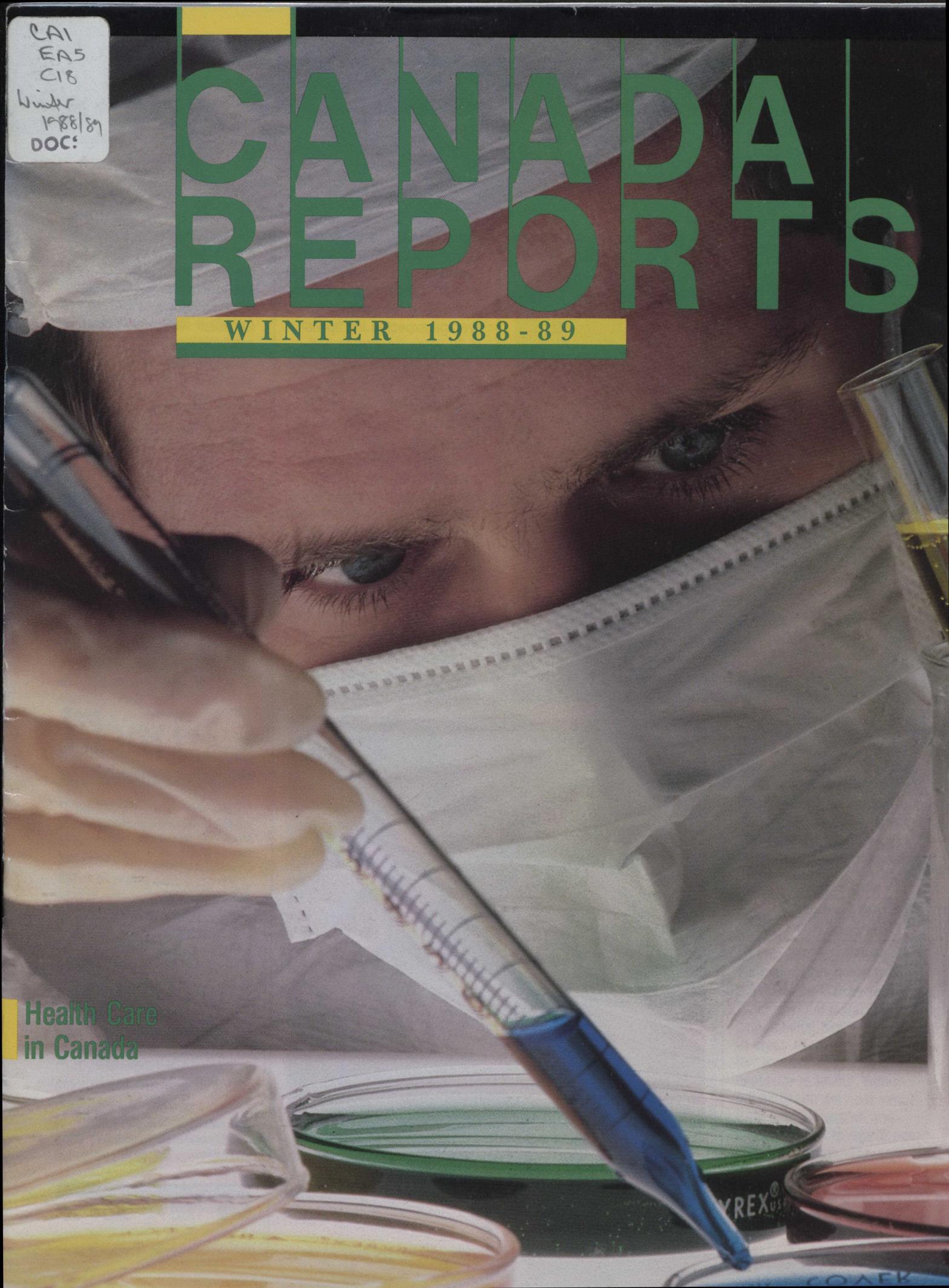


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CANADA REPORTS

WINTER 1988-89



Health Care
in Canada

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Editor's Note

The ancient Greek physician Hippocrates once described health as the greatest of all human blessings. Some two millennia later and half a world away, the Canadian health care system is helping all Canadians realize that blessing. Regarded as one of the world's most accessible, comprehensive and progressive, the Canadian model combines compassion with the latest medical advances to provide an unprecedented standard of health care for every citizen.

Once defined in terms of the absence of disease, health today refers to a state of complete physical, mental and social well-being. Healthiness is thus envisaged as a part of everyday living, an essential dimension of one's "quality of life."

Today, Canadians are participating in a health and fitness "revolution" that sees health promotion as an accepted fact of everyday life. And with average expected life spans of 80 years for women and 73 years for men, Canadians now rank among the top 10 healthiest nations in the world.

The hub of Canada's health care system is a nation-wide, publicly funded and administered health insurance program that ensures that every Canadian — regardless of financial circumstances — receives medical care. In addition to this is a solid research and technology infrastructure which has allowed Canadian scientists to remain at the forefront of medical developments. From breaking new ground in areas

such as laser technology and diagnostic imaging, to a deeper understanding of how one's genetic make-up controls the body and senses, Canadian researchers have provided vital impetus to the advancement of medical science.

A look into Canada's health and medical care system provides an intimate glimpse into the lives of Canadians — their beliefs, their lifestyles, their expectations. The pages that follow are an attempt to provide such a glimpse.



Photo : Four By Five Inc.

Canada

Canada Reports is published by the External Communications Division, Department of External Affairs, Ottawa, Canada K1A 0G2.

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Comments or suggestions from readers are welcome. A credit is requested for any material reprinted.

Cette publication existe également en français sous le titre Reportage Canada.

Esta publicación es disponible en español con el título Reportaje Canadá.



External Affairs / Affaires extérieures
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CARING FOR A NATION

Canada's health care system is a national, publicly funded and administered one that ensures that every Canadian — regardless of ability to pay — receives needed medical care. Under the system, the costs of all necessary physician services; of hospital services including in-patient care, drugs, diagnostic tests and many out-patient services; and of some dental procedures are paid for through a combination of general tax revenues and insurance premiums collected from those financially able to contribute.

Equal Care for All

A model of equitable and progressive health care coverage, the Canadian health insurance program, like the country itself, has come a long way in a short time. Under the 1867 terms of Confederation, the provinces (and later the two northern territories) were granted primary responsibility for health care, and they soon became involved in financing hospitals and providing medical care for those in need. By 1914 the prairie province of Saskatchewan had introduced community-level taxes to hire doctors, build hospitals and finance hospital care.

As medicine advanced at an exhilarating pace over the succeeding decades, the cost of health care rose significantly. The Saskatchewan government consequently introduced in 1946 a province-wide hospital insurance program that assured every qualified Saskatchewan

citizen access to necessary hospital care at public expense. Later, a similar insurance plan for essential physician services was launched.

Both were Canadian firsts and the precursors of today's national program. The federal government subsequently entered into agreements with all the provinces and territories to share the costs of hospital and medical care on the condition that the insured services met broad national standards. Today these standards require, for example, that 100 per cent of eligible residents have reasonable access to necessary hospital and physician services on a fully prepaid basis.

As a result, all Canadians are today guaranteed a standard basic level of health care. And responding to the unique health needs of their residents, all the provinces and territories have also opted to provide some additional health insurance coverage. Most help meet the costs of children's dental care, prescription drugs for senior citizens and optometry examinations. Some pay for chiropractic services, while others cover the cost of transportation to medical centres from isolated regions.

The System's Cells

Just like cells in the human body, the parts of the health care system provide specialized functions as individual elements, while in concert with each other they form a complex integrated network that maintains health.

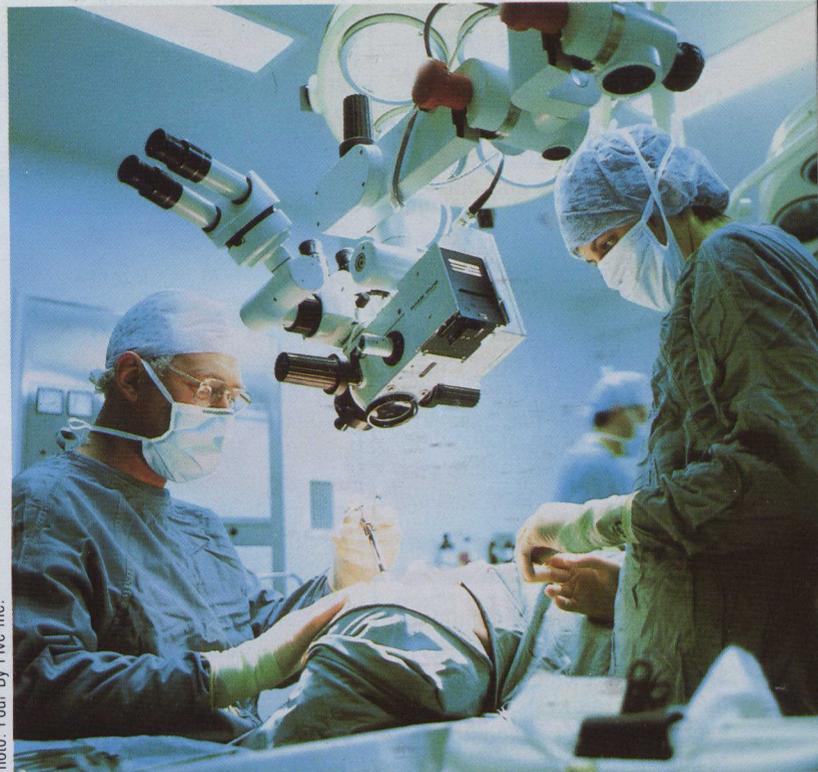


Photo: Four By Five Inc.

Medical experts work with state-of-the-art technology and advanced surgical techniques to provide the best care available.

The most visible components of Canada's health care network are the physicians who work with other highly trained medical professionals — nurses, psychiatrists, optometrists, dentists and nutritionists to name a few — are essential for providing comprehensive health care. Doctors are for many Canadians the primary source of medical attention, with most people receiving the health services they require at their doctor's office, community health clinics or even in their own homes. Regular checkups by one's physician are an accepted part of life in Canada.

In times of serious illness or injury, medical care is available at the country's world-class hospitals. Here medical experts work with state-of-the-art technology and advanced surgical and treatment techniques to provide some of the best care available anywhere.

Public health units perhaps play the largest role in maintaining Canadians' health while most often going unnoticed. Health officials enforce strict environmental and occupational health standards in areas such as water quality, waste disposal, and exposure to toxins. Other public health services range from food inspection and immunizations to health education programs. The services' near invisibility is proof of their effectiveness — clean

water, safe food and the absence of epidemics are taken for granted by most Canadians.

Volunteers are also essential catalysts in Canada's health care system. Hundreds of voluntary organizations extend the health network by providing support and in-home health services to the elderly, the disabled and those stricken with disease; by raising funds for research and equipment; and by developing counselling and public education programs. Canada is also one of only a handful of countries that rely exclusively on voluntary donors to maintain a national blood supply. Managing the program, the Canadian Red Cross Society handles over one million units of blood annually.

Return to the Community

To ensure Canadians continue enjoying one of the highest standards of health care in the world, the system is evolving to meet changing realities. Technological advances, new health problems, rising costs, an aging population, and a new health care approach that focuses on promoting a state of health as well as treating illness are all challenging the traditional system.

In response, Canada is placing increased emphasis on innovative community health centres that encourage public participation and serve both the health and social service needs of their local community, be that a small town or an ethnic community in a metropolitan city. Community-based boards of trustees run the non-profit centres whose services are particularly responsive to local needs and the social, cultural and economic backgrounds of clients. Progressive proponents of a broader approach to health care, most also emphasize health promotion and disease prevention equally with the

provision of primary medical care. Drawing together various health care professionals under a single roof, these "one-stop shopping centres" offer co-ordinated multidisciplinary services ranging from prenatal courses and cardiac rehabilitation programs to drug addiction clinics and cancer counselling sessions. Currently under study by several other nations, Canada's community centres have proven to be cost-effective, responsive and accessible models of health care delivery.

Canada's first community health centre was established in 1963 by a local steelworkers' union in the southern Ontario industrial town of Sault Ste. Marie. Originally providing basic medical care to union members, the centre now cares for approximately 70 000 patients, nearly 70 per cent of the local community.

But although Ontario was the site of the first health centre, Quebec soon emerged as the undisputed leader in community health services. During the 1970s it introduced a reform program establishing *centres locaux des services communautaires* to meet all the health and social needs of a designated population. By last year there were 153 such centres across the province, and their numbers continue to grow.

The Pulse of the Future

The remarkable advances in medical science during the last century have altered the very pattern of illness in Canada. Following a progressive shift from short-term illnesses to more long-term degenerative conditions, chronic diseases and disabilities have today replaced communicable diseases as the predominant causes of health problems.

This general trend is both a cause and a result of the so-called "greying" of Canada.

Today there are three times as many seniors (those 65 years of age or older) as there were 45 years ago, and the number will triple again in the next four decades.

An equally important group is the disabled, as at least one in ten Canadians lives with some kind of disability — physical impairment, chronic illness, mental retardation or sensory problems.

Providing care for the elderly and disabled is thus a major challenge facing the health system. Most of these individuals neither require the intensive level of care provided in hospitals nor wish to give up independent living for institutional life. Canada has now come to realize that quality of life and respect for independence must be primary concerns in the delivery of health care.

The solution once again lies in a return to the community and more specifically to the home itself. When provided with in-home medical equipment and a comprehensive range of home care services — such as nursing care, meal preparation and telephone alert networks — the elderly, disabled and those in periods of convalescence or rehabilitation can lead active,

independent lives as fully integrated members of the community.

