopeful prospectors north from San Francisco.

During the summer, an estimated 20 000 gold seekers made their way to Port Victoria on Vancouver Island, most of them setting off by canoe for the Fraser. Because of tricky navigation on the river, most made their landfall on the southern shore of Burrard Inlet and then followed forest trails south to the Fraser.

Acting with unaccustomed alacrity, the government in that same year proclaimed the Crown Colony of British Columbia. Less than a year later it named New Westminster, 19 km (12 miles) from Burrard Inlet, as capital of the colony.

To protect the new capital from any threat of invasion from the inlet, Col. R.C. Moody of the Royal Engineers was sent there to establish several military reserves — some of which eventually became the 143-hectare (354-acre) Stanley Park, the campus of the University of British Columbia and several other public preserves.

Four years later, in 1863, the first settlers came to Burrard Inlet and the first sawmill went into operation on the site of today's Saskatchewan Wheat Pool elevator and Neptune Terminal.

Lumber is major Port of Vancouver export.

A year later, Burrard Inlet saw its first export shipment as the barque *Ellen Lewis* took aboard a cargo of 277 750 feet of lumber and 16 000 pickets bound for Adelaide, Australia.

Over the next two decades two mill towns continued to develop at the western end of the inlet — Moodyville on the north shore and Granville (known to the locals as Gastown in honour of tavern owner "Gassy Jack" Deighton) on the south, the harbinger of today's trendy downtown area of the same name.

While docks at the two mill towns continued to load lumber exports, most of the steamships headed another 13 km (eight miles) eastward to the shallow water harbour at Port Moody, favoured because of its proximity to the capital of New Westminster.

All of this was to change abruptly in 1884. And the agents of change in a pattern becoming familiar across western Canada, were William Van Horne and his Canadian Pacific Railway.

Under terms of Van Horne's agreement with the Dominion Government, Port Moody had been selected as the western terminus of the transcontinental railway. He now decided that its shallow waters and the extra eight miles sailing up the narrow inlet were far inferior to the deeper waters and wider channel between Moodyville and Granville.

The government saw the logic of Van Horne's argument and asked him to extend his line from Port Moody to Granville. Generously, he agreed — after the government gave the CPR title to all of the right-of-way, part of the north bank of False Creek (the site of Expo '86), all the unsold lots in Granville townsite and 2 400 ha (6 000 acres) of other crown lands!

As a finishing touch, he even chose the name for the new city, which was incorporated in 1886.

The CPR completed the tracks to the foot of Granville Street and the first train reached the new terminus and 152-metre (500-foot) dock on May 23, 1887. Three weeks later the steamer *Abyssinia* tied up at the dock, inaugurating the trans-Pacific service that continues to this day.

(A shipment of tea from the ship was loaded onto a waiting train, sped across Canada and shipped on to England. It reached London 29 days after leaving Yokohama, eclipsing the times set by the famed clipper ships and

establishing a lucrative "land bridge" trade for the CPR.)

Vancouver's history as a grain-exporting port technically began in 1899 when three shiploads of bagged oats were sent to South Africa to supply British cavalary during the Boer War.

Sporadic bagged-grain shipments continued through the years, but it took the opening of the Panama Canal in 1914 and the end of the First World War to open the vast European markets to western Canada farmers.

Although the government had built a grain elevator in 1914, it sat idle until 1921 when the American steamer *Effingham* loaded 1 862 tonnes of wheat destined for Britain — the beginning of a bulk grain export trade that was to reach a record 10 897 000 tonnes in 1983.

Loading grain from Saskatchewan Wheat Pool elevators.

By the early 1920s, Vancouver was a thriving city of 100 000 and development of its harbour was continuing apace.

The First Narrows entrance to the harbour was dredged to a minimum depth of 15 metres (50 feet) at low tide and several dangerous shoals removed. Numerous wharves, shipyards and grain elevators sprang up along both sides of the inlet. In 1927, the 640-metre (2 100-foot) Pier B-C was completed and became the home berth of the CPR's famed Empress passenger service to the Orient. That service ended with the Second World War.

(In the past couple of years, the aging B-C complex was stripped to its foundations and now forms the base for the prestigious Canada Place hotel-office-commercial complex which also will serve as Canada's official pavillion at Expo '86.)

