



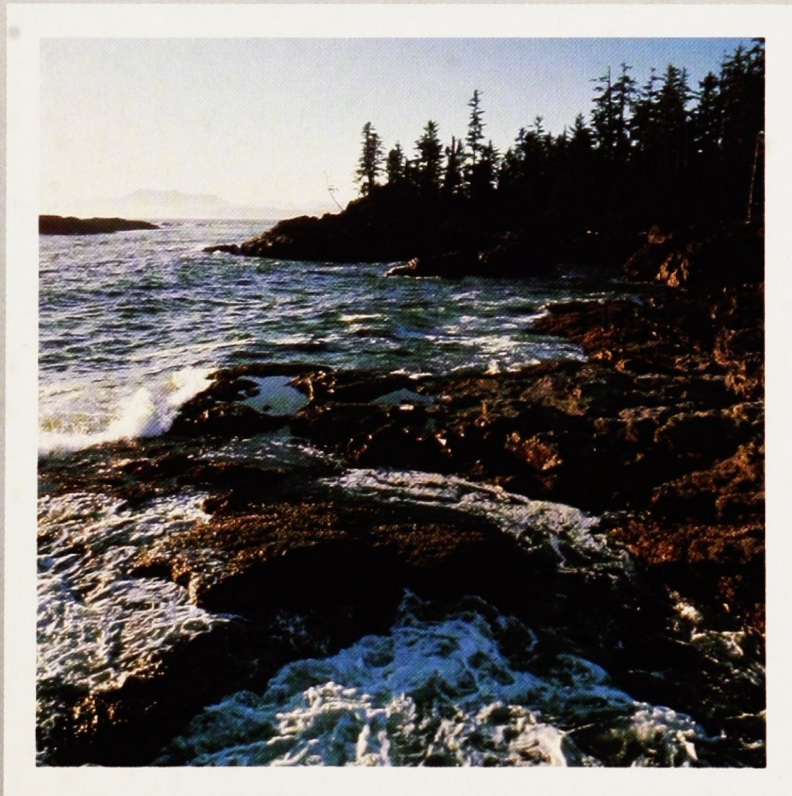
Environment
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E N V I R O N M E N T

Update

Volume 9, Number 1, Summer 1989



A Word from the Editor

It may surprise a few long-time employees of Environment Canada to learn that their department was 18 years old this June. Law and custom hold 18 to be the age of maturity, and we are going along with the idea in this issue of *Environment Update* by including some reflection and a bit of stock-taking, courtesy of Jack Davis and Robert Shaw. Mr. Davis was the first federal minister of the Environment and Mr. Shaw his deputy minister. Their joint retrospective gives us an idea of what has changed, and what has not, since the early days of Environment Canada.

The ozone layer was just beginning to worry a few people in those early days; today it is worrying everybody. The evidence keeps piling up that synthetic chemicals such as CFCs and halons are eating away at the ozone shield. But the world finally seems to be doing something about it. The signing of the Montreal Protocol in 1987 was a major step. Now the experts agree that the protocol, while significant, does not go far enough. Dr. Mostafa Tolba, executive director of the United Nations Environment Programme, was quoted in the *New York Times* as saying, "In September 1987, by the skin of its teeth, the Montreal Protocol was an acceptable document. In light of everything that has happened since, and the projections of what will happen, its provisions are now unacceptable." One of the articles in this issue deals with the world's intention to go beyond the protocol, and specifically with Canada's plans to phase out all CFCs by the end of the century.

If the world at large had not heard of CFCs back in the early days of Environment Canada, it had certainly heard of oil spills. We are still hearing about them, of course. The western waters have taken a particular beating this year, with the *Nestucca* oil spill in late December and then the *Exxon Valdez* spill in the spring. The television reportage has made clear just how complicated it is to clean up spills of this magnitude, how many variables are involved when ocean and oil meet. We take up oil spills, and chemical spills in general, in the main article of this issue.

Since we celebrated Environment Week last month, we decided also to include a short environmental quiz. It is designed to touch all bases, from parks to waste management to atmospheric change.

Once again this year, on Heritage Day, the Parks Service Heritage Awards were presented to a number of Canadians whose work in conservation is an inspiration to us all. In this issue is a report on the presentation ceremony and the special contribution of each award-winner.

Finally, a word of correction. The article "Saving the St. Lawrence" in the December 1988 issue of *Environment Update* described the beluga whale and the American black duck as being "in danger of extinction." Dr. Robert O. Bailey of the Canadian Wildlife Service has written to point out that, in fact, only the St. Lawrence River population of beluga whales is endangered. Much larger populations in the north are not. As for the black duck, Dr. Bailey describes it as "the most abundant waterfowl species in most areas of Eastern Canada [and] the prevalent species in the fall harvest by hunters east of Quebec City through Newfoundland." We thank Dr. Bailey for his information.

Jamie Findlay

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Cover photo: Pacific Rim National Park, B.C., where workers cleaned up an oil spill last spring.

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Environment Update

Environment Canada was created by the Parliament of Canada in 1971. The Atmospheric Environment Service, the Conservation and Protection Service, and the Canadian Parks Service of Environment Canada work to preserve and enhance the quality of Canada's environment.

Environment Update publishes a variety of articles on environmental and heritage issues relating to the mandate and work of Environment Canada.

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Environment News

Lucien Bouchard, Environment Minister

Prime Minister Mulroney said that the appointment of Lucien Bouchard as Minister of the Environment signalled the government's commitment to strong leadership on environmental issues.

Mr. Bouchard chairs the new Cabinet Committee on Environment and represents the Environment portfolio in the Priorities and Planning Committee. He is also a member of the Cabinet committees on Operations, Federal-Provincial Relations, and Foreign and Defence Policy.

Lucien Bouchard has expressed his strong support for the concept of sustainable development. "The only way to protect the environment," he said, "is to satisfy the needs of the present without threatening the needs of future generations."

He regards as very important the decision to establish an Environment committee of Cabinet. "This government has made a commitment to the environment," he said.

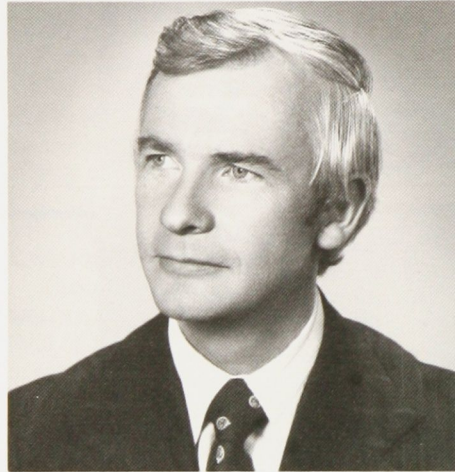
Tighter Emission Controls for Internal Combustion Engines

Work has begun on the development of stringent regulations to control emissions from internal combustion engines burning fossil fuels.