Other new models provide supplementary support and a continuum of health care services where necessary. Day hospitals are special daytime treatment regimes offered by hospitals for individuals living in the community. Independent Living Centres, founded and run by the disabled, provide information, counselling, and advocacy services for the disabled across Canada. And a new project in the east-coast province of New Brunswick, the Extra-Mural Hospital, provides an in-depth comprehensive hospital care program to patients in their own homes.

Today more health services are available in Canada than ever before. Although advances in medical sciences and new delivery models have reshaped the health care system in recent decades, behind it remains the original goal of providing the best health care possible to all Canadians. In Canada, health care continues to be much more than just medicine.

Caring for the elderly is one of the major challenges facing the Canadian health system.



Photo: Four By Five Inc.

Pushing Ahead the Frontiers of Medical Technology

Since the 1922 discovery of life-saving insulin by Canadian scientists Frederick Banting and Charles Best, Canada has remained at the forefront of medical research and technology. From pioneer breakthroughs in specialty areas such as laser technology, artificial prosthetic devices and diagnostic imaging, to a deeper understanding of the complexities of the human brain, Canadian researchers have proven invaluable to the progress of medical science.

Now, some of the world's most sophisticated medical diagnostic and treatment hardware is designed and manufactured in Canada. The list of products ranges from excimer lasers that clear blocked arteries to fixation plates that provide internal support to patients with severe spinal damage. And in between are to be found developments such as a special wheelchair for the disabled and a revolutionary scanning device called Positron Emission Tomography.

Today, there are close to 600 Canadian firms engaged in the manufacture and supply of more than 1 200 classes of medical products. Ranging from adhesive bandages to sophisticated imaging technology, many of these products enjoy an international reputation and are exported all over the world.



Excimer Laser Clears Blocked Coronary Artery

One area where Canada has become a world leader is heart surgery. Last year, an 84-year-old diabetic, almost crippled by severe leg pains caused by a blocked artery, was cured in 33 seconds. Within a few days, he was walking again.

Life could become easier for spinal injury victims thanks to a fixation plate developed by Canada's National Research Council.

A few months later, a 40-year-old man with plaque in his right coronary artery, which if left untreated could have led to his death, is now breathing more easily.

The list of miracles goes on thanks to one of Canada's leading wonder workers, cardiac surgeon Dr. Wilbert Keon. Director general of the University of Ottawa Heart Institute at the Ottawa Civic Hospital, he was the first in the world to perform a coronary-endarterectomy using an excimer laser.

The laser was developed over a three-year period by a group led by Drs. Lyall Higginson and Edward Farrell of the Heart Institute, physicist Dr. Rodney Taylor of the National Research Council (NRC) and engineer Roger Sandwell, director of medical products at the Ottawa-based Lumonics Inc. — an international leader in applied laser technology.

In the procedure, a 1.5-mm fibre-optic catheter with a light at the tip was inserted into the artery and directed to the blockage. Then a laser pulse was applied for a few billionths of a second which turned the blockage into gas.

Says Dr. Keon, who also helped pioneer the Jarvik-7 mechanical heart, "We have a long way to go, but this major advance [the excimer] has the potential to eventually eliminate the estimated 700 000 coronary bypass surgery operations performed yearly in Canada and the U.S.A."

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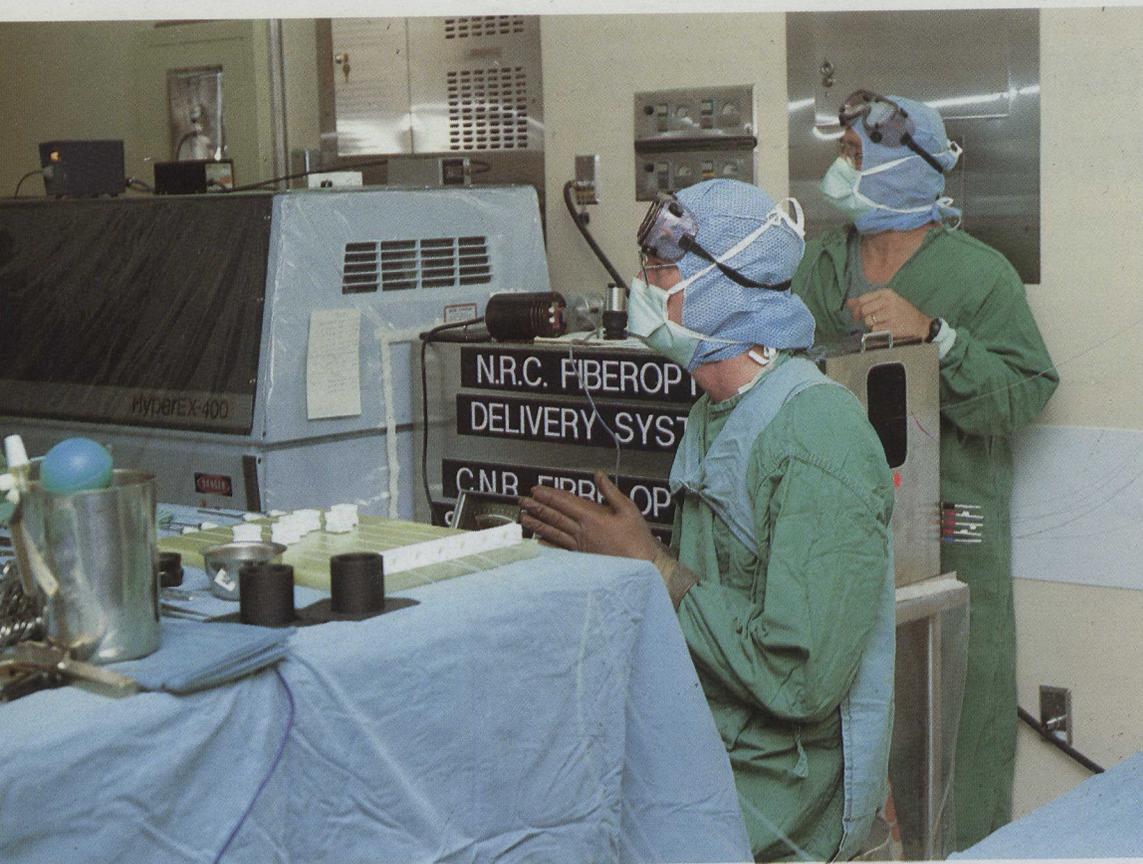


Photo: Daniel Gamache/NRC

Dr. Keon's next goal is to avoid open-heart surgery by employing a procedure called angioplasty. The technique will enable surgeons to unclog blood vessels by inserting a laser-tipped catheter through an artery in the leg or the arm and threading it to the heart. The technology required for excimer laser angioplasty should be available in two to three years.

New Hope for Spinal Injury Victims

Life could become easier for a good many spinal injury victims following the recent development of a fixation plate that provides internal support to persons with severe damage to the front of the spine. The device, when surgically implanted and screwed into place, provides the stability and structure once possible to get only from a healthy human spine.

The Contoured Anterior Spinal Fixation Plate (CASF) was designed by Dr. Robin Black

and his team from the NRC's Laboratory for Biomedical Engineering. Orthopedic specialists from the Ottawa Civic Hospital also collaborated in the effort.

Dr. Gordon Armstrong, former chief of orthopedics, and an Ottawa Civic Hospital surgical team have implanted the plate now in more than 20 patients. "We are very optimistic about the results so far," says Armstrong. "Existing bone plates are inadequate because they are too narrow and don't allow the positioning of more than two screws in each vertebra." The CASF plate, however, is contoured to fit snugly around the spine and is wide enough to allow the placement of at least three screws per vertebra. This in turn allows for stronger support.

NRC and Civic Hospital researchers have not stopped with the development of the CASF plate. In fact, the two institutions are currently collaborating on a new set of plates for the upper part of

Laser physicist Dr. Rod Taylor and colleague prepare laser fibre-optic catheters prior to surgery.

the spine and one that can be anchored to the pelvic bone. Help may be finally on the way for even more spinal injury victims.

Sophisticated Scanners

One of the most exciting of the new tools and techniques available to medical science today is the scanning system operating at McMaster University's department of nuclear medicine in Hamilton, Ontario. Known as Positron Emission Tomography (PET), the system recreates a shifting colour picture of the living human brain on a computer screen.

To operate the PET scanner, the patient is injected with tiny amounts of radioactivity which emit gamma rays that are picked up on a computer.

The computer then processes the information it receives and translates it into a changing picture of the brain at work.

Thanks to McMaster's PET — one of three such systems in Canada — scientists for the first time can see precisely what is going on in a person's head. The revolutionary PET system has recently helped Canadian researchers make early diagnoses of brain tumours and major advances in the study of many neurological disorders. (Some aspects of this subject were mentioned in the summer 1988 issue of *Canada Reports*.)

Easing the Life of Wheelchair Patients

Accepting a disability and facing a new form of transportation — the wheelchair — can be a traumatic experience. While the electric wheelchair offers greater freedom for some disabled persons, learning to control this mobile mechanism can be a frustrating and time-consuming task.

But a joint effort by the University of Calgary, the Technical Resource Centre and the Alberta Children's Hospital in Calgary is helping to change all this.

The project is a computer program called the "Wheelchair Simulator" that enables electric wheelchair users to master their movements through the use of a computer with joystick that simulates real-life efforts to move along corridors and around obstacles.

The program, although still in its initial stages, is currently being used in therapy situations at the Alberta Children's Hospital. The first of its kind in North America, the program is being studied by a group in the United States which plans to develop a similar one.

Meanwhile, a revolutionary wheelchair developed by Dr. Orest Roy of the National Research Council is now rolling off the assembly line thanks to an Ottawa-based high-tech firm.

Matrix Marketing and Management Inc. of Ottawa began production of the first-of-its-kind device for the Canadian market last spring. If successful, Matrix plans to go international with the wheelchair which, in addition to having a number of advantages, could halve the price of the standard \$5 000 (Cdn) motorized wheelchair.

The new wheelchair differs from regular models because it brings its occupant almost to the eye level of those standing around. The added height also makes work at desks or counters easier.

Unlike the standard model, this wheelchair is mounted on a circular turntable that rotates on four stabilizing castors. Because of this, it can move in virtually any direction on a small turning radius. There is a single drive wheel under the seat and a steering hoop that rests at waist level. When the hoop is turned, the device moves about and at a speed determined by how hard it is being squeezed.

Another advantage comes from the wheelchair's much smaller size which makes it far more manoeuvrable, particularly in a confined area. It is not, however, suitable for outdoor use because of its small wheels and inability to handle rough terrain.

Bliss Is the Ability to Communicate

Speech-impaired people often have a physical disability which means that besides being unable to speak, they also have difficulty moving about. As a result they often suffer the added hardship of isolation.

Help, however, is finally on the way. It comes in the form of a special symbol language known as Blissymbolics created by Charles Bliss and further developed by the Blissymbolics Communications Institute in Toronto — the centre responsible for the worldwide registration and dissemination of Blissymbolics. The Bliss system is currently used in many languages in 32 countries by more than 30 000 people.

Blissymbolics is a language that enables people who cannot speak to communicate complex ideas by indicating symbols pictured on a board. The more than 3 000 Blissymbols are created by using combinations of basic shapes, letters and numbers. To communicate, the user indicates one symbol after another until a complete thought is formed.

Ongoing development of Blissymbolics by IDON Corporation, an Ottawa-based research and development

firm, and the Government of Canada will soon allow many of the 30 000 users to communicate over ordinary telephone lines. Testing is now being done in the homes of four Montreal residents. These four, all severely disabled, have become avid users of their Bliss "phones."

Some of the world's most sophisticated medical diagnostic and treatment hardware is designed and manufactured in Canada

Giota Boussios, a 23-year-old woman with cerebral palsy who has one of the computer telephones in her home, cannot speak and cannot move, but can comment using Blissymbolics. Says Boussios, "I never thought I'd be able to do anything. Now I feel it isn't right not to have a telephone." One of her phone-mates, Frank Filipelli, comments, "I never thought I would ever have a telephone in my home. For handicapped people on their own it is very important. More people need to have them."

Indeed, the project has exciting possibilities. Some believe that the system may eventually help speech-impaired people learn to read. Others say it may be possible to add a sound generator to help people understand speech or even learn to speak. Many look forward to the day when the system will link Blissymbolics users in rural areas with centres of Blissymbolics education.

Towards the Future

Developments in Canadian medical technology continue to race ahead. But the main tools in the field are the minds of the researchers and scientists themselves. Reporting advances with explosive speed, they provide medical science with the implements and techniques needed to heal the sick.

Blissymbolics is a language that enables people who cannot speak to communicate complex ideas by indicating symbols pictured on a board.



Vital Signs of a Health Revolution

Canadians today are among the world's healthiest people. With an average life expectancy of 80 years for women and 73 years for men, Canada ranks among the top 10 nations. But Canadians are also becoming healthier in the broader sense of the term.

In the past, when infectious disease was the predominant cause of illness, health was defined as the absence of disease. By the mid-1900s, however, medical science had significantly reduced the incidence of such infections: chronic disease, disability and the stress of contemporary living became the major health problems in Canada. In turn, health came to mean more than simply freedom from illness. It was redefined as a state of complete physical, mental and social well-being. This new approach also recognized that health was influenced by a range of interrelated factors: human biology, lifestyle, and social, economic and physical environments.

Out of this new understanding of the subject grew an innovative approach to health care, known as health promotion — a process that encourages people to increase direct control over and improve their health. It represents a mediating strategy between people and their environments, synthesizing personal choice and social responsibility. In practical implementation, it fosters self-care and healthful personal lifestyles, takes steps to discourage the onset of disease and disability,

develops sound public policy on health, and creates social and physical environments conducive to good health. Thus individuals, the medical sphere, the private sector, communities and government all play a role in health promotion.

A New Lifestyle

Less than 20 years ago, Canadians were among the world's least fit people. Yet today Canadians number among the most physically active and fit people in the world.