Throughout the depression years, development of the port stagnated, although a new railway span was completed across Second Narrows in 1935 (it replaced an earlier one knocked off its supports by a 4 500-tonne steel log-barge and since replaced by a modern railway bridge) and the graceful, 472-metre (1 550-foot) Lions Gate bridge across First Narrows.

The Second World War brought a tremendous ship-building boom to the area, and in the years following war, private sources became major investors in new facilities stretching from First Narrows to Port Moody.

Grain continued to be the backbone of the port's export trade, but other bulk products loomed large in Vancouver's future following the discovery of potash in Saskatchewan, the production of sulphur as a by-product of the oil and gas industry and the opening of new markets for Alberta and B.C. coal.

As the port had grown and changed, so had the nature of its administration.

The first formal administration came in 1913 with the establishment of a three-person, federally-appointed Vancouver Harbour Commission, empowered to levy cargo rates and tonnage dues, buy and sell real estate and buildings and authorized to hire a harbour master, port warden, shipping master, engineers, clerks and other staff.

The commission quickly became a prime target for political patronage and the jobs of commissioners and employees alike were held at the whim of succeeding governments. Partly to alleviate this problem, but primarily to rationalize port development nation-wide, the federal government established the National Harbours Board in 1936.

International Radar Network Monitors Vessel Traffic

Canadian Coast Guard VTS radar operator.

The map of Vancouver Island and the Strait of Georgia coastline looks as though it has come down with a severe case of measles: the treacherous coastal waters are liberally strewn with tiny red dots — each dot representing a marine collision or grounding.

What is most significant about those dots, however, is that all but a half dozen or so of them indicate "incidents" prior to 1974, the year the Canadian Coast Guard (CCG) turned on the radar screens of its Vessel Traffic Services (VTS) system.

Through CCG radar bases at Vancouver and Tofino on the west coast of Vancouver Island and U.S. Coast Guard installation at Seattle (Canada and the U.S. signed the Joint Co-operative Vessel Traffic Management Agreement in 1979), operators are able to track and maintain voice contract with all commercial shipping headed in and out of the west coast's two major ports.

A ship from the Far East headed for Vancouver first appears on the Tofino radar scopes while it is about 130 kilometres (80 miles) at sea. The Tofino operator feeds pertinent data into a tracking computer capable of handling 40 vessels at a time, then maintains voice contact as the ship heads into Juan de Fuca Strait.

At this point the Tofino operator will hand the ship off to Seattle Traffic Centre which ensures the ship keeps to its assigned traffic lane as it navigates the crowded and tricky waters of the strait.

After picking up the obligatory pilot off Victoria, the ship will be handed off to Vancouver Traffic Centre which will oversee its movements as it approaches, enters, docks and then departs the Port of Vancouver.

In their aerie atop a black office tower at the north end of Lions Gate Bridge, four CCG radar operators keep track of traffic on twin 56-cm (22-inch) radar screens, one providing a general picture of the operator's area of responsibility, the other an enlargement of potentially hazardous areas or situations.

The tracking computer automatically passes the ship along from operator to operator and also provides each with visual and audible alarms to warn of hazards such as potential collisions or groundings.

From his perch high above the port, the harbour traffic regulator also can maintain visual contact with the vessels (on a clear day) and, in addition to his radar scopes, has the assistance of a closed-circuit TV signal from a camera slung under the Lions Gate Bridge.

Despite the fact the operators do not track fishing vessels or pleasure craft, the Vancouver Traffic Centre handles about 200 000 ships a year, more than half of them in the Port of Vancouver.

Although radar coverage does not extend north of Nanaimo, operators at Vancouver and Port Rupert in northwestern B.C. maintain VHF two-way contact with all commercial vessels to alert them to traffic, weather and navigation conditions.

The board centralized all decision-making in Ottawa, with local input coming from government-appointed port managers. Almost from the outset, shipping and business circles pressed the government for more local autonomy, leading to the establishment in 1971 of the 13-member Vancouver Port Authority to serve as an advisory board to Ottawa.

This in turn led to the formation in 1975 of the federal Canadian Ports Commission and, under it, the Port of Vancouver Commission which was given authority to establish its own operating budgets. Capital budgets, however, remained the prerogative of the federal body.

