Pollution and the Fisheries

Department of Fisheries and Forestry
Ottawa

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CANADA

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DEPARTMENT OF FISHERIES AND FORESTRY
MINISTÈRE DES PÊCHES ET DES FORÊTS
OTTAWA

POLLUTION AND THE ENVIRONMENT

Thank you for your interest in learning about the natural environment and the problems of pollution control. Information on these subjects and on the responsibilities and programs of the Department of Fisheries and Forestry (soon to be renamed the Department of the Environment) is attached.

Plans for the creation of a Department to be concerned with the environment and the management of renewable resources were announced in Parliament October 8, 1970. By Government Order dated November 26, responsibilities for certain federal services related to environmental quality were transferred to the Minister of Fisheries and Forestry. Legislation proposing the establishment of the Department of the Environment (Bill C-207, the Government Organization Act 1970) was introduced in Parliament December 9.

As it will be some time before integration of all Department services can be completed, information about the various units continues to be distributed by each of them directly. (See attached listing of Information Sources. N.B. If you requested specific information concerning responsibilities of these units, it will be forwarded to you under separate cover.)

Certain Federal Government programs concerned with environmental quality and pollution control will continue to be administered by other Departments. These, too, are shown in the attached Information Sources listing.

Provincial governments have direct responsibility for pollution control within their own boundaries, under powers assigned to them by Canada's constitution, the B.N.A.Act of 1867. Appropriate authorities responsible for pollution control in each province are listed also among Information Sources.

D. Eagles
Director
Information & Consumer Branch

January 1971

POLLUTION AND THE ENVIRONMENT

FEDERAL GOVERNMENT	INFORMATION SOURCES
DEPARTMENT OF FISHERIES AND FORESTRY	
* fisheries * pollution in fishing waters * mercury pollution * seafood quality * eutrophication * water environment * Fisheries Act	Fisheries Information Section Information & Consumer Branch Dept. of Fisheries & Forestry Sir Charles Tupper Building Riverside Drive Ottawa 8, Ontario (Area code 613: 997-4627, -4425)
* forestry * pesticide effects on forest environment * forest industry pollution	Forestry Information Section Information & Consumer Branch Dept. of Fisheries & Forestry West Memorial Building Wellington Street Ottawa 4, Ontario (Area code 613: 992-4595, -2060)
* air pollution * waste disposal * public health effects of pollution * proposed Clean Air Bill	Publications Unit Environmental Health Directorate Dept. of National Health & Welfare Tunney's Pasture Ottawa, Ontario (Area code 613: 992-2822)
* water pollution (general) * Canada Water Act * Great Lakes pollution * phosphates in detergents	Public Relations and Information Division Dept. of Energy, Mines and Resources 588 Booth Street Ottawa, Ontario (Area code 613: 994-5673, -9278)
* migratory birds * wildlife * pollution effects on migratory birds	Information Division Canadian Wildlife Service Dept. of Indian Affairs & Northern Development 400 Laurier Avenue West Ottawa, Ontario (Area code 613: 995-6131)
* atmospheric research * meteorology	Information Services Division Ministry of Transport Hunter Building O'Connor & Queen Streets Ottawa, Ontario (Area code:613: 996-5861)

FEDERAL GOVERNMENT	INFORMATION SOURCES
MINISTRY OF TRANSPORT	
* Canada Shipping Act: Pollution Amendments Bill * Motor Vehicle Safety Act: Exhaust emission regulations * Oil Pollution * Navigable Waters Protection Act	Information Services Division Ministry of Transport Hunter Building O'Connor & Queen Streets Ottawa, Ontario (Area code 613: 996-5861)
DEPARTMENT OF INDIAN AFFAIRS & NORTHERN DEVELOPMENT	
* Arctic Waters Pollution Prevention Act * Northern Inland Waters Act * Territorial Lands Act Amendments (re environment)	Public Information Division Dept. of Indian Affairs & Northern Development 400 Laurier Avenue West Ottawa, Ontario (Area code 613: 995-6206)
DEPARTMENT OF AGRICULTURE	
* Pesticide registration * Soil pollution	Information Division Department of Agriculture Sir John Carling Building Carling Avenue Ottawa, Ontario (Area code 613: 994-9551)
INTERNATIONAL JOINT COMMISSION	
* Canada-United States Boundary Waters pollution * Lake Erie-Lake Ontario-St. Lawrence Channel studies * Great Lakes pollution studies * Windsor-Detroit air pollution Reference studies	International Joint Commission 850 Burnside Building 151 Slater Street Ottawa, Ontario (Area code 613: 992-2417)
CENTRAL MORTGAGE & HOUSING CORPORATION	
* Loans to municipalities for sewage treatment facilities * Grants toward pollution control research	Information Division Central Mortgage & Housing Corporation Montreal Road Ottawa, Ontario (Area code 613: 746-4611)

PROVINCIAL GOVERNMENTS

British Columbia
Mr. W.N. Venables,
Director of Pollution Control,
Water Resources Service,
Department of Lands, Forests
and Water Resources,
Victoria, B.C.