During the winter, British Columbians head for the exhilarating Rocky Mountain ski slopes, while Canadians on the prairies strap on a different type of ski for the challenge of cross-country skiing. In the early morning hours joggers reclaim Montreal's streets from the traffic, while on the east coast, swimmers, surfers and sailors enjoy the Atlantic waters.

The Canadian fitness trend has been supported by the public and private sectors alike. In 1971 the federal government together with

high-risk practices as poor nutrition, smoking, and alcohol and drug abuse. For example, cardiovascular disease, accounting for one-third of all deaths annually, is the leading cause of death in Canada. The fitness trend has been an important first step in combatting it. And together the medical profession and government are also educating Canadians about the relationship between high-fat diets and heart disease. In part because of these and other initiatives, the number of Canadian women aged 25 to 74 dying from heart disease has decreased by 40 per cent over the past two decades, while the ratio for men has dropped 30 per cent.

The new understanding of the importance of diet and nutrition is evident elsewhere. Individual Canadians are eating less and adopting healthier diets. Health food stores are booming; more and more restaurants offer special selections for health-conscious clients; and nutrition lessons are now standard on school curricula.

Other major lifestyle changes are also revitalizing Canadians' health. Recognizing the dangers of alcohol and drug abuse, the government has launched aggressive campaigns against both to encourage responsible use of alcohol and freedom from drugs. The recently introduced National Drug Strategy addresses the problem of drug abuse through education and information programs, advertising, research into drug dependency, as well as enhanced



Photo: Four By Five Inc.

A new understanding of the importance of diet and nutrition has Canadians eating less and adopting healthier diets.

The amazing turnaround is the result of a revolution in lifestyles. Physical fitness has become a top priority for Canadians. Across the country people are on the move — working out at fitness clubs, swimming, jogging, walking, cycling or swinging racquets.

business created Participaction — a national agency promoting fitness and sport-for-all. The single, most important force behind the Canadian fitness revolution, Participaction, with its emphasis on participation in fitness through physical activity, has influenced many aspects of Canadian life.

Health promotion also extends into other phases of Canadian lifestyles, reducing such

law enforcement. The strategy balances health goals with enforcement, viewing prevention as the first and best line of defence against drug abuse.

Further encouraging healthy lifestyles is the emergence of holistic medicine. Concerned with the interdependent physical, mental and social well-being of individuals, holistic medicine attempts to treat the person as an integrated whole. Aimed at providing a state of complete healthiness, treatment may range from natural food diets and stress-management techniques to massage therapy or yoga.

Working towards Health

Studies have shown that when compared, physically fit employees are more productive, take fewer sick days and generally enjoy higher morale than their less physically active counterparts. It is not surprising then that the Canadian business sector is an active supporter of health promotion. Today, companies of all types and sizes are building fitness facilities, sponsoring stress-management programs and designing healthful physical work environments.

Just to cite an example of what one Canadian company is doing, Shell Canada Ltd. — a petroleum company — offers its employees a health insurance plan that covers expenses such as medication, dental work and psychological counselling. Regular medical check-ups are also provided, and medical care is available at the company's special health clinics.

To encourage physical fitness, Shell has built fitness facilities at all its work sites. The larger facilities offer programs that range from aerobics to weightlifting, and all are under the supervision of trained fitness instructors. In



Photo : Four By Five Inc.

Physical fitness has become a top priority for Canadians.

In addition, Shell hires nutritionists to design healthy cafeteria menus and to run nutrition education programs for employees and their families. The company also offers professional counselling for alcohol and drug abusers and provides sophisticated stress-management programs to help employees deal effectively with one of today's biggest health problems.

Like many Canadian companies, Shell has recently implemented a strategy to phase out smoking in the workplace. But the company has gone one step further in that it also provides special smoking cessation programs to assist its employees in "butting out."

Clearing the Air

The Shell no-smoking policy is part of a nationwide campaign for a smoke-free environment. Tobacco use is

the leading cause of preventable health problems, including lung cancer, in Canada — a fact that has sparked Canadians in all sectors into action.

Many major Canadian transportation carriers, for example, now offer no-smoking services. The country's largest airline, Air Canada, pioneered non-smoking flights in North America in 1986, extending the ban to more than 80 per cent of its flights last fall.

One of the world's most aggressive no-smoking campaigns was launched by the Canadian government three years ago. Aimed at producing a generation of non-smokers by the year 2000, the campaign features information programs, advertising, legislation, and research on tobacco addiction and the health consequences of smoking. Two years ago, the federal government, acting as Canada's largest employer, restricted smoking to specially designated areas throughout the public service. And as of January 1, 1989, smoking is prohibited in all federal workplaces.

The government of Canada has also taken action to promote health by stopping the promotion of smoking. Last June, it passed groundbreaking legislation that bans most forms of tobacco advertising; the law also requires that warning labels and lists of toxic constituents be printed on cigarette packages. Such efforts, together with other initiatives, are successfully clearing the air. Today, the majority of Canadians are non-smokers and tobacco use is rapidly on the decline.

The no-smoking trend is an example of Canada's expanding understanding of health. Increasing emphasis is now being placed on creating healthy social and physical environments in homes, schools, the workplace and the public setting at large.

The Canadian Healthy Cities Project, for example, aims to create cities conducive to good health. Twelve cities have joined the project, examining local issues such as housing, transportation, waste management, urban planning, economic development, and education, health and social services with an eye to their impact on health. The Healthy Cities Project has proven so successful in developing beneficial public policy that the World Health Organization has helped launch similar projects in several cities abroad.

The health revolution in Canada has thus grown from influencing individual lifestyle choices to progressively encompassing all sectors of society and the environment. A truly national phenomenon of unprecedented proportions, the vital signs of improving Canadian health are everywhere.

Health Care Multicultural Style

Multiculturalism is a Canadian way of life. Close to 80 distinct cultural groups can be found living in all regions of Canada. Six out of every 10 Canadians were born outside the country, and more than one-third speak languages other than English or French. Representing the majority of the population in most of Canada's major cities, ethnic minority groups are now the fastest-growing segments of the nation's population.

Multiculturalism is protected under the Canadian Charter of Rights and Freedoms and was recently enshrined into law in the world's first Multiculturalism Act. And now Canada is emerging as a pioneer in multicultural health care.

Canada is emerging as a pioneer in multicultural health care.

Defined as culturally appropriate, sensitive and responsive, multicultural health care has its roots in the city of Toronto. In 1950, two brothers from Hungary, Drs. Paul and John Reka, came to Canada as part of the post-Second World War immigration tide. Many of these immigrants, unable to speak English or French, found it difficult to adapt to their new country. Determined to overcome the linguistic and cultural barriers in the field of medical care, the Rekas founded a revolutionary new hospital in 1957.

Introducing the concept of multicultural health care to Canada, Central Hospital pioneered many of the methods now used worldwide. From the beginning, all facets of Central's operations were designed to respect and respond to different cultures.

Multicultural health services help to make the hospital stay less traumatic.

rooms. All written hospital material is produced in a range of languages, and a multilingual patient library supplies newspapers, magazines and books in more than 50 languages.

Central's food service is also uniquely international. Every patient's diet is designed to respond to nutritional needs, medical considerations and ethnic preference. Basic carbohydrate requirements, for example, may be met with

Cultural beliefs and norms can shape the delivery of health care. For example, different cultures have different "acceptable" responses to pain. Doctors must therefore be aware of such variances in order to accurately gauge the condition of their patients. Folk medicine also plays a critical role. Lab technicians note that Greek patients may be hesitant to give blood samples because their folklore emphasizes



Staff members were recruited from various ethnic backgrounds, spoke numerous languages and were specially trained in the varying cultural attitudes toward illness and health care.

Today, care is available at Central in some 30 languages as diverse as Italian, Chinese, Hungarian and Filipino. Patients are regularly visited by a staff member who speaks their language, and every effort is made to assign patients of the same nationality or those speaking a common language to shared

pasta, rice or lentils. And since spices are an indigenous part of a culture's food, meals are seasoned to the patient's taste whenever medically feasible.

Religion is an important consideration at Central. All efforts are made to accommodate various religious beliefs and customs, and celebrations of the various religious holidays take place throughout the year.

the danger of losing blood, while pharmacists sometimes reduce the size of pills in response to the Chinese folk belief that many small pills taken at once are more effective than a single large pill.

Other cultural beliefs affect everything from the temperature of food — the Chinese believe in a system of alternating hot and cold foods which maintains an equilibrium in the body — to interior decorating, as some cultures consider certain colours to be good luck.

The demand for Central Hospital's multicultural services is overwhelming — not surprising, since Toronto is one of the world's most ethnically diverse cities. Today, ethnic groups represent 56 per cent of the metropolitan population, form more than 70 distinct communities and speak over 100 different languages. In response to this multicultural reality, Central Hospital recently established another first: it launched Canada's first multicultural care nursing home, the Re kai Centre.

Like Central, the Re kai Centre provides health care that is sensitive to diverse cultures. The centre's staff, fluent in more than 22 languages, ensure that all new residents are greeted in their native tongue and make extensive use of Central Hospital's multilingual library.

Although in operation for only a year, the Re kai Centre has many exciting success stories. For example, one of the centre's first patients, an elderly Korean woman transferred from another nursing home, had not spoken for more than five years. Yet soon after her arrival, she was chatting with staff in her native tongue and joining in the centre's celebration of Chinese New Year.

Multicultural health care also works at the other end of the age spectrum. Being admitted to hospital can be a frightening experience for anyone, but for young children, unable to understand what is happening, it is often terrifying.

In response, the Montreal Children's Hospital is adapting the basic premises of culturally sensitive health care to the special needs of sick children and their parents. On-the-spot interpreters help allay the fears of immigrant families unfamiliar with the Canadian health care system. And whenever possible, the hospital will relax its rules.

Worried parents can sometimes stay overnight in their child's room or bring in home-made treats such as chicken soup, perogies and even whale blubber.

More and more, multicultural health care is winning support across the country. One of the most innovative and wide-ranging applications of this concept is currently taking place in Canada's west-coast city of Vancouver.

Fifty-five per cent of Vancouver's residents are from one of the city's 78 cultural communities, and 50 per cent speak English as a second language. Responding to this diversity, the Vancouver Health Department has made multicultural health care a top priority.

Cultural beliefs and norms can shape the delivery of health care.

An ongoing multiculturalism education program provides interpretation services in 34 languages. One of the department's most successful ventures is a prenatal counselling program for pregnant immigrant women at risk because of cultural or linguistic isolation. It has contributed to a significant increase in the health level of infants born to this group. Another exciting project is the specially designed medical clinic that serves the unique needs of Vancouver's large refugee population from Vietnam, Cambodia and Laos.

Since accessible information on Canadian health care is a primary need for newcomers, key health department brochures and other information are translated into many languages. Interestingly, these materials are not written in the languages' "pure" forms, but rather in the unique dialects that have evolved. A series of similar health education videotapes, to be aired on local television networks, is also being produced.

Volunteers as well have taken up the cause of multicultural health care. The Manitoba Association for Childbirth and Family Education provides specifically trained volunteer companions for immigrant and refugee women in childbirth labour in Winnipeg. These volunteers, fluent in various languages, accompany the pregnant women to medical appointments, act as translators and explain procedures. Not only are they present as labour companions during birthing, but they also give individualized prenatal education consistent with the family's cultural traditions.

With rapidly growing evidence of its effectiveness, multicultural health care is now taught at many medical and nursing schools across Canada. The very first multicultural health care course, however, was taught at Newfoundland's Memorial University. So successful was the course, that today the University offers a number of undergraduate and graduate classes on the topic. These courses, like those taught elsewhere in Canada, teach students in all the health care

fields the broad principles behind effective multicultural care. Students obtain a basic knowledge of various cultures and learn how to elicit relevant information from confused and frightened patients. Instructors, however, stress that concern and respect for the individual remain a top priority in effective health care.

In a very short time, multicultural health care has created entirely new, often multi-disciplinary, fields of study. Today, medical anthropologists, medical sociologists and even medical folklore specialists are conducting groundbreaking research at universities across Canada. Studies have already found that culturally sensitive care increases both the likelihood and speed of recoveries. And more and more, those on the front line of patient care believe that it makes sense. The reality is this: people who are sick feel better when their language, culture and religion are respected.

Inuit patients such as this woman receive medical care in their own language.



Photo: SSC Photo Centre

Unlocking Genetic Mysteries

In recent years, the emergence of genetic engineering has had an enormous impact on medical research. Today, new tools and techniques are helping science discover how one's genetic make-up controls the body and senses, what causes some brain disorders and why some people go insane.

In Canada, more and more medical researchers are looking to genetics in an attempt to understand human resistance or susceptibility to disease. And they are reporting discoveries at an exponential rate. Now, Canadian investigators have begun zeroing in on the genes believed to be responsible for such grave disorders as multiple sclerosis, schizophrenia and Alzheimer's disease. Last year, scientists at the University of Toronto reported that they had isolated the gene responsible for producing S100 — a brain protein that may cause Down's syndrome (mongolism), a disorder that affects about one in every 800 to 1 000 live births. So rapid is the advance of knowledge about genetics that many investigators believe that soon researchers could have the knowledge needed to pinpoint the origins of many major illnesses.

Ultimately, it is hoped that genetic engineering techniques will enable scientists not only to identify defective genes but also — although it may take decades — to find ways to repair them. In the meantime, researchers are setting their sights on identification.

Cruel Disorders

Genetic defects have long been suspect in the transmission of major diseases such as multiple sclerosis (MS) and cystic fibrosis (CF). MS affects more than 50 000 young Canadians between the ages of 20 to 40, and occurs when myelin, the sheath-like cover on nerve fibres, breaks down. Much like insulation on a wire, myelin's function is to speed the transmission of electrical signals between nerves. Its degeneration, however, cuts off communication from the brain and central nervous system to the body's various parts causing gradual paralysis, as well as speech and sight problems.