The new regulations, scheduled to come into effect by the spring of 1993, would reduce emissions of nitrogen oxides and volatile organic compounds, both prime causes of acid rain, and would also cap and eventually reduce carbon dioxide emissions, which contribute to global warming.

Existing standards established under the Motor Vehicle Safety Act in 1987 and 1988 will lower air pollution from cars and trucks over the next decade, but the decrease will be more than offset by a projected rise in use of gasoline- and diesel-powered engines. For this reason, the new regulations are required.

National Round Table on Environment and Economy



David Johnston

The federal government has appointed a National Round Table on the Environment and the Economy.

Chaired by Dr. David Johnston, Principal of McGill University, the National Round Table will provide a forum for highly qualified individuals from many sectors of Canadian society to share their expertise and consider ways of integrating environmental and economic decision-making. The aim is to forge a national consensus in support of sustainable development practices.

The first meeting of the Round Table was in mid-June in Ottawa.

Sunshine Village Proposal Withdrawn

The Sunshine Village Corporation has withdrawn its proposed plan for a major development at its ski area in Banff National Park.

The proposal is expected to be modified substantially and resubmitted within 18 months. At that time it will undergo the normal review process, including public meetings. Environment Canada officials will work with the corporation to ensure that the new proposal is environmentally acceptable and satisfactory to all concerned.

New Deputy Minister of Environment Canada

Len Good, Deputy Secretary to the Cabinet (Plans) since March 1987, was appointed Deputy Minister of Environment Canada, effective May 15, 1989.

Dr. Good is an economist by training. He worked in the Department of Energy, Mines and Resources for nine years and was Associate Deputy Minister before joining the Privy Council Office.

Dr. Good succeeds Geneviève Sainte-Marie, who has been appointed director of the National Museum of Science and Technology.

Royal Commission on the Future of the Toronto Waterfront



The Honourable David Crombie, Commissioner of the Royal Commission on the Future of the Toronto Waterfront (left), provided Environment Minister Lucien Bouchard with a guided tour of Toronto harbour to mark Environment Week.

The environment is the Commission's top priority, and Crombie wants an environmental evaluation to be completed before any new development is approved.



Mingan Management Committee

Environment Canada and the Montagnais band of Mingan, Quebec, have established a Management Committee at Mingan Archipelago National Park Reserve.

The committee comprises four Band Council representatives and four people appointed by the Minister of the Environment. Among the latter are two representatives of local non-native communities. The superintendent of the park reserve is an ex officio member.

The committee will review programs, policies and projects related to the park reserve's planning and operation. It will also see to the preservation of the Montagnais sacred grounds and the conservation of Amerindian artifacts, and will encourage individuals and businesses operated by the Montagnais to participate in developing and operating the park reserve.

Environmental Assessment and Review Process to be Strengthened

The federal government plans to legislate and strengthen its Environmental Assessment and Review Process, to ensure better integration of environmental and economic decision-making.

Environmental assessments will become mandatory for all activities under federal authority. The Federal Environmental Assessment Review Office, an independent agency, will determine the need for a public review of any assessment, and its decision may be appealed to the Environment Minister.

Interested parties will be guaranteed timely access to relevant government documents, and may be granted funding at public reviews. Assessment panels will have subpoena powers when conducting reviews. Overseas aid projects will be subject to environmental assessments. Finally, mediators will be used to resolve environmental disputes.



Environment Minister Lucien Bouchard and Montagnais Chief Philippe Piétacho sign agreement.

Canada Signs Convention on Hazardous Waste Movement

In March 1989, Canada was one of 34 countries to sign the new Global Convention on the Control of Transboundary Movements of Hazardous Wastes.

Signatories to this convention, developed under the auspices of the United Nations Environment Programme, agreed to reduce hazardous wastes to a minimum at the source where they are generated, to treat such wastes as near as possible to their source, and to ship wastes only to countries equipped to treat them. They further undertook to establish an international system whereby wastes being shipped must be accurately identified and the country of destination must give prior informed consent.

Canada is expected to be among the first countries to ratify the agreement, as many of the convention's provisions are reflected in existing Canadian law.

First Priority Substances List

In accordance with the new Canadian Environmental Protection Act, the federal government has issued a list of 44 potentially harmful substances for priority assessment. Each substance listed will be examined at every stage in its life cycle to determine its effects on human health and the environment.

The list, released in February 1989, contains individual substances as well as chemical families or effluents. All 44 must be assessed within five years. The first to be examined are dioxins, furans, pulp mill effluents, arsenic, benzene, hexachlorobenzene, polycyclic aromatic hydrocarbons, methyl tertiary-butyl ether and waste crankcase oils.

Substances such as chlorofluorocarbons, lead, mercury, halons and nitrogen oxides are not included on the list, as these are already subject to Canadian government regulation or international agreements.

The list, to be reviewed and updated within three years, provides a mechanism for controlling toxic substances now in use in Canada. New substances will be assessed before they can be introduced into the Canadian market.

Grasslands National Park

The federal and Saskatchewan governments have signed an agreement to accelerate creation of Grasslands National Park in southern Saskatchewan.

The new agreement regulates water-course management on park lands, and sets aside 337 square kilometres as a Crown mineral reserve where exploration for oil and gas is forbidden and where land purchase efforts will first be concentrated. The agreement establishes guidelines for oil and gas exploration on other lands that will eventually be included within the park. Finally, it requires that all measures to establish the park be taken with the consultation and consent of local property-owners.

Grasslands National Park will protect about 900 square kilometres of one of the last prairie wildernesses in North America.



South Moresby Forestry Compensation



Lyell Island, South Moresby

Under the terms of the agreement that established the South Moresby National Park Reserve in the Queen Charlotte Islands, the federal government has paid over \$22 million into the South Moresby Forestry Compensation Account.

This amount, together with \$8 million from the Government of British Columbia, has been set aside to cover compensation for forestry operations suspended as a result of the reserve's establishment. Should the funds exceed the total compensation to be paid, the balance of the federal share will be used for regional economic development initiatives in the Queen Charlotte Islands.

Controlling Pulp and Paper Mill Effluent

Environment Canada is taking steps to control the effluent of pulp and paper mills.

Existing effluent regulations, issued under the Fisheries Act of 1971, are being revised. The new regulations will set permissible limits for suspended solids, oxygen-depleting material and toxicity. Prompt compliance will be required of all mills.

Additional regulations are now being prepared, under the 1988 Canadian Environmental Protection Act (CEPA), to control the discharge of dioxins and furans. These regulations will be promulgated by mid-1990, after public consultation and ministerial review.