Alberta
Mr. H.L. Hogge,
Director,
Division of Environmental
Health Services,
Department of Health,
Administration Building,
Edmonton 6, Alberta

Saskatchewan
Mr. Grant C. Mitchell,
Executive Director,
Saskatchewan Water Resources
Commission,
SPC Building,
Regina, Saskatchewan

Quebec
Mr. J.P. Bôucher, President,
Quebec Water Board,
Department of Municipal
Affairs,
1995 Boul. Charest Ouest,
Ste. Foy 10, Quebec

Nova Scotia
Mr. E.L. Rowe,
Chairman,
Nova Scotia Water Resources
Commission,
Government of Nova Scotia,
Halifax, N.S.

INFORMATION SOURCES

Manitoba
Dr. P. Warner,
Chairman,
Clean Environment Commission,
Department of Health and Social
Services,
Government of Manitoba,
Winnipeg, Manitoba

Newfoundland
Mr. C.W. Powell,
Chairman,
Water Resources and Pollution
Control Board,
Confederation Building,
St. John's, Newfoundland

Ontario
Mr. D.S. Caverly,
General Manager,
Ontario Water Resources Commission,
135 St. Clair Avenue West,
Toronto, Ontario

New Brunswick
Mr. J.G. Lockhart,
Director,
New Brunswick Water Authority,
P.O. Box 1240,
Fredericton, N.B.

Prince Edward Island
Mr. A.J. Hiscock,
Chairman,
P.E.I. Water Authority,
P.O. Box 2000,
Charlottetown, P.E.I.

Federal Environment Department To Co-ordinate Battle Against Air and Water Pollution

An inscription carved into the stone above the vaulted entrance to Canada's Parliament Building in Ottawa proclaims proudly:

> "The Wholesome Sea is at Her Gates; Her Gates Both East and West."

Wholesome though those seas may have been when the sculptor inscribed the words half a century ago, Prime Minister Pierre Trudeau has pointed out, the excesses of shipowners and operators and the complacency of public and government have degraded them into foul water, unfit in places for any but the lowest forms of life.

With this dramatic introduction, the Prime Minister unveiled in Parliament, October 9, 1970, the Canadian Government's plan for necessary action "to contain and remove the conditions of pollution on our western and eastern gates" and to wage the anti-pollution battle in non-coastal waters "with increasing vigour and efficiency."

Urgency of the need for assertive federal action was underlined October 8 in the Speech from the Throne setting out government policies for the current legislative session: This is "an age in which the life-support systems of the biosphere may collapse unless man reverses his present course and begins again to live in harmony, rather than in competition, with his environment. It is an age in which the forces of science and technology now in motion are so massive, so swift and so comprehensive that man may be facing his last opportunity to control his own destiny rather than be subject to it. . . . . Pollution is a many-headed hydra and requires action in many forms."

In response to what was considered a pressing need to coordinate and consolidate anti-pollution efforts of various federal departments and agencies, the government announced the establishment of a new department to be concerned with the environment and the husbanding of renewable resources, with a mandate for the protection of the biosphere.

Designated as the nucleus of the new department was the Department of Fisheries and Forestry. Its Minister, Hon. Jack Davis, was to be assigned "the responsibilities and related elements of the public service which would permit him to take a broad ecological perspective in the discharge of his responsibilities, and in particular to take the lead in the enhancement of the quality of our environment," Mr. Trudeau said.

By Government Order dated November 26, 1970, under the Public Service Rearrangement and Transfer of Duties Act, responsibilities for the following were transferred to the Minister of Fisheries and Forestry:

- the Marine Sciences Branch, the Inland Waters Branch and the Policy and Planning Branch of the Department of Energy, Mines and Resources;
- the 1970 Canada Water Act;
- the Air Pollution Division and the Public Health Engineering Division of the Environmental Health Directorate of the Department of National Health and Welfare;
- the Meteorological Branch of the Air Division of Ministry of Transport;
- the Canadian Wildlife Service of the Department of Indian Affairs and Northern Development;
- in addition, administration and personnel staff which service the elements transferred to the enlarged Department of Fisheries and Forestry. Details are under negotiation.

Legislation proposing establishment of the Department of the Environment is contained in Bill C-207, the Government Organization Act 1970, which received First Reading in the House of Commons December 9.

The Prime Minister stated during his address in Parliament in October that the establishment of the Department of the Environment would not result in the creation of a super agency to be responsible for all matters relating to the environment:

"The fight against the pollution of our environment is far beyond the capacity of one Minister and his department. Indeed, it cannot be waged effectively by the Federal Government alone, or the provinces individually, or even

just by Canada. It is a fight that must be waged by all Ministers, all governments and all people" the Prime Minister declared.

Thus, many federal departments will continue to have important responsibilities for the preservation of the quality of the environment, and will co-operate with the new Department of the Environment, which will have the principal tools to lead the fight against pollution and to help co-ordinate the efforts of others.

The Ministry of Transport, for example, will administer the Canada Shipping Act, to which extensive anti-pollution amendments have been proposed in legislation currently before Parliament, as well as the Navigable Waters Protection Act. The Department of Indian Affairs and Northern Development will be responsible for ensuring adherence by shipping and industrial interests to provisions of the Arctic Waters Pollution Prevention Act and the Northern Inland Waters Act, both passed by Parliament in June, 1970. Various other federal departments and agencies contribute either directly or otherwise to the cause of preserving and protecting the environment.