At the forefront of MS genetic research is a team of scientists at the University of

Toronto and at Montreal's McGill University who have cloned and mapped all the major genes found in myelin. Now they are looking at how these genes are regulated during myelin formation.

Dr. John Roder, a neurobiologist at Toronto's Mount Sinai Hospital and a member of the research team, believes that once scientists understand how genes operate during myelin formation and myelin breakdown, they may have a better idea of how to get myelination started again.

Another genetic approach is the one taken by Dr. George Ebers at the University of

Dr. John Roder is studying gene regulation during myelin formation.

Western Ontario. Dr. Ebers has pioneered the genetics of MS susceptibility in collaboration with a number of MS clinics across Canada. The prominent researcher found that 28 per cent of identical twins are concordant for MS. According to Dr. Ebers and other experts, this ratio is a strong indication that multiple sclerosis is genetically determined.

One of the most tragic childhood diseases is cystic fibrosis. A generalized illness that presents chronic respiratory infections and digestive problems, it is the most common genetic disorder in North America and affects one in every 2 000 children.

In 1985, renowned Canadian scientists Drs. Lap-Chee Tsui and Manuel Buchwald located the site of the cystic fibrosis gene on chromosome 7. This discovery led to a large-scale CF genetics research program based at the Toronto Hospital for Sick Children where a team of investigators now appears to be close to isolating the faulty "CF gene."

Under the direction of Dr. Jack Riorden, the team's aim is to locate the CF gene and to understand the resulting defective chain of biochemical reactions which leads to abnormal chloride transport in CF cells.

In victims of the disease, faulty chloride transport leads to the incorrect movement of salts and water across cell membranes. As a result, perspiration in persons with CF has too much salt and mucus does not have enough water. Thick mucus, in turn, damages the lungs and pancreas, and causes both breathing and digestive disorders.



Photo: Brian Williar

Once the CF gene is located, group members will attempt to identify the one or more mutations with the "cystic fibrosis gene." Some researchers will look to discovering the steps needed to open or close the "chloride pathway"; others will explore the consequences of cell membrane defects on other cell functions such as mucus production.

Until recently, scientists have been studying the symptoms of CF in the lungs, the pancreas, the sweat glands and working back towards some common denominator that triggers the malfunctions, but today CF genetics holds the prospect of an assault on the disease from an understanding of its cause — the basic genetic defect.

The Mind's Make-up

Recently, a team of Canadian and U.S. scientists identified a new marker for the gene responsible for Huntington's disease — an inherited degenerative illness that leads to the involuntary movement of limbs, severe mental impairment and personality change. When found, the gene is expected to yield knowledge that could bring about improved treatment for the more than 2 500 Canadians who suffer from the illness.

The discovery of the marker has led researchers to develop a test that determines a person's susceptibility to Huntington's. The discovery has also led to the creation in Canada of the world's first national testing program for the disease.

"Until now, people have been unwitting partners in the transmission of this disorder to future offspring," says Dr. Michael Hayden of the University of British Columbia Health Science Centre where clinical trials were initiated. "People will now be able to make informed decisions about whether they want to



Photo: Henry Hilliard

have children and risk passing the disease on to them."

Meanwhile, the search goes on to locate the "Huntington's gene." When found, it will be possible for scientists to determine what the defective gene does biochemically and what goes wrong as a result. Ultimately, the hope is that drugs can be developed to counteract the disfunctioning gene and stop the inexorable progress of the devastating disorder.

Dr. Peter St. George-Hyslop, a Canadian working at Boston's Massachusetts's General Hospital, made another major genetic breakthrough in 1987 when he located the site of a gene that is involved in up to 30 per cent of inherited Alzheimer's cases. After studying inheritance patterns in four extended families, he and a team of researchers began looking for a genetic marker. They believed that the 21st chromosome was a good place to begin because victims of Down's syndrome — who have an extra copy of this chromosome — often manifest the same abnormalities as Alzheimer's patients.

After testing a number of markers on chromosome 21, last year the team located the

area of the gene. Now they are searching for the specific gene that causes brain malfunctions in Alzheimer's patients.

Mental Illness: Decoding Its Secrets

In 1986, a study of one family by Vancouver psychiatrist Anne Bassett found startling similarities between two schizophrenic family members. The two men — an uncle and his nephew — shared strong physical resemblances, with both having wide-set eyes and short fourth toes. But most striking was the genetic similarity: both had an extra copy of part of the fifth chromosome located inside the first chromosome. Said Bassett: "It was a complete surprise that they had the same chromosomal abnormality. It was a one-in-a-million chance."

Prior to Dr. Bassett's finding, researchers who suspected a genetic cause of schizophrenia did not know where to begin looking. Since that time, however, this new genetic direction has given exciting promise to researchers in the field.

Dr. Peter St. George-Hyslop: a race to isolate the Alzheimer's gene and find a cure.

What the Future Holds

For all the progress that genetic research has made in the past decade, the field is still rich in mysteries. Admittedly, genetics may not hold all the answers for all diseases. Medical researchers, however, do believe that the field is a promising one as it assists them more and more in decoding the secrets of the human anatomy.

New genetic engineering techniques have produced the knowledge that many physical and mental illnesses are indeed the result of inherited characteristics passed from parent to child. And the pioneering work — much of which has been done by Canadians — has set off a wave of studies worldwide that are looking to identify the genes believed to be involved in such diseases as manic depression, muscular dystrophy, alcoholism, Parkinson's and some cancers. In very short order it should be known if the research has borne fruit.

Health for All

Canada and the International Health Network



CIDA/David Barbour

Through a myriad of international health projects, Canada shares its specialized knowledge with nations around the world.

For many years, Canada has shared its specialized knowledge in health research and development with nations around the world. Today, the country's overall contribution to international health is more than \$100 million per year. This includes assessed contributions and donations to the World Health Organization (WHO), Canadian International Development Agency (CIDA) programs, health development research carried out by the International Development Research Centre (IDRC), global immunization programs for the Commonwealth and la Francophonie, and the more than 600 international health projects administered by Canadian non-governmental organizations.

Canada and WHO

Since its beginning, the World Health Organization has provided Canada with unparalleled opportunities for participating in the international health effort. In fact, the organization began in 1948 under the stewardship of Canadian Dr. Brock Chisholm. His contribution is summarized by his successor Dr. M.G. Candau: "The name Chisholm is . . . [one] that has become identified with the basic ideals of the organization."

Since the early years, Canadians have participated actively in every facet of WHO's activities. In the case of funding, Canada is one of WHO's largest contributors, in terms of both regular budget and voluntary contributions. In addition, Canadians consistently serve on WHO expert committees and study groups. The country is also involved in WHO's extensive network of collaborating centres — organizations cho-

sen for their excellence in research and methodology and for their scientific leadership. Through joint projects, their aim is to overcome the gap created by scarce research facilities and to train research workers needed in developing countries.

Today, there are 15 WHO collaborating centres operating in Canada, all doing research aimed at ensuring that a wide range of products, methods and technologies is used effectively and safely.

Year after year, Canada's delegation to the UN's World Health Assembly contributes to the success of its sessions. In 1987, the Canadian delegation played a particularly active role in co-authoring resolutions on AIDS and the elimination of leprosy, and in drafting a resolution for a World Non-Smoking Day in 1988.

The Commonwealth Connection

Since 1965, Commonwealth health ministers have met every three years to discuss common problems and priorities for national and joint action.

At the 1985 Commonwealth Summit in Nassau, Canadian Prime Minister Brian Mulroney announced a major initiative in support of a universal immunization program for children. The government of Canada offered \$25 million for Commonwealth health activities over five years. Now, the program is being administered by the Canadian government, the Canadian Public Health Association and the Commonwealth Secretariat. The program is

directed primarily against diphtheria, measles, polio, pertussis, tetanus and tuberculosis.

Health Co-operation through la Francophonie

Since 1986, heads of state and government of countries using French as a common language have met annually at the Francophone Summit.

At both the Paris (1986) and Quebec City (1987) summits, a number of initiatives were undertaken to help Third World Francophone countries. In 1986, Canada announced a \$10-million contribution to an immunization program for Francophone states, and in 1987, it supplemented its contribution with an additional \$8 million. Canada also announced an experimental communications network to broadcast medical programs to developing countries.

Benefits for All

Although the international health effort is directed primarily at developing countries, they are far from being the only beneficiaries. Health development is a two-way, co-operative process. Monique Tardif, parliamentary secretary to the Canadian minister of National Health and Welfare, supports the view that international co-operation benefits all countries, including Canada. At her address to the 40th World Health Assembly she cited the AIDS epidemic to underline the need for global solidarity in health. "We all share the AIDS problem," said Tardif. "For our preservation, we must share the solutions."

Providing Fair Sanctuary Canada's New Refugee Determination System

In recent years, Canada's refugee system has groaned under the weight of an ever-escalating number of refugee claims. It was estimated that by the beginning of 1989, more than 70 000 refugee claimants would be waiting for their claims to be heard — a process that could be appealed and dragged out for many years.

By the early 1980s, it was obvious that some people were using refugee claims to evade the immigration selection process and gain rapid entry into Canada. The Canadian government concluded that the only way to restore order to the system was to introduce improved refugee determination procedures — particularly since, upon investigation, the majority of refugee claims proved without merit.

Because of the difficulty in balancing the two objectives of the system — protecting refugees and deterring abuse — a painstaking redesign process was conducted involving extensive consultations in Canada and abroad.

The legislation establishing a new refugee determination system comes into effect in early 1989. It provides sanctuary for those in need of protection and includes numerous safeguards to ensure that no authentic refugees will be returned to a country where they might face persecution. The legislation also provides the means to quickly deal with those who abuse the system or who organize and profit from abusing it.

Determining a Refugee Claim

People arriving at a Canadian border or facing removal from the country after their authorized stay have a right to claim protection under the 1951 Geneva Convention and its Protocol.

rule that the individual is eligible to be protected in Canada, the refugee claimant is referred to the CRDD for an oral hearing. People accepted at this hearing can then seek permanent residence in Canada. Those rejected at this stage can appeal to the Federal Court.



Eligibility for protection is assessed in an oral hearing before an independent adjudicator and a member of the Convention Refugee Determination Division (CRDD) of the new Immigration and Refugee Board. Refugee claimants have the right to legal counsel. Legal aid is provided where necessary.

The rejection of a claim requires a *unanimous* decision of the adjudicator and the CRDD representative. Claimants have a right to appeal their rejection to the Federal Court of Canada within 72 hours. Appellants will be removed from the country pending the results of the judicial review.

Should *either* the adjudicator or the CRDD representative

Canada's new refugee determination system: a painstaking redesign to help those most in need.

People who present a security risk are not eligible for protection in Canada under the provisions of the Geneva Convention and Protocol. Claims from war criminals are also rejected. This applies as well to claims from people convicted of serious crimes, those who already enjoy refugee status, or those who have a refugee claim pending in countries that are not threatening them with *refoulement* (removal to a country where the claimant fears persecution).

Working Internationally for Refugee Protection

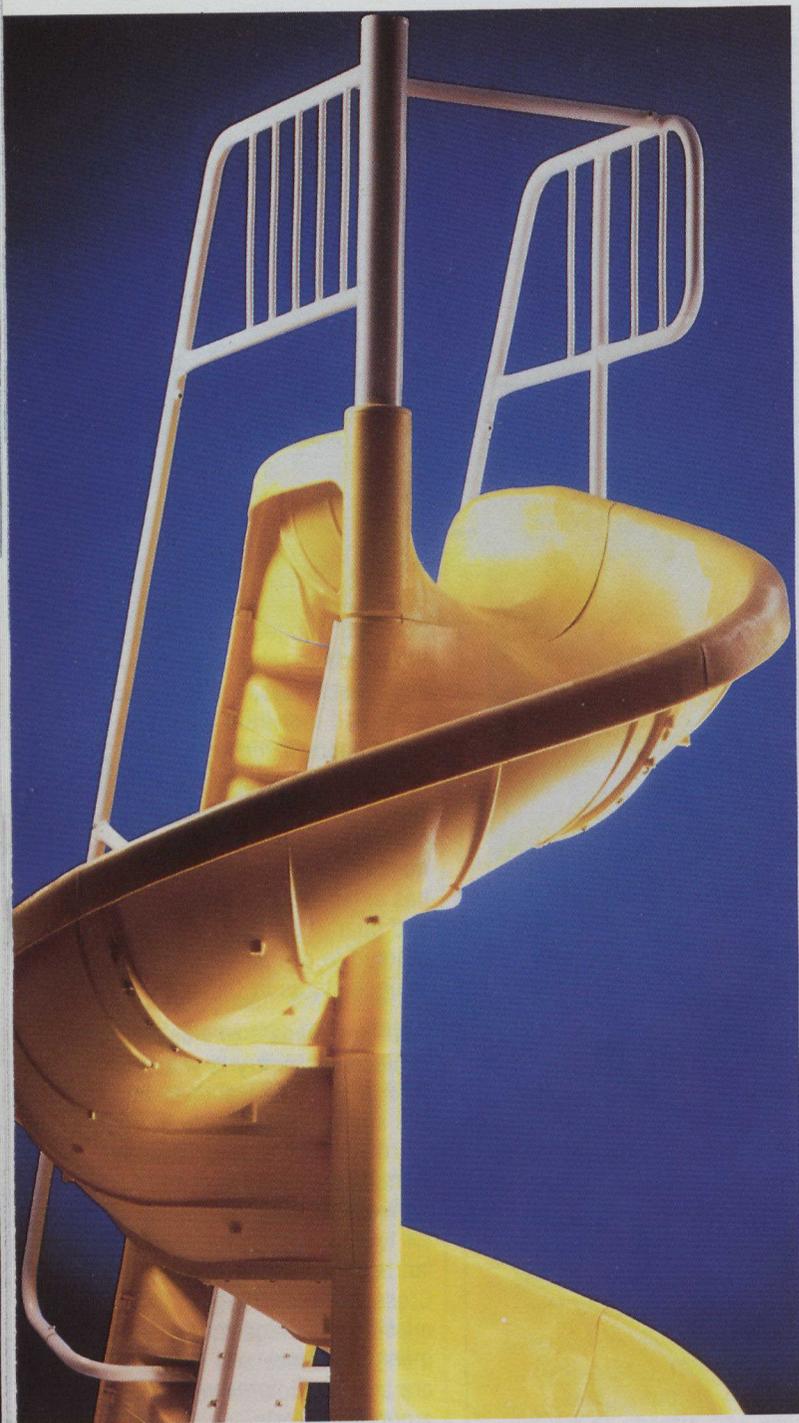
"Canada's record as a sanctuary for the oppressed and persecuted is second to none," says J.B. Bissett, executive director of Immigration. "Its international role is carried out, in part, through a significant resettlement program. Canada's service to refugees was formally recognized when in 1986 the United Nations' High Commissioner for Refugees awarded this country the Nansen medal."