Last year, all pulp mills were required to report the level of dioxins, furans and organochlorines in their discharge, as well as their plans to control these levels. By this fall, effluents from mills using bleaching will be assessed to determine what substances in addition to dioxins and furans should be controlled.

Environmental Partners Fund

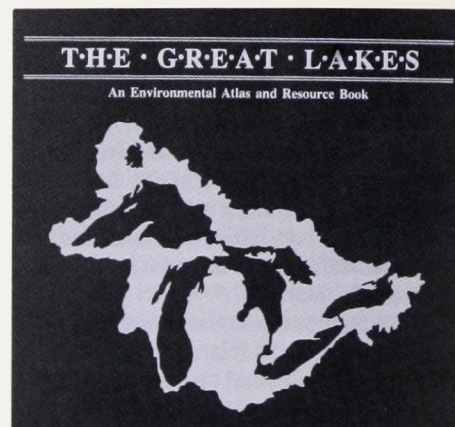
The federal government has established a \$50-million fund to foster environmental action at the community level. To be administered over a five-year period by Environment Canada, the Fund will provide up to half the financing for small-scale projects that protect, preserve, enhance or restore the environment.

Eligible for consideration will be a broad range of proposals from service clubs, community organizations, environmental groups, schools and youth groups. Industry, municipalities and provincial governments are encouraged to give their support.

The emphasis will be on innovative ideas that offer tangible results. Of particular interest are projects demonstrating to community members that their efforts can make a difference to the environment.

More information is available from Environment Canada offices in each province and territory.

Atlas Wins Award



A publication co-sponsored by Environment Canada has won the British Cartographic Society's prestigious design award for excellence in map production. *The Great Lakes: An Environmental Atlas and Resource Book* is the product of a joint effort of Environment Canada's Ontario Region and the United States Environmental Protection Agency. Canadian representatives for the project were Daryl Cowell and Tom Clarke.

The atlas is an educational tool intended to foster awareness of the Great Lakes as a complex and fragile ecosystem. Its maps were prepared by Brock University's Department of Geography in collaboration with Northwestern University of Chicago.

The award and a copy of the atlas are on display for a year at Canada House in London, England.

Spills Management: Clean-up and Control

The urgent calls come thick and fast here – generally about 50 a day. The callers relay information and seek advice on all manner of chemical spills, from diesel fuel leakages to oil slicks to PCB releases. This is the National Environmental Emergencies Centre in Hull, the nerve centre for reporting spills and other such emergencies in Canada. At least one person is always on call at the centre, for the people here know that the first few minutes of a chemical spill are critical.

“Proper action at the start can prevent irreversible damage and reduce the cost of clean-up considerably,” says Peter Mazerolle, manager of the centre.

There are an estimated 10,000 spills a year in Canada, ranging from relatively frequent minor incidents, such as the leakage of antifreeze in car accidents, to rarer massive releases. Roughly two-thirds of the spills involve fuel. Tanker accidents are the ones that get the news coverage, but they contribute an average of less than two per cent to the total volume of oil spilled every year. Pipelines are the greatest single contributor by volume to oil spills (30-40 per cent), since in their case extensive leakage may occur before action can be taken. Most spills, whether chemical or oil, can be traced to human error. Training programs can help to minimize the problem.

The primary responsibility for clean-up of chemical and oil spills lies with the polluter. If outside help is required, the municipal or provincial governments are generally the first to take action, sending fire and emergency crews when necessary. The federal government gets involved in about 10 per cent of all incidents, either because the spill is very large or dangerous (as was the case in last year's PCB fire in Saint-Basile-le-Grand) or because the problem involves areas under federal jurisdiction.

Different federal departments have different responsibilities – for example, off-highway transportation of dangerous goods is the concern of Transport Canada, and ship spills come under the jurisdiction of the Canadian Coast Guard. Environment Canada has an overall responsibility to assist these departments – and the provinces, if necessary. It also has a jurisdictional responsibility for national parks and for marine “mystery spills” that cannot be traced to a specific source or polluter.

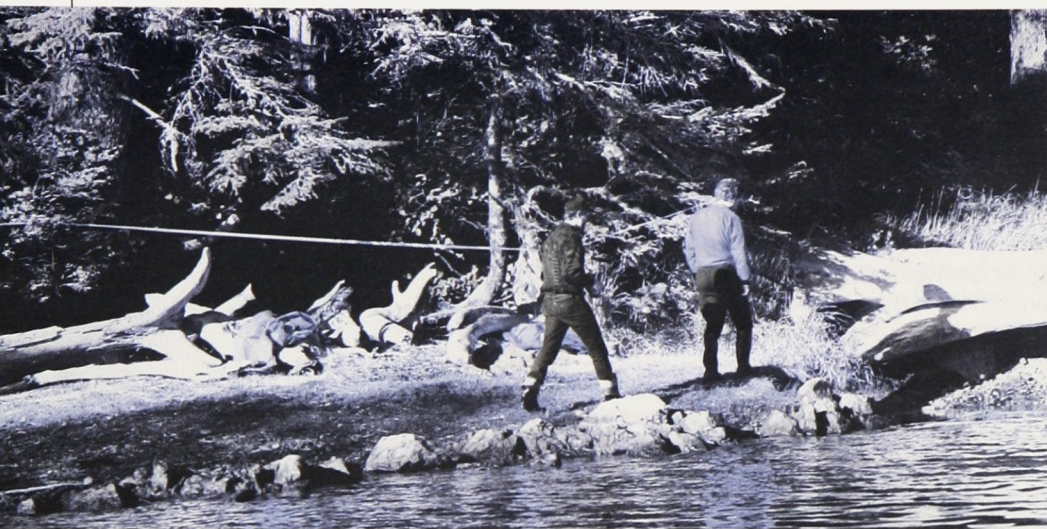


Sampling sediment off Ucluelet, B.C., after Nestucca oil spill.

There are an estimated 10,000 spills a year in Canada, ranging from relatively frequent minor incidents, such as the leakage of antifreeze in car accidents, to rarer massive releases.

The centre that Mazerolle heads is an essential part of Environment Canada's Environmental Emergency Program (EEP), which works to help prevent and clean up oil and chemical spills across the country. The program has approximately 35 full-time staff, half in the regions and half at headquarters in Hull and Ottawa. The regional and district offices play a key role: they provide training courses, work with provincial agencies, industry associations and companies on promoting spill prevention and readiness, and assess and monitor spill sites.





Cleaning up at Ucluelet after the Nestucca spill (above, and two following pages).

“The regions are a vital link between the technology and its end-users,” says Brian Mansfield, Chief of the Environmental Emergency Program Division at headquarters. “They’re the ones who get a call in the middle of the night and have to head out in dirty weather to a spill site.”