The most recent changes came in 1983 with the passage of the Canada Ports Corporation Act, establishing the present-day Vancouver Port Corporation, an autonomous Crown corporation akin to Air Canada or the Canadian National Railway.

"Basically," says board vice-chairman Cosulich, "the port is to be run just like a business."

Reporting to the board and its chairman, Capt. Hector Perry, is newly-appointed Port Manager Francis McNaughton who directs a staff of 230 in the police, real estate, harbourmaster, engineering, legal, financial and administrative divisions.

Under their jurisdiction are 555 km^2 (214 sq. mi.) of water stretching along 219 km (136 miles) of shoreline south to the U.S. border, including more than 70 berthing facilities for the 30 freight shipping lines and the more than 150 cruise ships that use the port each year.

Although the corporation's most recent annual report shows it has fixed assets in excess of $150 million, corporation officials say that, because there is little turnover in harbour properties, it is impossible to get a true estimate of the value of their land holdings.

"You see that piece out there?" says corporation vice-chairman Cosulich pointing to a small portion of the north shore. "That's privately owned and the last I heard they want $40 million for it."

With real estate both scarce and expensive, the corporation has started creating some of its own — most spectacularly at Roberts Bank, a coal-loading terminal dredged from the Fraser River delta silt some 33 km (20 miles) south of Vancouver's Burrard Inlet harbour.

Clearly visible from aircraft flying in and out of Vancouver International Airport, Roberts Bank is a tidy, square, 110-ha (271-acre) island attached to the mainland by a 4.1-km (2.5-mile) causeway which provides both rail and road access to the loading facilities.

Roberts Bank Coal terminal.
— Photo by Jim Murray, DRIE Vancouver

Originally opened in 1970, a 20-ha (50-acre) "pod" was more than quadrupled in size by a 1982 program in which silt dredged from the bottom to widen the shipping channel and provide a turning basin, was used to enlarge the island.

Don Buggie, the corporation's vice-president of finance and administration, explains that the site is at present exclusively a coal terminal (leased to Westshore Terminals Ltd., a part of British Columbia Resource Investment Corporation — BCRIC) although it is possible other bulk commodities could be handled in the future.

To a large degree, the Port Corporation's role is that of a landlord.

"We own substantial lands around the harbour," Buggie explains. "Those mainly are leased out to private opera-

tors and most of the terminals in the port of Vancouver are operated by private firms."

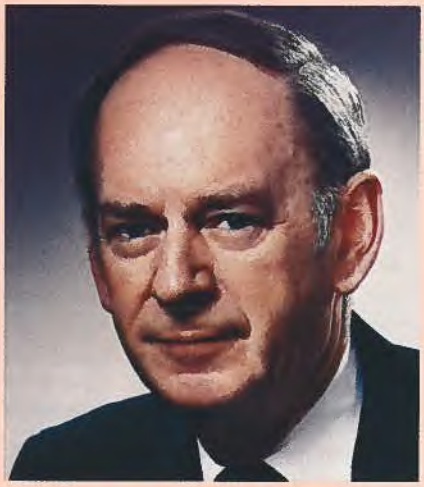
Among the largest of these is the Seaboard Lumber Sales Co. Ltd. terminal, whose 10 to 15-metre (32 to 50-foot) high stacks of lumber can be seen along the north shore of Burrard Inlet near the Second Narrows bridge.

Seaboard, winner in 1982 of a federal exports award, is a shipping and marketing firm jointly owned by 20 companies, including such giants of the B.C. forestry industry as Canadian Forest Products, Crown Forest Industries, Weldwood and Whonnock.

"When Seaboard was formed (in 1935)," company president Clive Roberts told *B.C. Lumberman* magazine, "it was very necessary because there were so many small operators, and they weren't the sophisticated and large companies you have today.

The Coast Mountain provide a backdrop for Seaboard Lumber Sales' wharf.

Key Role for Vancouver Port



Francis J. McNaughton, Port of Vancouver Corp. Manager and Chief Executive Officer.

Opportunities in the Pacific Rim for enhancing international trade represent the greatest growth potential for Canadian exports. The Port of Vancouver, strategically located on Canada's Pacific Coast, has a key role to play in facilitating this trade growth and in the economic activity and employment growth such export trade will create.