In fact, since the Second World War, more than 500 000 refugees have come to Canada to rebuild their lives. Each year, the government and individual Canadians sponsor the entry of thousands of refugees from camps abroad. No other country with an equivalent number of refugee claimants has extended as many rights and guarantees as those granted to people seeking refugee status in Canada.

"While Canada's role as a resettlement country is widely recognized, its level of financial support to refugees in Third World countries is also significant," says Bissett. Canada is a leading contributor to international humanitarian bodies such as the Red Cross and the UN High Commission on Refugees. Resettlement assistance and food aid are also provided to refugees around the world.

In addition, Canada works actively on the diplomatic front to promote better standards of human rights observance and to support the search for durable solutions to international refugee problems.

ELEGANT DESIGN FOR EVERYDAY LIFE



The Duraglide slide is now sold in more than 20 countries worldwide.

At first glance, the brightly coloured butterfly shapes look like pieces of an artist's mobile: they hang from the ceiling on nylon threads, forming a frozen, midair cascade down a stairwell. But in fact they are practical plastic hinges; unlike metal hinges, they will not rust. Created by British Columbia industrial designer Neville Green, the sturdy objects formed one of the many displays at a recent major Canadian design retrospective.

"Art in Everyday Life: Aspects in Canadian Design 1967-1986" highlighted the innovations of some of Canada's top industrial designers. The Toronto show focused on mass-produced products encompassing a remarkable range of items, from jewellery and juice jugs to a rolling pin and a fire-retardant suit for use by members of bomb-disposal squads.

The curators of Art in Everyday Life, Peter Day, arts commentator for the Canadian Broadcasting Corporation and Linda Lewis, former designer and professor of film theory and design at Ryerson Polytechnical Institute in Toronto, are attempting to gain recognition for a field which they believe has been long overlooked in Canada. Said Day, "To us, these objects give a portrait of Canadian society."

Although for the most part Canadian design has been largely underestimated, some aspects have found significant recognition at the international level. For instance,

a hockey mask designed by George Lynn for Cooper Canada Ltd. is on permanent display at New York's Metropolitan Museum of Art. Thomas Deacon and Scot Laughton collaborated to create a floor lamp for which they received a design citation in the reputed American publication *Progressive Architecture*. And the costume jewellery designs of Vancouverite Martha Sturdy have been used as accessories by Americans Oscar de la Renta and Geoffrey Beene for their fashion creations.

Art in Everyday Life is temporally defined by Canada's two world fairs: Expo 67 and Expo 86, held in Montreal and Vancouver respectively. According to Lewis, who helped design the Man, His Planet and Space pavilion at Expo 67, "The feeling then was there was just no end to this tremendous thing that was happening. We felt that design in Canada had a new place in the world." But only two years later, design activity began to lag.

The items on display in the Art in Everyday Life exhibition, however, clearly demonstrate that many of Canada's best designers produced quality work between the two Expos.

Paris Playground Equipment Inc. of Paris, Ontario, offered for display a "you can't miss it" canary yellow version of their best-selling Duraglide slide for children. Designed by Gerry Beekenkamp, it first appeared on the market in 1981 and won the prestigious Design Canada Award in 1983.

According to Beekenkamp, the Duraglide slide, made of plastic, is much more efficient than its metal predecessor in several ways. The metal slide was welded and riveted together, standing approximately 2.4 m high at time of shipping; the Duraglide slide packs to a 273 cm² box.

Beekenkamp says that there were many considerations besides packaging that led him to this particular design: "The Duraglide slide is made of polyethylene plastic, which has a much lighter weight than metal. It is easier to assemble for the consumer and doesn't heat up nearly as much on hot summer days. Furthermore, it is less labour-intensive than the old metal slide, and is therefore less expensive to manufacture."

When the slide went on the market in 1981, it achieved resounding consumer approval as sales soared to five times that of the metal slide in its best year. Today, the Duraglide slide is sold in more than 20 countries worldwide, including Australia, China, Hong Kong, Japan, Kuwait, Saudi Arabia and Singapore. It is also sold in many countries throughout Europe and North America, and according to Edward Attlebery, marketing director for Paris Playground, "sales are increasing dramatically every year."

Another interesting item on display at the exhibition was L'Attaché, a briefcase made of a single piece of plastic. Designed by Michel Dallaire for La Compagnie Resentel Ltée of Montreal, it is inexpensive, waterproof and durable. Available at retail outlets across Canada, the briefcase was also selected to appear in the boutique catalogue of New York's famed Museum of Modern Art.

The Strala, a floor lamp designed by Scot Laughton and Thomas Deacon, combines modernism with ancient references. Composed of two

black rods, the higher one has at its top a light bulb surrounded by a conical shade, while the shorter one is topped by a brass knob that serves as a dimmer. Said Deacon, "It has a ritualistic, totemic feel, and at the same time, it is reminiscent of an early astronomical model." The name Strala is doubly fitting since the word, taken from Middle English, means "beam of light" and "javelin."

By far the biggest item at the exhibition is the decidedly glamorous four-wheel-drive tractor from Versatile Farm Equipment Ltd., of Winnipeg, Manitoba. Designed by Morley Smith and William Stanton, the tractor first appeared on the market in 1976. The Model No. 276 Bidirectional on display at the Toronto show is a revised version of the original and dates back to 1984. The

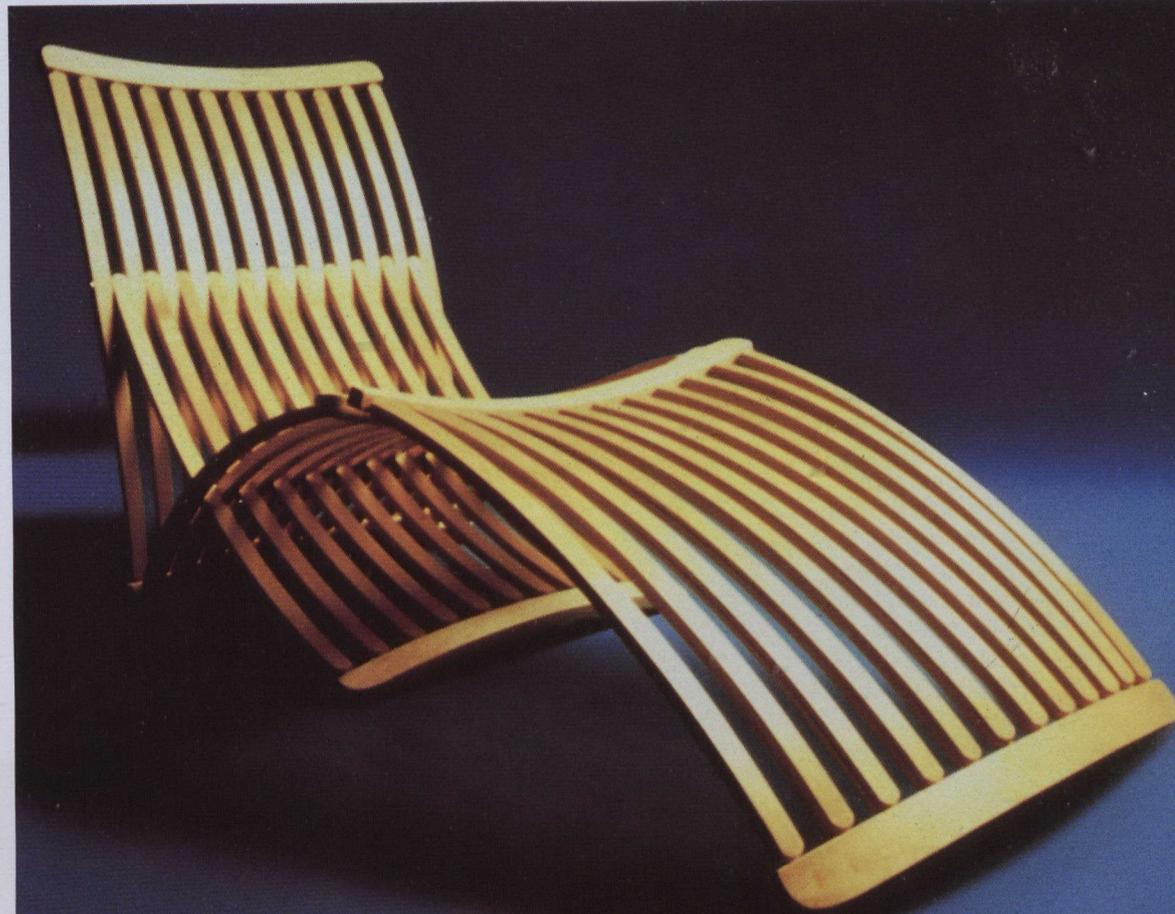
design's most prominent feature is that it allows the driver to sit inside the cab and turn or swivel the entire seat so that he or she may face either the front or the back of the tractor, according to the needs of the task — that is, whether it is a "pull" or a "push" job. A less-expensive swatter head is available that fits onto the tractor; instead of the typical \$35 000 swatter, one can be bought in the \$10 000 to \$15 000 range. The No. 276 Bidirectional is currently sold in Canada, the United States, Saudi Arabia, the Ivory Coast and Australia, and plans for distribution include many more countries in the very near future.

Thomas Lamb of Uxbridge, Ontario, brought several of his elegant designs to the Art in Everyday Life show, including his 1978 Steamer Lounge Chair. Reminiscent of steamboat deck chairs, it is made of interlocking wooden slats, thus creating a look that is both practical and adventurous.

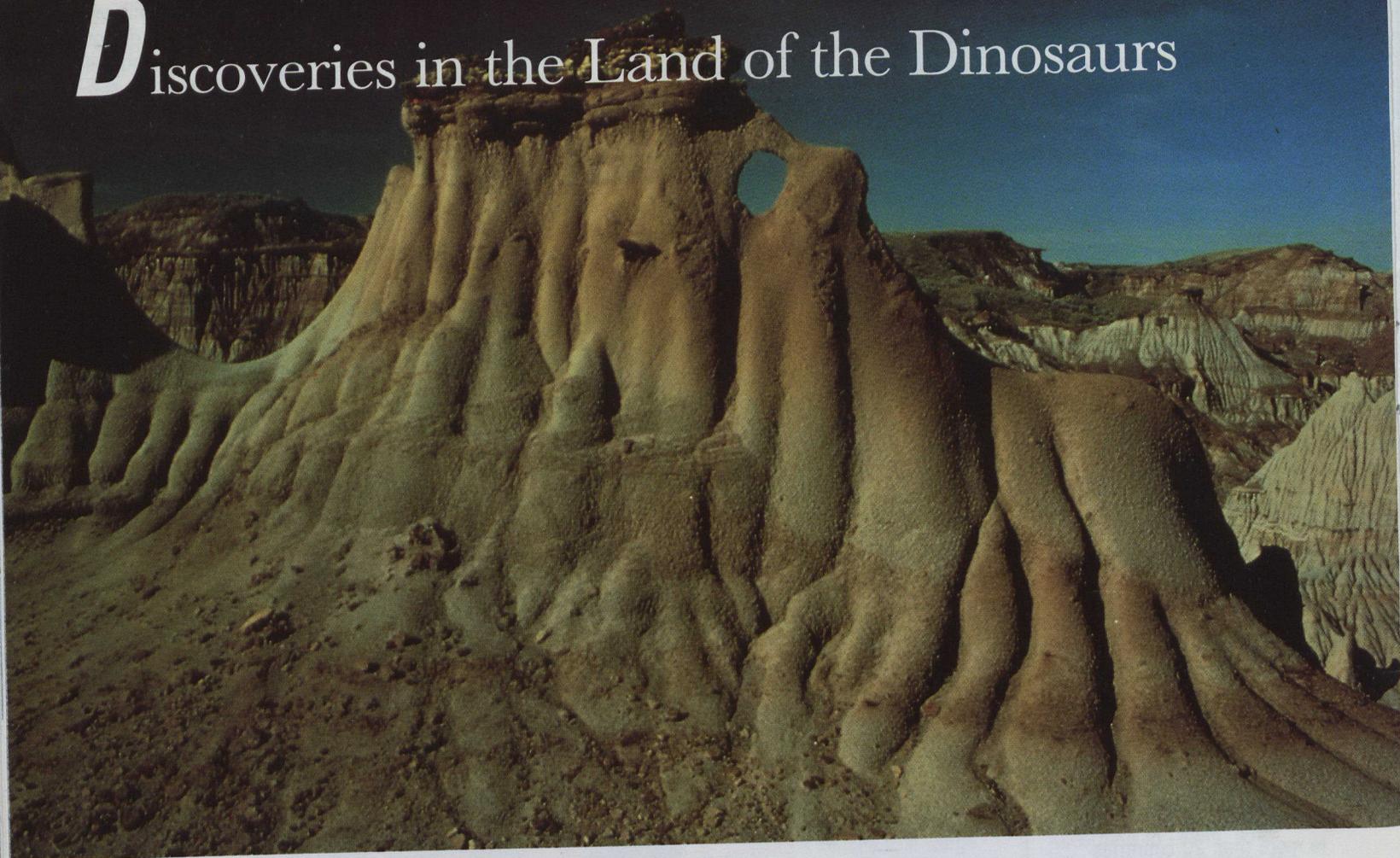
Although Canada does not yet rival such international design heavyweights as Italy and the United States, the recent successes of many domestic products are sounding notes of optimism. Canadian design is finally gaining recognition both at home and abroad.