Mansfield’s job involves working closely with the petroleum and chemical industries. He is a member of the spills response committee for the Petroleum Association for the Conservation of the Canadian Environment (PACE) as well as the chemical industry’s Transportation Emergency Assistance Plan (TEAP) committee.

Last January Mansfield received a special award from PACE for his contributions to the environmental cause in the petroleum industry. “We’ve had many jointly funded training programs, courses, seminars and workshops,” he says. “We’re working at developing a better preparedness, cajoling and stimulating others to do their part.”

The encouragement takes several forms. There are the technical seminars held every year under the Arctic and Marine Oilspill Program (AMOP) and the Chemical Hazard Emergency Countermeasures (CHEC) program. The seminars are organized by the Environmental Emergencies Technology Division of Environment Canada’s River Road Environmental Technology Centre. To date the division has put out more than 230 publications on the spills theme. These range from a first-response manual for police and firefighters, to highly detailed publications on spill countermeasures in arctic waters, oil detection methods, and case studies from other countries.

The Environmental Emergencies Technology Division also spends a considerable time doing much-needed research on spill clean-up and containment. “Environment Canada is the only organization in this country that in recent years has consistently invested any substantial amount of money in research and development on spill countermeasures,” says Ken Meikle, Chief of the division. “The United States Minerals Management Service contributed a total of \$750,000 since 1986 because there isn’t anyone else in North America doing this kind of work on a continuing basis.”

In the early years of the Environmental Emergency Program, all of Environment Canada’s research and development on spill prevention and clean-up dealt with oil spills — primarily because concerns focussed on possible oil-well blow-outs in the Beaufort Sea. Between 1974 and 1984 there were 38 ship spills involving releases greater than 100 tonnes. The largest of these occurred when the *Kurdistan* dumped 7,130 tonnes of bunker oil into the Cabot Strait in March 1979.

Over the years the department has come a long way in learning how to deal with oil spills. “When we first started,” says Meikle, “few people in the country knew anything about oil spills, and they fumbled with makeshift methods. In our first years we evaluated the methods available, and then began to develop and promote improvements. Now we are an internationally known source of information.”

The success of an oil-spill clean-up depends on many factors, including the type of oil involved, the thickness of the slick, weather conditions, the presence of floating debris and the location of the spill. Booms, or floating “dams” that can be strung out around the spill, are a common method of containment or diversion.

Skimmers are the tools used to clean up the oil once it has been controlled or contained. These come in several varieties: suction skimmers that vacuum the oil off the surface of the water, sorbent-surface skimmers that attract oil to adhesive or sorbent surfaces, and submersion skimmers that draw the oil down into the water and then allow it to float up into a collection tank. Materials such as pine bark, feathers, peat moss, straw or polyethylene fabric are often used to soak up the last traces of a spill.

Oil spills on land are generally easier to contain than those on water, but often involve costly, large-scale clean-up efforts. Contaminated material recovered from a spill site poses a host of waste disposal problems.





The *Nestucca* barge spill in December 1988 proved a challenge to 200 workers and volunteers off the coast of Vancouver Island, as stormy weather hindered clean-up efforts.

"Oil spills will never be totally controllable, because Mother Nature intervenes," says Mansfield. "You can't use booms and skimmers under stormy conditions. Clean-up in bad weather is just too dangerous."

In recent years the Technology Division has focussed more on chemical spills. This isn't surprising, given the major chemical spills Canada has seen over the past 10 years. The best known occurred in Mississauga in 1979, when a train derailed and 22 box cars filled with propane, caustic soda, styrene, toluene and chlorine caught fire. The incident prompted the second-largest evacuation in the world to date — 220,000 people — although no deaths or serious injuries resulted. "Spills represent a localized, high concentration of pollution," says Mazerolle.

There are tens of thousands of chemicals used commercially in Canada, but the top 150 of these account for 97 per cent of all spills.

He estimates that there are tens of thousands of chemicals used commercially in Canada, but the top 150 of these account for 97 per cent of all spills. Ten of them alone account for 32 per cent: ammonia, ammonium nitrate, calcium oxide/hydroxide, chlorine, methanol, natural gas, potash, sodium hydroxide, sulphur and sulphuric acid.

The Technology Division has established a "worst offenders" list of chemicals by taking into consideration the volume of chemical used and transported, the frequency and relative volume of spills, and the chemical's toxicity to animals and marine life. Sulphuric acid appears high on all lists — it is spilled frequently and in large volumes. PCBs are spilled even more frequently, but usually in very small quantities.

The top 50 chemicals on the list have become the subject of detailed 60-to-100-page monographs called EnviroTIPS (Environmental and Technical Information for Problem Spills). EnviroTIPS are used by spill specialists to improve prevention programs and countermeasure planning, as well as to help assess the effects of chemical spills on the environment. The 51st such monograph — on PCBs — is expected to be published next year.

Chemists, biologists and engineers in the Technology Division have developed or evaluated hundreds of analytical, remote-sensing, and spill countermeasure devices since the program started. The chemistry and physics section is headed by Mervin Fingas, whom Meikle calls "the best-known individual in the world in the spill countermeasures business." Fingas is proud of the lab's recent advances. "Our understanding of how substances and equipment behave under different conditions has increased significantly over the past 10 years," he says.



Research and development in the Technology Division tend to focus on Canadian problems, such as arctic or cold-weather spills, including the interaction of spilled substances with ice. There is also the job of separating the technological wheat from the chaff. "We still spend an awful lot of time testing these wonderful dispersants that people say will make oil disappear magically, or debunking claims for clean-up gadgets that won't work," says Meikle. "But occasionally we strike gold."

Major technological achievements include a mobile laboratory that can analyze soil samples from spill sites and assess the contamination levels of hundreds of chemicals. The lab was used extensively during the PCB spill in Saint-Basile-le-Grand last year.

The division also has a prototype of a miniature remote-controlled helicopter with a TV monitor, and a sampling device for remote measurement of concentrations of chemicals accidentally released into the air. Another undersized, but valuable, tool is a tiny underwater instrument, towed behind a boat, to read the parts-per-million of oil in water.

An area of rapid progress in recent years has been in membrane technology — that is, the removal of contaminants from water by using thin plastic sheeting as a filter. The division was the first to apply this technology to spill clean-up. A microfiltration/ultrafiltration (MF/UF) unit removes suspended solids such as oil globules from contaminated water. A reverse osmosis (RO) unit then takes out dissolved contaminants. The end result is relatively clean water. The equipment can be moved for use at the site where a spill occurs.