Both the Vancouver Port Corporation and the industries in the port will continue to expand facilities and capacity to aid the export challenge. The corporation has recently added two new container cranes to the port's container facilities. Construction has also commenced on a 145-metre (476-foot) berth extension which will provide 595 metres (1 950 feet) of container berth-face at Centerm.

The Roberts Bank outer port has been expanded from a land area of 20 hectares (50 acres) to 80 hectares (200 acres) providing sufficient area for three new terminal sites. One of these 20-hectare (50-acre) sites has been incorporated into the existing coal exporting facility operated by Westshore Terminals Ltd. The remaining two sites provide unused capacity for future export cargoes. The Roberts Bank expansion included the widening of the ship channel and the creation of a vessel turning basin.

A process of continual improvement by private terminal operators is also evidenced in the port, from the major investment by Westshore Terminals Ltd. at its Roberts Bank facility to investments in rolling stock and cargo handling equipment by stevedoring firms.

Development by the corporation is also underway on a new cruise ship facility to be part of the integrated development of Pier B-C which will include a trade and convention centre, a world trade centre and office-hotel complex. Scheduled for opening in 1986 this facility will provide a focus for international trade development.

Future facilities planning by the corporation will include increased container handling capacity and the enhanced utilization of port facilities. In addition, infrastructure, such as access roads and overpasses, will be improved to ensure efficient intermodal capacity in the port.

These improvements and investments must be in place if Canada is to capitalize on the export opportunities in the Pacific Rim.

— by F.J. MacNaughton
Port Manager
Chief Executive Officer
Vancouver Port Corporation

"Individually, they couldn't organize and handle the export business. They needed someone who could get it all together for them. That way they could worry about producing it and someone with the necessary skills could worry about selling it."

To achieve this, Seaboard operates a fleet of 10 ships on long-term charter and has subsidiary companies in seven foreign cities including London, Sydney and Tokyo to establish markets worldwide.

"We have worked hard to develop markets everywhere B.C. wood could be used," says Roberts.

Although, the largest volume of exports from the port are coal and coke (nearly 20 million tonnes in 1984), Vancouver ranks as the world's premier grain port with shipments last year of 10 887 000 tonnes, an increase of 25 per cent during the past five years.

Virtually all of the 25 grades of wheat plus barley, rye, oil seeds, mustard, flax and specialty grains are shipped to Vancouver from the Prairies by rail. There is it is sorted, inspected and cleaned before being loaded from one of the five major grain terminals (total capacity 929 000 tonnes) owned by Pioneer Grain Terminals, Saskatchewan Wheat Pool, Alberta Wheat Pool, Pacific Elevators and United Grain Terminal.

While bulk shipments (which also include exports of sulphur, potash, woodpulp, copper ores, fodder and feed and propane gas and imports of phosphate rock, raw sugar, salt and metals) account for nearly 80 per cent of the port's tonnage, general cargoes and containerized freight account for almost all the revenues from the three terminals owned and operated by the Vancouver Port Corporation.

These three terminals — Centennial, Lynnterm and Vanterm — are unlike most port-owned facilities in Canada, in that the corporation owns the container cranes and provides terminal maintenance and billing services, with stevedoring companies providing services under contract to load and offload the freighters.

The 11-berth Centennial Terminal (it was opened in 1958, B.C.'s centennial year) is primarily a general cargo facility and is notable for its 272 000 kg (300 ton) heavy-lift crane.

Completed in 1975, the $20 million Lynnterm is a deep-sea general-cargo wharf offering a total berthing length of 732 metres (2 400 feet). Designed primarily to handle forest products and steel, it also has the potential to handle containers should the need arise.

The $30 million Vanterm, also completed in 1975, is the corporation's showpiece facility. Covering a total of 30.8 ha (76 acres) along the south side of the harbour, it offers two 275-metre (900-foot) container berths, a Ro-Ro (roll-on, roll-off) berth and four general cargo berths.

In addition to 17 319 m^2 (186 420 sq. ft.) of covered storage, Vanterm provides 19.4 ha (48 acres) of space for storage of 7 000 TEUs of containerized freight (TEU is the standardized container measurement equal to a Twenty-foot Equivalent Unit: 20' × 8' × 8').