And now, the situation looks even more promising as there is an ambitious project under way to convert Toronto's old stock exchange into a resource centre for design. Tentatively called The Design Exchange, it will contain a large gallery space for national exhibitions to enhance the promotion of Canadian talent. The project is being spearheaded by the Toronto show's curator Linda Lewis who hopes the centre will bring Canadian design to the international forefront in the 1990s.

Reminiscent of steamboat deck chairs, the Steamer Lounge Chair is both practical and adventurous.



Discoveries in the Land of the Dinosaurs



In recent times, the western Canadian province of Alberta has become a paleontological hot spot. Each summer, researchers joined by dozens of volunteers from around the world eagerly uncover dinosaur remains in an attempt to piece together the story of the existence and eventual extinction of the mighty prehistoric animals.

Last summer, researchers and volunteers concentrated their efforts on four digs, two of which were in Dinosaur Provincial Park. This dusty, barren 75-km² area is located roughly 200 km southeast of Calgary, and is characterized by numerous peaks and ridges created by millions of years of erosion — a direct contrast to the lush, tropical habitat that existed there some 75 million years ago when the dinosaurs lived.

Linda Strong-Watson, head technician for the Tyrell Museum of Paleontology in Drumheller (approximately 100 km northwest of the park), explains: "At the time these animals were alive, this area was an extremely rich ecological niche of which many, many different animals were able to take advantage." Over the years, fossils of 35 species representing almost every group of dinosaur have been uncovered. Because of this variety, Dinosaur Provincial Park was declared in 1979 to be a world heritage site by UNESCO (United Nations Educational, Scientific and Cultural Organization).

A third site is located in northern Alberta near Grande Prairie, where a bone bed of pachyrhinosaurus was dis-

covered. The fact that so many specimens of the horned dinosaur were found in one place led researchers to conclude that the remains were deposited there by running water — likely a mass drowning of a herd crossing a river in flood. The fossilized bones of the pachyrhinosaurus being found are from juveniles, yearlings, two-year-olds and adults. This lends support to the idea of a herd, including young animals, dying in one short episode.

A fourth dig took place at Devil's Coulee, in the southern part of Alberta, where researchers excavated a nest of dinosaur eggs, intact, two years ago. This was a rare find and demanded the most up-to-date techniques to enable a thorough study of the specimens without destroying them.

Alberta's Dinosaur Provincial Park: a dusty, barren area of peaks and ridges created by millions of years of erosion.

Computerized axial tomography X-rays or CAT-scans provided such means of analysis. Says Strong-Watson, "CAT-scan analysis gave us an opportunity to look at the insides of brain cases which we had not been able to look at before."

This year, Alberta scientists reconstructed the complete skeleton of a dinosaur embryo from one of the fossilized eggs found at the site. The embryo is now on display at the Devil's Coulee Dinosaur Egg Site, the only dinosaur nesting ground found in Canada and only the second in the world to contain embryos.

Each year, hundreds of people from Canada and abroad offer to help find new fossils. Last summer, there were 36 volunteers from Canada, the United States, Norway and Nepal working with the professionals. Their enthusiasm was crucial, for they did much of the necessary and time-consuming spade-work. As Strong-Watson points out, "Although it appears you are just sitting scraping away dirt from a single bone, you're learning the entire time. People find it relaxing and they find it very educational."

Popular theories on the disappearance of the dinosaurs are many and varied, but the Alberta digs are helping to answer the question more definitively. While some hold that a catastrophic event such as a meteor colliding with the earth caused their extinction, others contend that a slew of volcanic eruptions wiped them out. It seems more likely, however, that it was neither of these possibilities.

Indeed, Pat Lee, among other paleontologists at the Tyrell Museum, believes that the dinosaur population decreased gradually over several million years, due to changing vegetation and climatic conditions. This theory is supported by findings in Alberta: there have been 35 species of dinosaurs found that date back to between 68 and 72 million years ago; a substantially smaller number of species (found further north) date back to between 65 and 68 million years ago; and very few species (still further north) date back to 64 million years ago — the cut-off point when the last of the dinosaurs lived.

Although the story of the dinosaurs is by no means complete, paleontological studies in Alberta are making great strides in advancing humankind's understanding of the mighty prehistoric creatures.

In Search of Ancient Secrets: Canada and China Join Forces to Unearth Dinosaur Fossils

The Canada-China Dinosaur Project is the most ambitious international joint program ever undertaken in the field of dinosaur paleontology. It involves four years of field work in China's Gobi Desert, the western Canadian province of Alberta and the Canadian Arctic by scientists from both countries. Prepared and mounted for display, the skeletons recovered will form a touring exhibit that will visit more than a dozen museums in nine countries in Europe, North America and the Pacific Rim for another four years beginning in 1991. Indeed, the Dinosaur Project is a wonderful adventure in co-operative exploration of earth history.

At various times between 65 and 100 million years ago, ancient North America and Asia were connected as one big landmass. Roaming across this immense territory were the gargantuan animals that have come to be known as the dinosaurs.

While many of the dinosaur fossils found in North America and Asia are remarkably similar, still others are radically different. Indeed, one of the great challenges of modern science is to understand the series of developments that led to these similarities and differences, and to thereby reveal the nature of the ancient biological ties between East and West.

With the Dinosaur Project, leading paleontologists from Canada and China are now in the process of filling in some of the fossil record gaps. In

fact the project is shedding new light on how dinosaurs evolved, how species from Asia and North America were inter-related, and whether certain species migrated from one continent to the other.

Initiated and co-ordinated by Edmonton's Ex Terra Foundation, the Dinosaur Project has three core partners: the Alberta government's Tyrell Museum of Paleontology, Canada's National Museum of Natural Sciences and the Institute of Vertebrate Paleontology and Paleoanthropology (IVPP) of the Chinese Academy of Science (Academia Sinica).

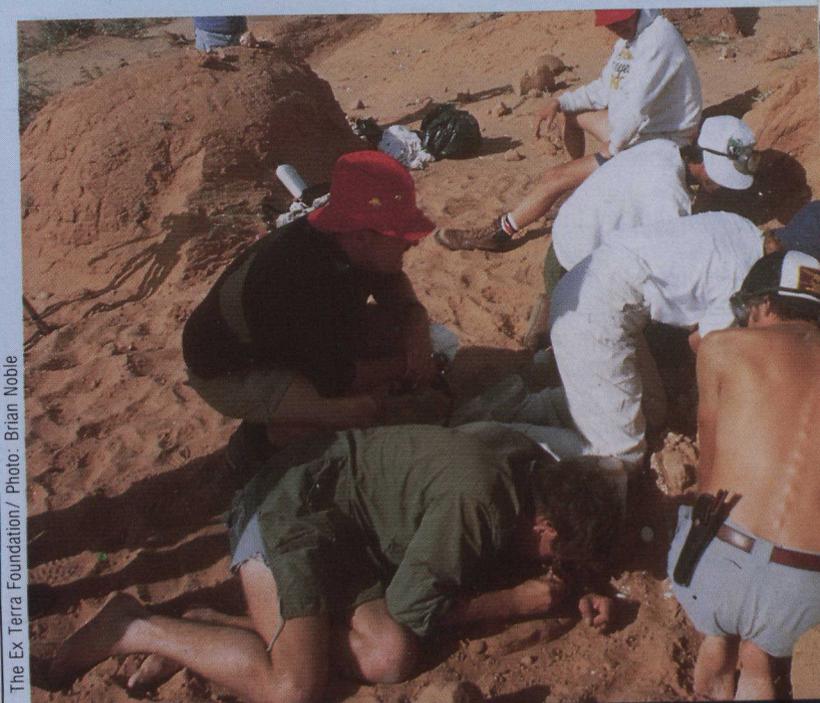
Canada's two leading dinosaur paleontologists, Dr. Phillip Currie of the Tyrell Museum and Dr. Dale Russell of the National Museum of Natural Sciences, and China's leading dinosaur paleontologist, Dr. Dong Zhiming of the IVPP, are directing the project's scientific activities.

The joint efforts of scholars and experts from both China and Canada have thus far resulted in a highly success-

ful project. Last summer's discoveries, announced in Beijing in August, made headlines in the (Chinese) *People's Daily*, the *New York Times* and almost every major newspaper in between. The publicity confirms what the expedition's organizers already knew: the world is fascinated by dinosaurs.

Says Brian Noble, founding executive-director of the Ex Terra Foundation who has worked on the project for seven years, "Dinosaurs make people reflect, they make their minds wonder. It's universal. It doesn't matter if you're Canadian, Russian, Chinese, Mongolian, French or British. . . . Dinosaurs . . . bring people and ideas together."

The Dinosaur Project has certainly succeeded in bringing the people of Canada and China together. It has also succeeded in shedding further light on the life and times of the mighty creatures that dominated the planet for more than 140 million years.



The Ex Terra Foundation/ Photo: Brian Noble

Leading paleontologists from Canada and China hope to shed more light on dinosaur habits and travels.

Kaleidoscope

Images in Motion



Photo: Liz Gorrie

Red from *Kaleidophonics* — Kaleidoscope's symphony show.

A kaleidoscope presents reflected images in motion, ever-changing perspectives of brilliant colour and shape. So too does Kaleidoscope Theatre, an innovative west-coast theatre company that combines mime, improvisation, music, song, movement, dance and mask in its vibrant productions.

Founded 14 years ago in the Vancouver Island city of Victoria, Kaleidoscope has been dubbed the "theatre of imagery." Its presentations, staged with the barest essentials in set pieces, costuming and props, are impressionistic rather than realistic, leaving much of the interpretation up to the audience's own perceptions and imaginations.

Those unfamiliar with Kaleidoscope are often startled to learn that such an experimental theatre is one devoted to producing drama for children and youth. But Kaleidoscope's

Creative Director, Elizabeth Gorrie, thinks the imagistic style and children are well suited. "We often underestimate the fresh keenness of children's minds — their imagination, curiosity and creativity. If a drama can satisfy a child's untempered creative sense, it can certainly satisfy that of adults."

Over the years, Kaleidoscope's more than 60 original productions have charmed both the young and the young at heart across Canada, the United States, Japan and Israel.

Two performing companies bring Kaleidoscope to life. The first, Story Theatre Company, is acclaimed for its contemporary adaptations of classic fables and folktales. Featuring original song and music, the adaptations spotlight the performers' talent for on-the-spot improvisation in response to audience suggestions. The results are often hilarious. Aesop's fables have been peopled by Santa Claus, brain surgeons and leading political figures.

"Cartoon super heroes are particularly popular with young audiences," notes Director Jim Leard, "which means the actors must watch a lot of Saturday morning cartoons to familiarize themselves with all the characters. But whatever the suggested setting or characters, the actors always manage to convey the fable's original moral lesson."

Beneath the fun there is a deep commitment to education. Playing in hundreds of schools each year, Story Theatre designs much of its repertoire to convey appropriate educational lessons in science, history and literature. And while on tour, the company also offers theatre workshops for teachers and students.

Currently, the company is busy preparing its newest production, *Dreams and Drag-ins*. Loosely based on local secondary students' essays, stories and poetry about their dreams and what stands in their way, the play

promises to be both thought-provoking and entertaining. Given Story Theatre's knack for surprising its audiences, a "guest appearance" by a dragon might be expected — but the company is giving away no hints yet.

Kaleidoscope's other performing group, the Resident Company, mounts a panoply of plays ranging from adapted Shakespearean classics to satirical spoofs of television comedy shows. Impossible to categorize or predict, the company is perhaps consistently characterized only by the sense of vitality and versatility that animates its experimental productions.

Together the two companies have brought Kaleidoscope's original style to the world stage. They have appeared at the International Theatre Festival in Wales and the American Showcase of Performing Arts for Young People in Birmingham, Alabama, in the United States. Story Theatre tours extensively across Canada and the United

States each year; held a special residency at the Smithsonian Institute in Washington during 1984; and was a popular showcase at Canada's Expo 86. And at the same time that Story Theatre was charming the international crowds at Expo in Vancouver, Kaleidoscope's Resident Company was on a two-month tour of Japan, performing in all the major cities, including Tokyo and Osaka. The following year, the company wove its special magic over audiences at Washington's renowned Kennedy Centre for the Performing Arts.

Perhaps bearing in mind the centuries old adage that all the world is a stage, Kaleidoscope has also recently taken to the streets. This summer, assisted by three members of Canada's famed Cirque du Soleil, Kaleidoscope launched the Street Spectacle Theatre — a vaudevillian-style show featuring clowns, acrobatics, juggling, unicycles, stilts, and colourful masks and puppets.

The force behind Kaleidoscope is Elizabeth Gorrie. Prior to the theatre's founding, Gorrie had been active in avant garde theatre but had never before worked with children. That, however, did not deter her from quick success. Instead, she discovered that she could work from a more experimental viewpoint with children. As she explains, "Kids can go any imaginative route you wish — as long as it is good. I have found that children can cope with imaginative abstracts more easily than adults."

With a degree in English literature and history, and training and performance experience in singing and drama, Gorrie brings her considerable talents and unique perspective to many aspects of Kaleidoscope. She has written and directed over 40 plays, many of which have received national and international attention.