The RO unit was originally designed to produce fresh water from seawater for use by the Coast Guard in steam-cleaning harbour structures. The division then recognized its applicability to spill clean-up. Membrane technology can also be used to treat industrial effluent. In a pilot project at the General Motors plant in Oshawa, the equipment developed by the division removed over 95 per cent of contaminants from wastewater containing oil and glycol.

Other successes of this technology include cleaning blood-water at a fish-processing plant in Nova Scotia, cleaning contaminated water collected after a pesticide warehouse fire, and removing solvent from National Defence aircraft wash-water. In demonstrations, the equipment has proven so successful at removing timber-treating chemicals from contaminated water that the chemicals can actually be

DOE's technical experts are finding solutions that can be of economic value as well as immediate environmental benefit.

re-used. "Our technical experts are finding solutions that can be of economic value as well as immediate environmental benefit," says Mansfield.

With their technological know-how and resources, the regional and headquarters staff in the Environmental Emergency Program can give much help to all those



involved in spill management. They contribute significantly to a co-operative initiative called the Major Industrial Accident Co-ordinating Committee (MIACC). MIACC was formed in 1986 to follow up on recommendations made by a task force of federal, provincial and industrial analysts in response to the Bhopal accident in India.

The steering committee for MIACC is made up of representatives from Environment Canada, Transport Canada, Emergency Preparedness Canada, Quebec, Ontario, Alberta and British Columbia, as well as industrial and emergency service associations. It serves as an information-sharing forum for those who have a part to play in accident prevention and emergency response.

The past 10 years have seen some major chemical and oil spills in and around Canada. Every successive accident – Saint-Basile-le-Grand, the *Nestucca*, the *Exxon Valdez* – brings home the need to learn more about the complex matters of controlling and preventing spills.

In June, Prime Minister Mulroney announced the appointment of a federal review panel on tanker safety and marine spills. The panel will study existing methods of facilitating safe transport of oil and chemicals through Canadian waters. It will also examine the capacity to prevent and clean up spills, and will make recommendations for improvements. The panel is to report by the end of the year. ■



Merv Fingas (left), Derek Vandenberg and Alice Bobra in the RRETC mobile laboratory they took to Saint-Basile.

The Nestucca Spill: An Update

In December 1988, an American barge called Nestucca leaked 860 tonnes of bunker oil off the coast of Washington. The oil began washing up on the shores of Vancouver Island over a week later. Some 150 kilometres of shoreline were affected, mainly between Carmanah Point and Kyuquot Sound on the western coast.

Colin Wykes, of Environment Canada's Pacific and Yukon Region, reported in May that the main thrust of the clean-up is over. Patches of oil still drift ashore or are uncovered by the changing beach surface, and these necessitate occasional clean-up of particular stretches. The shoreline will continue to be monitored this summer. In addition, a small interpretive program in Pacific Rim National Park will inform visitors about the impact of the oil spill.

The worst casualties of the spill were sea birds. Over 3,000 dead birds have been found on Canadian shores, most of them belonging to offshore species such as the Common Murre and Cassin's Auklet. Environment Canada will not know the long-term impact on these populations until surveys are conducted later in the year. Populations of marine mammals, such as otters and sea lions, will also be monitored.

The area suffered economically as well as ecologically because of the spill: oyster and crab fishing areas were closed during the worst days. The federal Department of Fisheries and Oceans will continue to monitor fish catches and habitats.



1988 Heritage Awards

The Canadian Parks Service Heritage Awards for 1988 were presented to 10 recipients on this year's Heritage Day, February 20, by Environment Minister Lucien Bouchard.

The awards honour significant contributions to heritage conservation in the fields of policy development, research and education, resource management, public awareness and stewardship.

The following people and groups were the award-winners for 1988.

- G.H.U. (Terk) Bayly has served as Deputy Minister of Ontario Lands and Forests and as Chairman of the Ontario Heritage Foundation. His efforts were largely responsible for the passage of Ontario's *Conservation Land Act* in 1988.
- Marc Denhez, an Ottawa lawyer who specializes in heritage issues, is a former Research Director of the Heritage Canada Foundation and author of *Heritage Fights Back*.
- The Island Nature Trust of P.E.I. has been active in developing provincial legislation to protect the environment. It has raised funds to acquire significant natural areas and has undertaken an education program on P.E.I. heritage issues.
- Sister Estelle Lacoursière, of Trois-Rivières, Quebec, a botany professor and author of 24 books, has developed an inventory of flora in Gaspésie.
- Father Donat Martineau, of Rouyn-Noranda, Quebec, had a major role in the designation of Fort Témiscamingue as a national historic site. He also founded the Société du patrimoine de l'Abitibi-Témiscamingue and wrote a series of articles on the area's cultural history.
- The late Bill Mason, of Old Chelsea, Quebec, produced 18 internationally acclaimed wilderness films.



Back row, from left: Marc Denhez, John Woodworth, Gerry Glazier (Executive Director, Nature Conservancy of Canada), Doug Deacon (Vice-President, Island Nature Trust), Terk Bayly, Father Donat Martineau. Front row, from left: Sister Estelle Lacoursière, Joyce Mason, Lucien Bouchard, Muriel Kent Roy, Sakiassie Soudloapik (President, Pangnirtung Tourism Committee)

- The Nature Conservancy of Canada, a non-profit organization dedicated to preserving ecologically significant natural areas, has helped to protect 75,000 acres of land across Canada in the last 25 years.
- The Pangnirtung Tourism Committee, N.W.T., co-ordinates and implements programs for tourism development that have helped commemorate and interpret the history and culture of southeast Baffin Island.
- Muriel Kent Roy, of Moncton, N.B., director of the Centre des études acadiennes at the University of Moncton, has actively promoted the Acadian cultural heritage for many years. She was a member of the 1980 LaForest Commission on land acquisition for new national parks.
- John Woodworth, of Kelowna, B.C., is founding director of the Okanagan-Similkameen Parks Society and the

Nature Trust of British Columbia. He was influential in the designation of the Alexander Mackenzie Heritage Trail and in the establishment of four provincial parks and several wilderness and ecological reserves.

Addressing the recipients, Mr. Bouchard said, "The Heritage Award exists to allow us to express our appreciation; but it is also to allow your fellow citizens to discover and better understand the values you cherish.

"We are attached to our nature, which pervades our identity, in the same way that we are proud of our past. To protect the quality of the environment, the impetus must come primarily from citizens, from committed individuals like you whom we honour today, and those who will follow you and share your sense of commitment." ■

CFCs: Cutting Back, Cutting Out



Mostafa Tolba, Executive Director, United Nations Environment Programme, addresses international meeting of legal and policy experts.

The world is inching closer to eliminating CFCs, the substances that deplete the earth's ozone layer.