Vanterm offers the public a look behind the scenes of a container dock.

Vanterm also offers the public an unusual opportunity for an inside look at the operations of a modern terminal from its glass-enclosed Public Viewing Area.

Available five days a week for individual or group tours, it provides visitors with an excellent audio-visual introduction to the Port of Vancouver activities and a stroll along a window-walled walkway through the storage sheds and over the container yard to an observation lounge overlooking the entire terminal and much of Vancouver harbour.

Operating round-the-clock, seven days a week, Vanterm and other container facilities have undergone a rapid increase in traffic volumes. In 1984, the number of containers handled in the port increased 11.3 per cent to 151 551 TEUs, while tonnage handled jumped 21 per cent to 1 400 000 tonnes.

"These," says Buggie, "are quite dramatic growth figures in one year, particularly when one looks at the overall economic climate, not only in Canada, but worldwide."

"And," adds Cosulich, "every attempt is being made to increase that."

The corporation's current major project is the $25 million cruise ship facility that forms a key part of the Canada Place development. Linked to both the sea-bus terminus and the Waterfront Station of the city's new Light Rapid Transit line, the terminal will be able to handle up to five ships at a time when it opens for the 1986 season.

But, wharves, terminals and storage sheds make up only the more obvious portions of the corporation's responsibilities.

"We also get involved in the infrastructure behind the terminals," says Buggie, "providing roadways, overpasses and utilities to the facilities. There's also a fair amount of commercial activity such as marinas and boat yards related to pleasure craft.

"In many ways, a port is very much like a small city, although we don't have the number of residential developments that one would find in a traditional city.

"I suppose it can be described as an urban industrial community."

— by Ron Johnson
Canada Commerce

PORT OF VANCOUVER STATISTICS

PRINCIPAL CARGOES IN 1984 IN METRIC TONNES
(Percentage change from 1983 in parentheses)

EXPORTS	
Coal and Coke	19,804,000 (+26)
Grain	10 887 000 (0)
Sulphur	5 558 000 (+23.9)
Potash	4 065 000 (+26.8)
Lumber	2 074 000 (−6.5)
Woodpulp	824 000 (−6)
Pulpwood Chips	1 045 000 (−17.1)
GENERAL CARGOES	5 252 000 (−6.6)
CONTAINERS	1 400 000 (+20.9)
PORT TOTAL	59 297 000 (+14.8)

IMPORTS	
Phosphate Rock	989 000 (+43.7)
Common Salt	279 000 (−3.9)
Raw Sugar	100 000 (−3.3)
Iron and Steel Products	75 000 (+7.1)

Stevedores ready general cargo for loading.

PRINCIPAL TRADING COUNTRIES (BY TONNAGE)

IMPORTS	
U.S.A.	(1 561 192)
Mexico	(281 121)
Japan	(210 810)
Australia	(106 385)
Taiwan	(38 261)
Malaysia	(35 477)
Singapore	(33 537)
South Korea	(32 035)
Italy	(27 030)
West Germany	(23 618)

EXPORTS	
Japan	(20 827 838)
South Korea	(4 670 335)
China	(3 693 192)
Brazil	(2 141 511)
Taiwan	(1 548 903)
U.S.S.R.	(1 366 544)
India	(1 358 551)
U.S.A.	(1 317 450)
West Germany	(1 006 842)
Australia	(1 006 842)

HARBOUR CAPACITY

BERTHING FACILITIES	
General Cargo	32
Grain	11
Bulk (coal, potash, etc.)	7
Oil (deep sea)	5
Liquid gas	2
Bulk Sugar	1
Salt	1

ANCHORAGES	
English Bay	19
Inner Harbour	8

CRUISE VESSEL VOYAGES (AND PASSENGERS)

1984 — 145	(209 262)
1983 — 144	(175 626)

PUBLIC VIEWING AREA (VANTERM CONTAINER TERMINAL)

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Open Monday to Friday, 9 a.m. to noon and 1 p.m. to 4 p.m. (Sunday tours in June, July and August at 1, 2 and 3 p.m.)

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Mrs. Janet Toddington. Telephone: (604) 666-6129.

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