For example, Gorrie has twice travelled to Israel's National Theatre for Children in Jerusalem, first to direct her adaptation of *The Snow Goose*, and then in 1982 for a production of *Unicorns*. Both were staged in Hebrew, but Gorrie did not find language differences to be a major problem, given Kaleidoscope's unique theatrical style.

"Kaleidoscope can easily travel across language and cultural barriers because it is a theatre of imagery as opposed to one of prose. The spoken word is only part of our productions; it is integrated with movement, mime, music and mask. All this makes our work more visually translatable than traditional drama."



Photo: Liz Gorrie

A few years later, in 1984, Japan's foremost director for youth, Yukio Sekiya, saw Kaleidoscope perform at Vancouver's Children's Festival — a festival conceived and founded by Gorrie — and

was so impressed that he invited Gorrie to Japan. The visit led to a collaborative production of *Hajimari-No-Hajimari* in 1987. Scripted by Gorrie, the play is based on creation myths from the Pacific Rim, including those of Canada's west-coast aboriginal people.

Gorrie's artistic vision has not only earned her an international reputation as an innovative playwright and director, but has also inspired an original performing art form which combines interpretative theatre with musical performance. Defying attempts at categorization, *Kaleidophonics* is a startling, original performance in which actors, working with props of large

notes and coloured material, embody the sounds, moods, colours, rhythms and harmonies of the music of an accompanying symphony orchestra. Special sections of the performance are devoted to composers and musical works from Great Britain, Scandinavia, the Soviet Union, the United States and Canada.

As a means of introducing youth to the basic elements of classical music, *Kaleidophonics* has been an outstanding success. The show has appeared with major symphony orchestras in eight cities across Canada, as well as the special Olympic Symphony Orchestra established for the Calgary Winter Games.

Seemingly driven by an unending abundance of energy and commitment to youth, Kaleidoscope supports a range of activities extending beyond those of traditional theatres. Its Performing Arts School offers classes in everything from dance, to clowning, to voice. Under the innovative Theatre-in-Education program, Kaleidoscope spends one day a week at local schools conducting workshops for both students and teachers. The workshops explore all the arts — visual, literary, musical and dramatic — and are directly related to classroom studies. Kaleidoscope also frequently mounts special performances and programs for physically disabled and mentally handicapped children.

Kaleidoscope's perceptive and imaginative work is as fascinating to watch as it is elusive to categorize. Perhaps Elizabeth Gorrie best captures the theatre's true essence: "Facts can be taught, but the creative instinct, that connection between the heart and mind, can only be nourished. It is with this nourishment that Kaleidoscope approaches its work in young people's theatre. It is the child-like vitality in all of us that our work strives to hold on to."

Hajimari-No-Hajimari: a Canadian-Japanese co-production based on creation myths from the Pacific Rim, including those of Canada's west-coast aboriginal people.

Whitehorse

Land of the Midnight Sun



Robert Service wrote these words to what has become one of Canada's great epic poems, *The Cremation of Sam McGee*, while working as a bank teller in Whitehorse between 1904 and 1908. They captured the magic and the mystery of a remote northern territory and a frontier town that spawned the stuff of legend.

Today, the frontier town is a city of more than 15 000 people, the largest in northern Canada and capital of the Yukon — a territory containing some of the most inspiring mountains and rivers in North America.

A triangle in the northwest corner of Canada and neighbour to Alaska, the Yukon is larger than Germany and a little smaller than France. With 70 per cent of its population living in Whitehorse, the Yukon remains a land of vast wilderness dotted with small communities tied together by a thin web of roads and rivers. At the heart of them is Whitehorse, a modern city with one foot planted firmly in the past and the other securely in the present. Today the city stands much as it always has: the gateway and service centre to the territory.

*There are strange things done in the midnight sun
By the men who toil for gold;
The Arctic trails have their secret tales
That would make your blood run cold;
The Northern Lights have seen queer sights,
But the queerest they ever did see
Was that night on the marge of Lake Lebarge
I cremated Sam McGee.*

— Robert Service

Whitehorse remains one of Canada's best-kept secrets. But 100 years ago, this was not the case.

The paddlewheeler *Klondike*, which today rests as a historic site in downtown Whitehorse on the bank of the Yukon River, is a reminder of earlier times when an extraordinary mass movement of people from around the world travelled to the Yukon to seek their fortune in the gold fields of the Klondike. During the 1890s, Whitehorse was the last resting place for gold

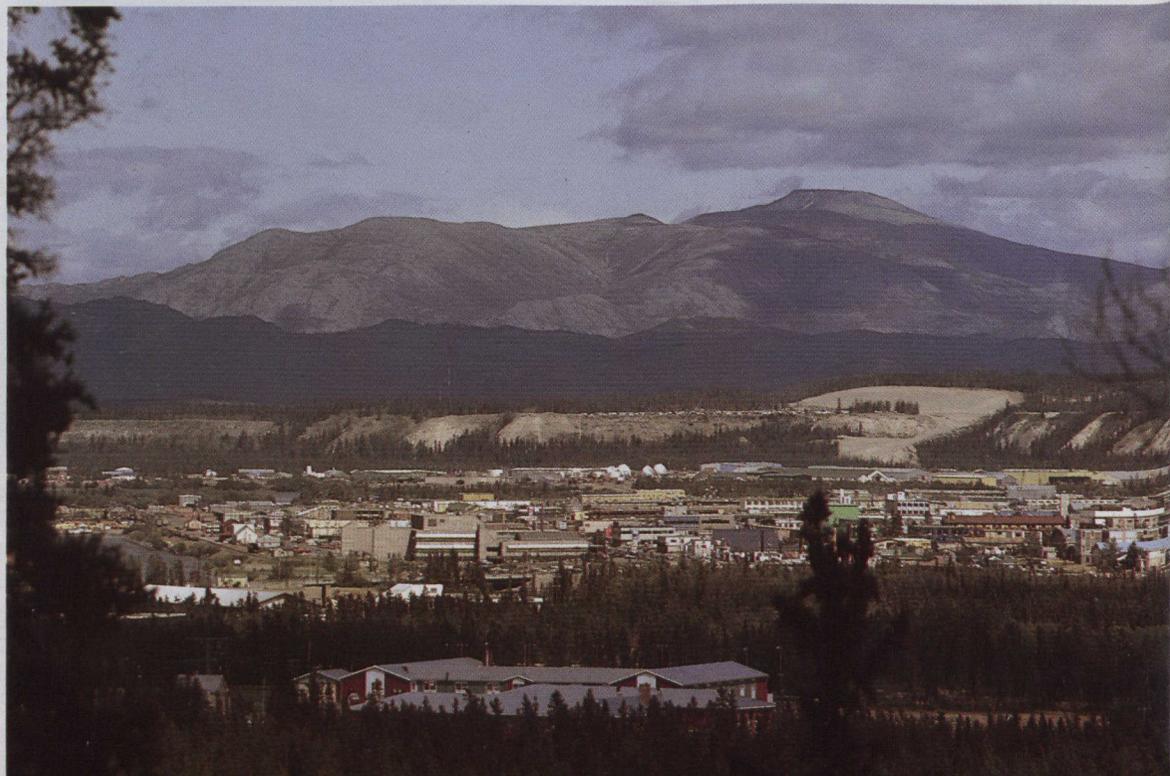
seekers on their journey down the Yukon River. It was here that adventurers like the great writer Jack London braved the great turbulent waters, said to move like the white manes of charging horses.

With the completion of White Pass and Yukon Route Railway from Skagway in Alaska, Whitehorse began to expand and develop. The community grew around the point where the railway and river met on the western bank of the river.

It is only recently that Whitehorse has returned to the population high it knew in 1942, the year that the U.S. Army Corps of Engineers began construction of the Alaska Highway. In anticipation of a second "rush" (34 000 people, as it turned out), a road was hacked out in nine months to Fairbanks, Alaska. Soon after it was upgraded to an all-weather highway. The following years saw the development of an extensive road network across the Yukon in response to mineral developments and the establishment of new towns more easily serviced by road from Whitehorse.

Ferry traffic continued out of Whitehorse into the 1950s until most of the services

For all its northern pioneer traditions, Whitehorse is very much the quintessential modern city.



© Bill Brooks/Masterfile



Photo: Malak

Dog races are just one of the traditional events that take place at "rendez-vous" — an annual Whitehorse celebration to help break the winter blues.

they provided were replaced by road traffic. Only remnants of the old piers remain along the waterfront, and the horses' manes have not blown since the construction of the Whitehorse Rapids Hydroelectric Dam. Nonetheless even old memories remain active in modern-day Whitehorse.

Each March, the city happily and nostalgically welcomes its place as a terminus of the "Yukon Quest" — one of the longest and toughest sled dog races in the world. Following the Yukon River between Whitehorse and Fairbanks, the Yukon Quest attracts international competitors who cover the 1 600 km in as few as 12 days. With only six resupply points and carrying at times unwieldy 136-kg loads, mainly of dog food, drivers and dogs find the race a test of endurance.

For Whitehorse the Quest is a celebration of a way of travel severely eroded by the snowmobile, car and airplane. It is a modern tribute to the Yukon pioneers, miners, missionaries, mail carriers and Mounties who followed the same route as they ventured in and out of Whitehorse along one of the most famous water highways in the world.

Similarly, in February of each year, Whitehorse holds a 25-year-old ritual to combat "cabin fever" — that feeling of lethargy born from a winter that seems endless and living quarters too cramped. In the ritual, called "rendez-vous," Yukoners emerge from cabin, home and office tower to dress in turn-of-the-century costume and throw themselves into one week of celebration and competition. Dog races, fire building, log sawing, and snowshoe races are just some of the more traditional events to break the winter blues.

Still, for all the traditions that Whitehorse holds to, it is very much the quintessential modern city. A thriving business area holds an array of banks, retail stores, restaurants and office buildings. The city is also the seat of government for the Yukon's 16-member legislature.

In addition, Whitehorse is the supply centre for much of the Yukon's thriving mining industry — an industry that has remained a mainstay of the Yukon economy. Together hard rock and placer mining production was valued at \$440 million in 1987, largely from the recovery of gold, silver, lead and zinc. Many of these products are increasingly bound for Pacific Rim countries contributing to closer trading relations with the Yukon.

Since 1960, there has been an average annual growth rate of 12 per cent in the tourist industry. In 1987, an estimated 400 000 people visited Whitehorse, bringing in revenues of around \$82 million. Today, there is much optimism for the industry's future, much of which is based on the tourist potential of the compelling northern landscape.

As Whitehorse has entered the international tourism market, a rapidly growing number of travellers from around the globe and especially west

European countries are flying or motoring to Whitehorse for a Yukon holiday or adventure experience. Here they have a choice of world-class restaurants some of which offer a "country food" menu of reindeer, caribou, arctic char, broad whitefish and muskox.

A number of Whitehorse theatre companies offer productions of contemporary plays, Indian legends, and vaudeville period pieces. Local tour operators assist visitors in planning river trips by raft, canoe and motor launch; hikes to the internationally renowned Kluane National Park; photo tours by airplane; or coach tours to historic sites.

All of these amenities and services combined with a small population, the close proximity to the Yukon's magnificent lakes and rivers, and untouched alpine reaches make Whitehorse the ultimate playground for residents and visitors alike.

The poems of Robert Service and the stories of Jack London mask an environment that in Whitehorse is more temperate than severe, more friendly than hostile. Whitehorse has relatively dry weather with warm southerly winds moderating most days throughout the year. From early June to the end of

August, Whitehorse has about 82 frost-free days allowing most people to cultivate prize-winning flowers and vegetables.

While the famous Yukon winters are consistently cold, they are still warm enough to allow enjoyment of Whitehorse's world cup cross-country ski facilities and trails. And the 24-hour darkness that communities further north experience is absent in Whitehorse. For Whitehorse, compensation for the short days of winter comes in the long warm ones of summer (almost 20 hours in June) when the fishing is superb and the landscape splendid.

The self-reliance, friendliness and spirit of adventure that Service chronicled 80 years ago remain in Whitehorse today. A modern city steeped in tradition, Whitehorse boasts the best of modern technology and communications while preserving a heritage of which it is deeply proud. The best of its colourful past and present is caught in this dynamic city which continues on an adventure that is both old and new.

Whitehorse: the seat of government for the Yukon's 16-member legislature.



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A PRIZE FOR PEACEKEEPERS



Carrière/Publiphoto

Last fall, soldiers on the front lines of the United Nations' (UN) 40-year quest for peace won the 1988 Nobel Prize for steadfast duty in the crossfire of the world's conflicts. The Nobel Committee said that the UN peacekeeping troops — of which nearly 80 000 have been Canadians — have built greater faith in the United Nations, which "has come to play a more central role in world affairs."

Today, nearly 10 000 peacekeepers from more than 30 countries serve under the UN flag. The citation from the Nobel Committee said the soldiers show the world's determination to settle disputes peacefully. It also said that they "made a decisive contribution toward the initiation of actual peace negotiations."

When the Nobel Peace Prize Committee announced that its 1988 award would go to the UN peacekeeping forces, many Canadians took special pride in the fact. "We are here to keep the peace, but winning the Nobel Prize sure makes you feel good," said Canadian peacekeeper Tony Mayfield, a soldier who guards a crossing between the Greek and Turkish sectors of Nicosia, the capital of Cyprus.

For four decades, Canada has sent more peacekeeping soldiers to more places than any other country, and today more Canadian soldiers are wearing the United Nations' blue berets in global hotspots than the forces of any other nation. From Kashmir in 1949 to the Middle East and Afghanistan last year, Canadian soldiers have been involved in every one of the UN's peacekeeping operations. Canada is the only country to have such a record.