Canada is in the forefront of nations that are stepping up efforts to control this environmental hazard. In February, Environment Minister Lucien Bouchard announced that the federal government had set a new national objective: the complete elimination of all controlled CFCs within 10 years. ("Controlled" CFCs are those marked for reduction under the Montreal Protocol of 1987.)

Mr. Bouchard made the announcement in Ottawa, at an international meeting of legal and policy experts on the protection of the atmosphere.

Environment Canada has already issued draft regulations for curbing CFC use by at least 85 per cent. The remaining fraction will be eliminated as soon as substitutes are found for the CFCs in such items as refrigerants and medical products.

There are strong hopes that the 10-year target deadline may be shortened. "It is my firm belief," said Mr. Bouchard, "that with a quickening international race for answers, we will soon find promising ways to advance our schedule."

The Canadian targets go far beyond those set by the Montreal Protocol, which committed the signatory countries to halving CFC use by 1999. It came into force on January 1 of this year, and as of March 1 it had been ratified by 32 countries and the European Economic Community (EEC), representing most of the world's industrialized nations.

But almost all experts agree that the Montreal Protocol doesn't go far enough. The targets must be more stringent if damage to the ozone layer is to be curbed. This winter, Environment Canada again found evidence of ozone deterioration over the arctic — a further spur to action.

Canada was one of the first countries to commit itself to additional reductions in CFC use. Other countries have since followed suit. In March, the United States and the EEC announced their intention to eliminate production and use of CFCs by the end of the century.

In early May, at an international meeting in Helsinki, 80 nations supported a declaration to eliminate ozone-damaging substances by the end of the century. The declaration was endorsed by all the signatories to the Montreal Protocol, as well as a

number of non-signatories. The signatory countries will meet again in June 1990 to discuss amendments to the Montreal Protocol.

The big question — the perennial question on the ozone front — is how quickly this resolve can be translated into action. For its part, Environment Canada has already issued a strategy for phasing out CFCs.

The first step is to meet the terms of the Montreal Protocol. This involves two actions: freezing the consumption of CFCs at 1986 levels, and then reducing CFC consumption to 50 per cent of 1986 levels by 1999.

The second step is to go further than the Montreal Protocol — to come up with ways to reduce CFC consumption by at least 85 per cent, and to do it as soon as possible. One way to do this is to restrict production, import and export of ozone-depleting substances. Another is to prohibit their use for non-essential purposes.

Environment Canada has issued draft regulations proposing a ban on the import, manufacture and sale of the following items by January 1, 1990:

Ozone Depletion: Identifying the Enemy

Two sorts of synthetic chemicals threaten the ozone layer: chlorofluorocarbons (CFCs) and halons. (There are other enemies, but these are the worst.) CFCs are used in refrigeration, in making foam products, and as solvents to clean microchips and other electronic equipment. Halons are used mainly in such devices as fire extinguishers.

When released into the air, both halons and CFCs float slowly up to the ozone layer, situated between 15 and 35 kilometres above the earth's surface. There they are broken apart by the ultraviolet light of the sun.

One of the substances produced in this breakdown is chlorine, a voracious consumer

of ozone. A single molecule of chlorine can destroy up to 100,000 ozone molecules. Halons are even worse than CFCs, for their breakdown produces bromine, which is 3 to 10 times more destructive of ozone. As the ozone layer disappears under the onslaught of halons and CFCs, so does our protective screen against the sun's harmful ultraviolet rays.

The Montreal Protocol calls for a reduction in the use of five kinds of CFCs and three kinds of halons — the worst of a bad lot. Canada's plans to eliminate CFCs include a reduction in halon emissions.



Test Your E.Q. (Environmental Quotient)

- aerosol products containing controlled CFCs, with the exception of certain medical products and industrial applications for which alternatives are not yet available or for which fire safety is a concern;
- food-packaging foam, including food holders and beverage holders that contain, or are manufactured with, controlled CFCs;
- portable halon fire extinguishers for home use;
- small pressurized canisters that contain controlled CFCs, including refrigerants available at hardware stores and air horns such as those used at hockey games.

CFCs in other items will take longer to phase out, because of problems in developing and implementing alternatives. These include the CFCs used in cleaning solvents, in refrigeration, and in the manufacturing of foam items such as insulation. The phasing out of such CFCs is discussed in a report recently issued by Environment Canada, *Preserving the Ozone Layer: A Step Beyond the Montreal Protocol*.

By these measures, Canada has taken the lead in efforts to strengthen the Montreal Protocol. The aim is to go beyond a cutback in use of CFCs, and instead to eliminate them entirely. Environment Canada officials chair an international panel of experts studying the technical feasibility of phasing out CFCs completely. The panel is also examining ways of controlling other chemicals that damage the ozone layer, such as methyl chloroform and carbon tetrachloride.

The panel will report to the 1990 meeting of parties to the Montreal Protocol. That meeting may take significant further steps to counter the threat of ozone depletion. ■

The following quiz has been drawn up using Environment Canada sources. Answers are on page 16.

1. CFCs can remain in the atmosphere for
 - a) 100 years or more
 - b) 50 years
 - c) 5 years
 - d) all of the above
2. Ozone is
 - a) beneficial to the environment
 - b) harmful to the environment
 - c) both of the above
3. Which national park contains the highest mountain in Canada?
 - a) Glacier National Park, B.C.
 - b) Kluane National Park Reserve, Yukon
 - c) Banff National Park, Alta.
4. Which parts of Canada are most affected by acid rain?
 - a) areas close to the Canada-US border
 - b) industrial areas
 - c) the eastern provinces
5. Polychlorinated biphenyls (PCBs) are toxic chemicals that can be
 - a) absorbed through the skin
 - b) inhaled
 - c) eaten in fish
 - d) all of the above
6. In L'Anse aux Meadows National Historic Park in Newfoundland are the remains of eight sod buildings constructed by
 - a) unidentified European settlers of the 15th century
 - b) Irish monks
 - c) Norse settlers
 - d) Dorset Eskimos
7. Which of the following is a major cause of the greenhouse effect?
 - a) carbon monoxide emissions
 - b) carbon dioxide emissions
 - c) sulphur dioxide emissions
 - d) all of the above
8. Dioxins and furans are chemical by-products created in
 - a) the manufacture of some herbicides
 - b) waste incineration
 - c) wood burning
 - d) all of the above
9. The country that generates the most waste per capita in the world is
 - a) the United States
 - b) Canada
 - c) Japan
10. What do the ancient city of Damascus in Syria, Urnes Staves Church in Norway and Anthony Island in Canada's Queen Charlotte Islands have in common?
 - a) All bear testimony to an ancient way of life.
 - b) All have a special spiritual significance.
 - c) All are on UNESCO's list of World Heritage Sites.
 - d) All of the above.



Environment Canada: The Early Years

Environment Canada came of age this June – it was born 18 years ago on June 11, 1971 – and to mark the occasion we spoke to two of the original mainstays of the department, Jack Davis and Robert Shaw.

Jack Davis was Canada's first minister of the Environment (he is now B.C.'s Minister of Energy, Mines and Petroleum Resources) and Robert Shaw was his deputy minister. The environmental movement was gathering steam when they began their tenure in 1971, and governments were just beginning to pay attention.

"There was an upwelling of concern worldwide," says Mr. Davis. "France had been the first to create a ministry of the environment, and Canada was the second." Fighting pollution was the order of the day, but, as both men explain, there were other concerns as well.

Environment Canada originated with the Department of Fisheries and Forestry, of which Mr. Davis was Minister. "The department was based on the Fisheries Act," says Mr. Shaw, "because fisheries, according to the Fathers of Confederation, were a federal responsibility.

"Anything that was good for a fish was to be encouraged by the Government of Canada, and anything that was bad for a fish was to be discouraged."

"Anything that was good for a fish was to be encouraged by the Government of Canada, and anything that was bad for a fish was to be discouraged. Obviously, without going into detail, that covers the health of the whole environment – forests, air and water."



Jack Davis

Added to fisheries and forestry were various services from other departments: the Canadian Meteorological Service (from the Department of Transport), the Canadian Wildlife Service (from Indian Affairs and Northern Development), the Air Pollution Control Division and the Public Health Engineering Division (from Health and Welfare), the Canada Land Inventory (from Regional and Economic Expansion) and the Water Sector (from Energy, Mines and Resources). When Jack Davis took over the portfolio, he assumed the dual titles of Minister of the Environment and Minister of Fisheries.

The initiative for creating a Department of the Environment came from several directions, says Mr. Davis. "I was pushing for it because we wanted to get more clout in extending our limits offshore, to protect the living resources bordering on Canada. But Prime Minister Trudeau had a background all his own in this area – I understand he came to Ottawa in the late forties and early fifties as an adviser to Louis St. Laurent, with respect to matters dealing with the Gulf of Saint Lawrence. And there were a number of people who were beginning to see the protection of wild things as crucial."



Robert Shaw

Pollution was the first item on the agenda for the new department. There were, and are, two aspects to fighting pollution – setting emission standards, and imposing them. The department recruited task forces in a number of industries to develop guidelines and standards for pollution control.

There were, and are, two aspects to fighting pollution – setting emission standards, and imposing them.

"The task forces identified standards that could be met with leading-edge technology," says Mr. Davis. "These standards were applied to anything that was new or that was being rebuilt, whereas the old existing industry, the polluting industry, was left to wither away."



The next problem was to enforce those standards across the country, and that was more difficult. "We had to be relatively even-handed," says Mr. Davis. "We endeavoured to get the provinces to introduce tougher standards. But some were more responsive than others. Canada has not enforced standards across the country in an even-handed way. But we attempted to approach the matter in that fashion."

The new department also began to take action on other fronts. "One of the first things we did was reduce the phosphate content in detergents," says Mr. Davis. "We also reduced the lead content in gasoline. We brought in an act concerning the use of toxic chemicals by industry. We did a lot of the 'cruder' things that are now being refined." Another achievement was the creation of the 200-mile offshore limit, which other countries have since adopted, and the signing of the Great Lakes Water Quality Agreement with the United States.

"We were curious and frightened, but totally ignorant, about the ozone layer."

More comprehensive worries were also looming. Robert Shaw says, "We were curious and frightened, but totally ignorant, about the ozone layer." At that time, he says, one concern was that the exhaust fumes of high-flying jet aircraft might somehow be damaging the ozone layer.

Mr. Davis' tenure ended in 1974, and later forests and fisheries were detached from the Department of the Environment. Both Davis and Shaw regret the change, arguing that it weakens the environmental effort.

"If you take fisheries away from the environment in Canada, then, given our constitution, you take away the one piece of legislation that Canada has for dealing with water quality," says Mr. Davis. "I suppose that, under the present circumstances, you could have a lead minister of the environment, and then reporting through that ministry would be parks, fisheries, and other related areas. But in this country we certainly should have a senior ministry of the environment."

Asked to comment on the progress made by the early department, Robert Shaw says wryly, "I would guess that any man who has made a sixteenth of an inch of progress in his life has done quite well."

Jack Davis sees a slow but steady progress in environmental improvement, but notes that certain industries — like pulp and paper — could still use cleaning up. And he adds that he would like to see the provinces carry more of the load. "The provinces control property; the provinces essentially control industrial location; the provinces have more bite when it comes to local taxation," he says. "And since a lot of pollution is localized, the provinces have a major role to play."

"Since a lot of pollution is localized, the provinces have a major role to play."

"Some of them are playing it, and others are not. It's the same old bit. When I was at Stockholm (at the United Nations Conference on the Human Environment, in 1972), it was the wealthy nations that were agog about the environment, and the emerging nations were saying, 'Well, you had your industrial revolution; leave us alone.' And it's the same in Canada."

"Where a major company is in the process of building, it's easy to have standards; but in an area where a dirty industry is barely surviving, and unemployment is high, it's very difficult politically to move on the situation." ■



Update Reviews

New Studies in Climate Change Digest Series

Quebec faces major climatic changes in the next 50 years, according to a study prepared for Environment Canada by Dr. Bhawan Singh of the University of Montreal.

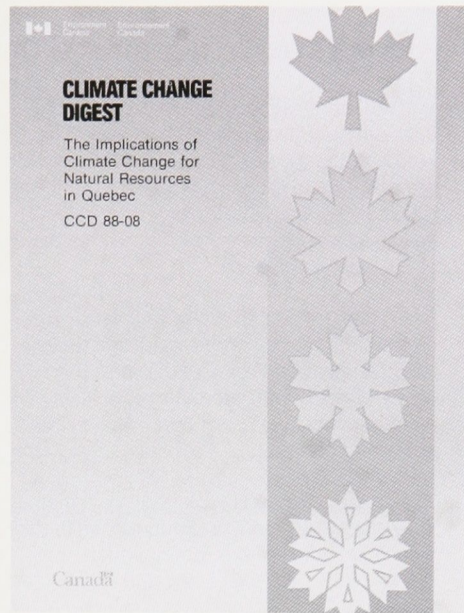
The study examines the potential impact of the greenhouse effect on agriculture, forestry and power generation in Quebec. It predicts a generally warmer climate with higher rainfall in the north of the province. As a result, the area of boreal forest may decrease by 20 per cent while the southerly hardwood forest could triple.

Heavier rains would increase surface run-off and hence hydro-electric generating capacity in the James Bay area. At the same time, warmer weather would dramatically reduce heating requirements in southern population centres. Agriculture could expand in certain northern regions, and cultivation of grapes and apples could increase. On the other hand, drier soil conditions in the south could limit crop growth and necessitate greater reliance on irrigation.