Carrière/Publiphoto

In the 40 years since the UN's truce supervisory organization was formed, Canada's longest and most costly involvement has been in Cyprus. Canadians have participated in at least battalion strength since the force was set up in 1964 to keep the peace between Greek and Turkish Cypriots. At its peak representation, Canada had 1 126 soldiers in Cyprus; currently there are 570 Canadians in the 2 100-member force.

UNII MOG, the Iran-Iraq Military Observer Group, included 520 Canadians out of a total of 850 men from 24 countries. UN officials say that Canada's ability to make its troops available and to get them on-the-spot in record time was an essential element in the success of the Gulf war ceasefire, which began last August.

Other peacekeeping operations in which Canadians are serving under the UN flag include five Canadians with the mission in Afghanistan and Pakistan; 220 Canadians with the disengagement observer force in the Golan Heights between Syria and Israel; and 22 Canadians with the truce supervisory unit headquartered in Jerusalem to oversee the 1948 armistice agreement reached by Egypt, Israel, Lebanon, Jordan and Syria. In addition, 140 Canadian soldiers are serving with an international observer force that monitors observance of the 1979 Israel-Egypt peace treaty in the Sinai desert; it is not, however, a UN operation.

Peacekeeping remains the proudest postwar tradition in the Canadian military — one whose importance has at long last been recognized with the highest form of praise: the Nobel Prize.



CROSS CANADA CURRENTS

Northern Rights



Last fall, in a tiny native community in the Northwest Territories, Prime Minister Brian Mulroney signed a historic agreement in principle that will make the Dene and Métis of the region the largest non-government landowners in North America.

The pact gives about 15 000 aboriginal people of the Dene and Métis tribes that inhabit the Mackenzie Basin of the Northwest Territories ownership, including sub-surface rights, of approximately 10 000 km² of land.

Prime Minister Brian Mulroney and National Chief of the Assembly of First Nations George Erasmus after signing a historic agreement in principle that will make the Dene and Métis of the region the largest non-government landowners in North America.

Accordingly, the two aboriginal groups receive mineral rights that would entitle them to half of the first \$2 million the government receives in royalties

and 10 per cent of anything above that. The first \$20 million would be tax-free. The deal also gives them special rights and interests in an area totalling 180 000 km², including a voice in land, wildlife and water management decisions. Starting in 1990, the Dene and Métis are entitled to \$500 million in cash to be paid out over 20 years.

Prime Minister Mulroney said the signing marked "a day of justice" and heralds "new economic and political development" for the North. "This agreement in principle, when carried to its final form," he said, "will establish a new, stronger and healthier rela-

tionship between the people of this area and the governments which serve them." The Prime Minister added that the land pact marks "real progress" in the Dene quest for self-determination.

But issues such as self-determination and aboriginal title were not included in the agreement. These have yet to be hammered out in discussions between the government of Canada and aboriginal leaders over the next two years.

Victorious Victoria

Victoria, the British Columbia capital, has been chosen to host the 1994 Commonwealth Games.

The decision was reached by the Commonwealth Games Federation in Seoul, South Korea, the site of last year's Summer Olympics. The Canadian west-coast city was selected on a first-ballot majority.

David Black, chairperson of the Victoria organizing committee, said it was the "personal approach" that made the difference. "We worked to get to know the delegates and their needs, to design a Games that would help them," said Black. "We're

in a situation where the Games are guaranteed . . . we have a good management team and funding in place. Our Games will be great Games."

Delegates were perhaps looking for an angel to save the Commonwealth Games from extinction. The 1986 Games in Edinburgh, Scotland, became a financial disaster when more than half of the entries pulled out as part of an anti-apartheid boycott.

The 1994 Games make Victoria the fourth Canadian city since 1930 to be awarded the Commonwealth Games.

Magical Mermaid

From a cultural perspective, the small university town of Wolfville, Nova Scotia, with its 4 000 inhabitants is perhaps best known as the home of world-renowned painter Alex Colville. But it is home as well to another cultural phenomenon — a fanciful children's puppet theatre that is captivating audiences the world over.

Mermaid's artistic director since 1982 has been Graham Whitehead, 46, a Cambridge-educated, former professor at Dalhousie University who several years ago began working part-time at Halifax's Neptune Theatre. That led to his association with Mermaid, where he now creates and directs most of the shows.



Mermaid Theatre of Nova Scotia, Atlantic Canada's major theatre for family audiences, is gaining worldwide recognition for its multimedia productions and its retelling of children's classics. Started 16 years ago with a \$12 000 grant, the company began by presenting local puppet shows based on works by writers such as Gogol and Chekhov and on Micmac Indian legends. Today, with an annual budget of more than \$765 000, Mermaid Theatre mounts four touring productions a year, with 15 actors doing 445 performances before about 130 000 children.

Nova Scotia's Mermaid Theatre — a fanciful children's puppet theatre that is captivating audiences the world over.

"I use my 13-year-old daughter for most of my ideas," says Whitehead. "I'm lucky in that I have a sort of captive control group. I bounce ideas off her. Also I'm essentially childlike myself."

Playing a major ambassadorial role for Nova Scotia and for Canada, Mermaid Theatre

tours regularly to major U.S. cities from Anchorage to Orlando, and from New York City to San José, California. The theatre has also performed in England, Wales and Mexico.

Last summer, Mermaid undertook a five-month tour of Pacific Rim countries, including Japan and Australia. The company presented *Just So Stories*, Rudyard Kipling's classic, and *Anna's Pet*, based on the Canadian story by Margaret Atwood and Joyce Barkhouse. Both performances used novel music as well as highly innovative sets, props and costumes to enhance the viewer's experience, and both were pre-

sented at the International Puppet Festival in Japan where they received critical acclaim.

More recently, an inventive adaptation of Prokofiev's beloved *Peter and the Wolf* was presented at the Lincoln Center in New York City and at the John F. Kennedy Center for the Performing Arts in Washington, D.C. The company then undertook an 11-week, 90-performance tour of the American Midwest where it was hailed by critics, educators, parents and children alike. Plans for 1989 include a cross-Canada tour as well as performances in New York, Florida and California.

New Hope for Arthritis Victims

Chances are someone you know suffers from arthritis — the painful disease that produces chronic inflammation, swollen joints, redness and sometimes severe restriction to movement. In Canada, one in every seven persons develops arthritis at some point in his or her life, and for many it's a veritable crippling disorder. But now there's hope for arthritis victims: two Toronto doctors have made a critical breakthrough which they say will lead to better treatment of the disease.

Until now, no one knew the exact cause of arthritis. Recently, however, Dr. Vladimir Pruzanski and Dr. Peter Vadas of Toronto's Wellesley Hospital isolated an enzyme called PLA2 which exists in human joints. At low levels PLA2 is harmless, but at high levels, they discovered, these enzymes destroy cells and tissues around the joints and cause massive swelling.

Research now is under way on how to stop these enzymes from multiplying and clogging up the joints. So far doctors have had only partial success in alleviating the effects of the disease using aspirin and other drugs.

Drs. Pruzanski and Vadas are now trying to develop an enzyme-blocking drug. Said Dr. Pruzanski, "In this instance, we are sure we can tailor a drug to specifically inhibit PLA2 which we believe is important in causing inflammation."

The doctors hope that a new drug to control arthritis will be available in three to five years.

Underwater High Adventure

Tourist submarines are turning into big business for a Vancouver firm that launched its fifth sightseeing submarine last June. Sub Aquatics Development Corporation — the world's only manufacturer and operator of passenger submarines — has built three subs for the Caribbean tourist trade and a fourth for Hawaii.

"The fifth sub, christened *Atlantis V*, went into operation at Guam, a popular Japanese tourist destination, last fall," said Andrew Mowatt, marketing vice-president for Sub Aquatics. "And *Atlantis VI* and *VII* are already under construction," he said.

Diving to depths of 45 m, the battery-powered subs carry up to 46 passengers through a living underwater world, gliding past exotic fish, sponge gardens, grottos and coral formations. These depths give access to underwater areas of greatest marine life interest and colour which are out of the normal range of scuba divers, not to mention non-scuba diving tourists!

Sub Aquatics went into the tourist submarine business five years ago after company president Dennis Hurd, an experienced submersible builder and operator for offshore drilling companies, noticed that oil company executives couldn't resist taking their friends and families for a trip on the submersibles. "When we'd take a client on board for a dive, they'd get really excited," says Hurd. "I felt there was a real market for this type of experience."

Hurd was right. In three years of operation, company subs have carried more than 300 000 passengers in 8 700 day and night dives, resulting in overwhelming market response and customer satisfaction.

Submarines are non-polluting and environmentally safe. They have also proven to be extremely reliable in operation.

Diving to depths of 45 m, tourist submarines carry passengers through a living underwater world of exotic fish, sponge gardens, grottos and coral formations.

Security for Valuable Documents and IDs

With increasingly sophisticated copying technology it has become easier to tamper with and forge documents. But thanks to new methods developed by the National Research Council (NRC), such things as the forging of drivers' licences can now be prevented.

In British Columbia, a Vancouver firm has picked up on the NRC's idea and will be producing all of that province's driver's licences using this new technology. The process involves coding cards and security documents with a thin coating of iridescent clear plastic that changes colour in an unpredictable way.

George Dobrolowski, senior researcher with the NRC and director of the research group that developed the technology, explains that the process provides results similar to what can be seen on credit cards — the hologram that changes colour depending on the lighting — but is based

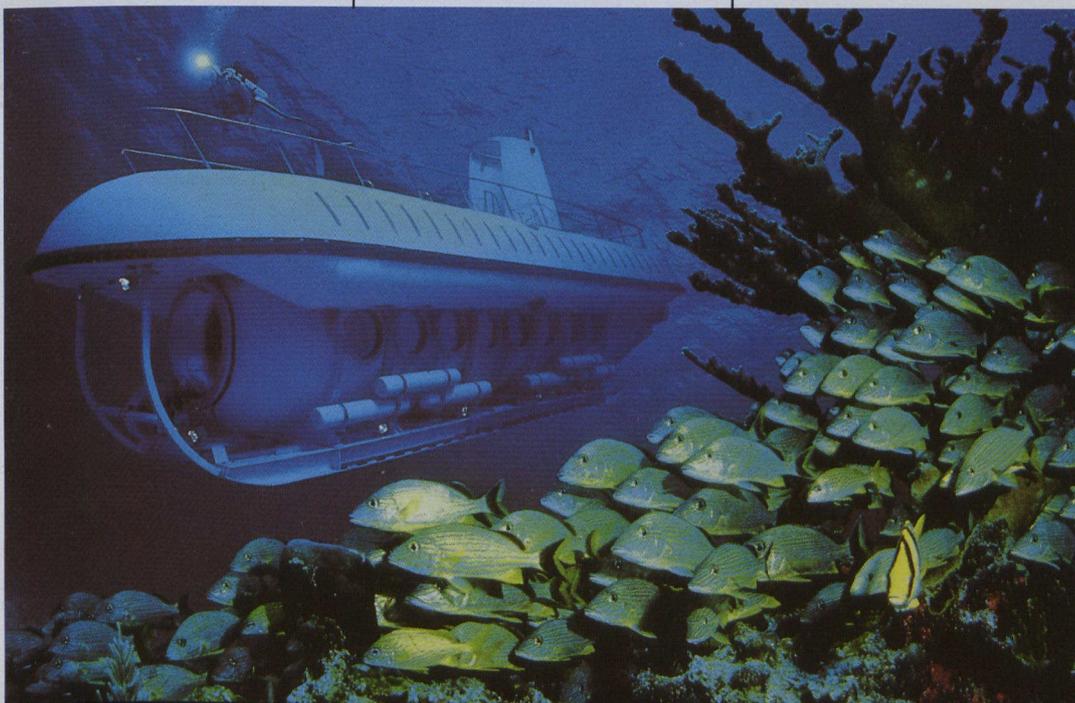
on a different physical principle. "It is based on interference of light in thin films," he explains. "Soap bubbles and oil slicks on wet pavement, for instance, are based on this principle."

Dobrolowski believes that this new technology is going to make a big difference in curtailing the forgery of documents. On a document that uses the interference of light principle, "colours will change or some kind of logo will appear depending on the angle at which the document is viewed," he says. "And this, of course, is an effect that you cannot duplicate by photocopying or photography or printing."

With this technology, anyone will be able to look at a document, view it at different angles and look for any changes. Says Dobrolowski: "If there's no change, the document doesn't have the protective device, and is therefore suspect."

The practical applications of this interference of light technology are numerous: for driver's licences, passports, visas, airline tickets, birth certificates — in fact for any type of valuable document.

According to Dr. Dobrolowski, the NRC is at the leading edge of this technology and is currently working closely with private companies and universities. In his view, there are many fascinating technological and scientific applications of this new interference of light technology on the horizon.



Canada's New National Aviation Museum Takes Off



Photo: Malak

At last . . . a new home for one of the world's great collections of vintage aircraft! The opening of the new National Aviation Museum last summer at historic Rockcliffe Airport just a few kilometres from Parliament Hill in Ottawa marked a major step forward in Canada's recognition of its aeronautical history.

Since Canadians began the world's first commercial bush flying operations shortly after the First World War, aircraft have played a critical role in opening up the country's vast, rugged and sparsely populated land. Perhaps no other nation in the world has relied as heavily as Canada on aviation, and Canadians have made pioneering contributions to the field that are out of all proportion to the country's population.

Through the extraordinary efforts of dedicated individuals, Canada has one of the finest aeronautical collections in the world. However, the collection languished for years in dilapidated hangars that dated back to the early years of the Second World War. With the new museum, Canadians and visitors can view this collection in a first-class facility for the display of aircraft and aviation artifacts.

"It is appropriate that Canadians now have one of the best aviation museums in the world," said Robert W. Bradford, associate director of the museum. "Aviation is very special to Canadians and it has touched many of our lives. At long last we have a chance to appreciate this important part of our history."