The study, entitled *The Implications of Climate Change for Natural Resources in Quebec*, is number 88-08 in the Climate Change Digest series.

The effects of global warming on agriculture are assessed in Climate Change Digest number 89-01. *Climate Warming and Canada's Comparative Position in Agriculture* summarizes the findings of a study prepared by the Land Evaluation Group of the University of Guelph.

The Group found that warming caused by the greenhouse effect could increase wheat and grain corn yields in Canada



while creating less favourable conditions for the production of barley, oats and soybeans here as well as in Europe and the USSR.

A milder climate could allow farmers to grow corn and wheat in more northerly areas and to plant higher-yield winter wheat. Poor northern soils, however, could limit agricultural production. So could secondary effects of warming such as more frequent drought, fire and insect pests.

Over the past three years, approximately 75 per cent of Canada's wheat harvest has been exported. The study suggests that the predicted climate warming could present an opportunity to expand wheat exports considerably.

Both these publications are available free of charge from the Climate Program Office, Canadian Climate Centre, Environment Canada, 4905 Dufferin Street, Downsview, Ontario M3H 5T4; telephone (416) 739-4431. ■

A Practical Guide to Environmental Action

Environment Canada's Atlantic Region Communications Unit has issued a handy guide entitled *What Atlantic Canadians Can Do For Their Environment*. In 54 pages, this booklet offers advice on what to do at home, in the yard, while shopping or driving, at work or play, at the cottage or school, as individuals or in groups. It also lists regional contacts and other publications as sources for further information.

Presented in point form, the text is simply written and easy to consult. Its basic message is that individuals can still act to protect our environment despite the many problems that threaten it nationally and globally.

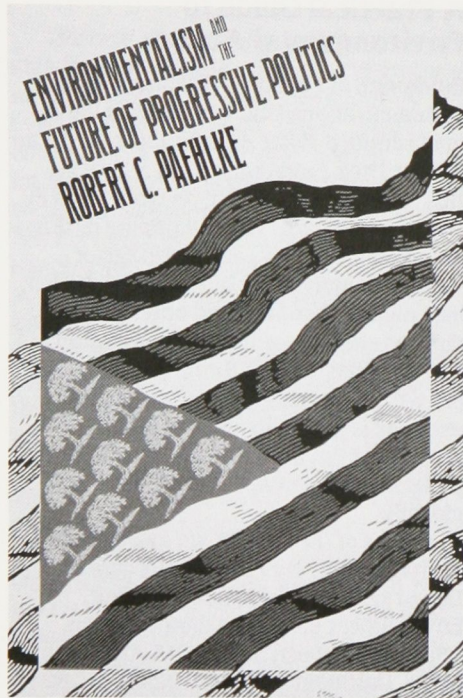
Copies of the booklet are available free of charge from the Publications Officer, Departmental Communications Unit, Environment Canada, Atlantic Region, 15th Floor, Queen Square, 45 Alderney Drive, Dartmouth, Nova Scotia B2Y 2N6; telephone (902) 426-7990. ■

Environmentalism from the Perspective of a Political Scientist

Could environmentalism be the basis for a new political ideology? Robert C. Paehlke argues that it can in his recently published book, *Environmentalism and the Future of Progressive Politics*.

Paehlke examines the evolution of environmental ideology and the scientific, social and political values that characterize it. He compares these values with those of classic political ideologies — liberalism, conservatism and socialism — and concludes that the environmental approach could be applied to a wide range of contemporary policy issues.





Far from being an impartial analyst, Paehlke is an enthusiastic proponent of environmentalism. He studies the movement within its own terms of reference, from the perspective of political science rather than economics or sociology. Nevertheless, his book is a thoughtful presentation of the history and theory of the environmental movement.

Robert C. Paehlke is a professor of political science and environmental and resource studies at Trent University, Peterborough, Ontario.

Environmentalism and the Future of Progressive Politics is published by Yale University Press. It may be ordered through booksellers in Canada or directly from the publisher at 92A Yale Station, New Haven, CT 06520, USA. The price is US \$25.00 plus \$2.00 for postage. ■

Answers to Environmental Quiz

1. **d)** All of the above. Different types of CFCs have different lifetimes, varying from 5 to more than 100 years. Even if the entire world were to stop producing and using them tomorrow, some of the CFCs already released will still be damaging the ozone layer in the middle of the next century.
2. **c)** Both of the above. Naturally occurring high-altitude ozone protects us from the sun's harmful ultraviolet rays, but ground-level ozone, formed from car exhaust, gasoline vapours, and a variety of other sources, is a serious pollutant.
3. **b)** Kluane National Park Reserve, Yukon. In the St. Elias Mountain Range found in the west of the park stands Mount Logan, a 5,951-metre peak that is the highest in Canada.
4. **c)** The most severely affected areas are in the eastern provinces, where acid deposition rates are high and the environment is vulnerable. Areas in the Prairie provinces, British Columbia and the north are also vulnerable; at present, however, they do not receive acid deposition at levels high enough to cause damage.
5. **d)** All of the above. PCBs were used for a wide variety of purposes until the early 1970s. In Canada, approximately 16,000 tonnes of materials containing PCBs are estimated to have been released into the environment. Because they are highly resistant to decomposition, PCBs have spread widely through the ecosystem.
6. **c)** Norse settlers. The site probably dates from the 11th century, the time of the legendary Leif Eriksson. Dorset Eskimos also lived there from the sixth to the ninth centuries. L'Anse aux Meadows was placed on UNESCO's World Heritage List because it is the only authenticated site of a Viking-period Norse settlement in North America.
7. **b)** Carbon dioxide emissions. Like the glass roof of a greenhouse that traps heat below it, CO₂ in the atmosphere freely admits the sun's rays but retards the return flow of energy to space. Increasing use of fossil fuels may double levels of atmospheric CO₂ within the next 75 years. The results would be a much stronger greenhouse effect and higher global temperatures.
8. **d)** All of the above. The most toxic form of dioxin has been shown to have a harmful effect on animals. In humans, it is known that high acute exposure after accidental release can cause chloracne and neuropathies; there may be other effects not yet determined. Federal and provincial governments are working to control these substances, which appear in very minute amounts throughout the environment.
9. **b)** Canadians generate the most waste – 1.8 kg per person daily. Of this we recycle the least of any country – only two per cent, far less than Japan, which recycles 50 to 60 per cent.
10. **d)** All of the above. Anthony Island, added to the World Heritage List in 1981, is the site of an important collection of totem and mortuary poles of the Haida people.

Our Common Future: It's in our hands