Provincial Governments have direct responsibility for pollution control within their own boundaries under powers assigned to them by the B.N.A. Act.

The choice of the Department of Fisheries and Forestry as the central element of Canada's new Environment Department reflects the historically prominent role of that agency in pollution control. The Canadian federal Fisheries Service was empowered under the Fisheries Act of 1868, one year after Confederation, to prohibit the input of "deleterious" substances into waters frequented by fish. This legislation served over the years as a foundation for punitive action against water polluters, and for some deterrent action as well.

Pulp mills on the Fraser River in British Columbia which were persuaded to install anti-pollution systems in consultation with Fisheries representatives, are regarded among the cleanest in the world.

Changes were introduced in the Fisheries Act in 1970 to emphasize the preventive role in pollution control while also imposing stiffer penalties for heedless industries and citizens.

Industries whose operations may affect aquatic life are now required to submit expansion plans to the department for examination and approval in reference to needed pollution prevention facilities. Cooperative action is sought at all times, but when friendly persuasion does not have the desired results, the Department may, subject to government sanction, halt construction and require the necessary alterations to be made. Fines of up to $5,000 a day may be levied on conviction for breaches of the Act.

While the development of programs and policies to be pursued by the new federal environment agency must await its formal establishment, indications of future policy lines have been spelled out in public statements by the Minister.

"Shaping our Canadian environment is the biggest challenge we face in the 70's," Mr. Davis declared in a House of Commons address. "It's a bigger challenge than unemployment. It's a bigger challenge than inflation. . . . To many Canadians it's a bigger challenge than all of our financial and social problems put together.

"There is real urgency here. We have to act on the environmental front quickly and with determination. We have to move ahead of events, rather than from crisis to crisis. Our critical path, in other words, must be laid out ahead of time. We must preserve our wildlife and our fish and our trees. We must renew our renewable resources as quickly and as effectively as we know how.

"Economic growth is essential. Social progress must also continue in the 70's. But their spin offs must not result in a deterioration of our surroundings."

Davis called for emphasis to be put on the wise management of living resources and the elements which support them. Industry and municipalities must keep their

poisons to themselves by recycling their wastes and renewing their inventories. Industry must be more respectful of its surroundings and bend increasingly to environmental considerations.

The Minister stressed his faith in man's ability to better his environment:

"I disagree with those who look on our earthly biosphere as a timeless realm in which animals and plants jostle each other in humble harmony. They say that man must fit in, accept nature's limits, reduce his consumption, limit his reproduction, join the Society for Zero Population Growth. On the contrary, I believe that man can better his lot, improve his standard of living and still make the most of his environment."

To carry out pollution control responsibilities, the Fisheries Service has a field surveillance staff of over 200 supported by several hundred assistant patrolmen, ships' crews and others who patrol fisheries waters in Atlantic, Pacific and Arctic coastal waters and tributary fresh waters.

Teams of technical experts regularly assess water quality and its effects on fish. They investigate operating and proposed industries and other possible pollution sources; advise on control requirements and negotiate corrective measures. They in turn are supported by staff chemists, biologists, oceanographers and other scientists as well as special consultants as required.

Ecological improvements take time to develop. This is why sudden changes in the environment are to be deplored, Davis warned.

He cited this as the reason why government must "turn thumbs down" on those who would tax the so called assimilative capacity of water and air. No lake however large and no sky however vast is capable of absorbing man's harmful effluents forever, he said.

In preparation for his task as Minister of the new federal environment department, Davis outlined initiatives which could be taken before that agency is formally constituted:

- transfer of relevant branches, divisions and sections of other departments to Fisheries and Forestry to permit operation as a federal unit (effected Nov. 26, 1970);

- naming of a dozen key advisers in renewable resource development and environmental control to help set guidelines and map future programs; this group to form the nucleus of an eventual National Environmental Council;

- personal visits by the Minister to ministers responsible for pollution control in the ten provinces to discuss cooperative action, to seek advice on a proposed new Clean Air Act, and to press for designation of water management areas as regional water pollution control units envisaged under the Canada Water Act;

- the first nationwide standards under pollution provisions of the Fisheries Act to be released shortly will be brought into operation industry by industry. First industries affected will be those using elemental mercury, and those producing phosphorus and pulp and paper;

- tighten control on tanker owners and oil companies through the Canada Shipping Act; have standby task forces ready for future crises;

- launch high priority government-research projects aimed at developing processes satisfactory for treatment of waste effluents;

- encourage and inform community groups concerned with cleaning up the environment.

Action has already been taken to implement many of these proposals, and planning is underway on new programs aimed at restoring Canada's proud heritage of clean air, land and water.

DEPARTMENT OF FISHERIES AND FORESTRY

CANADA

MINISTÈRE DES PÊCHES ET DES FORÊTS

CANADA

House of Commons Debates

Speech

of

Hon. Jack Davis

Minister of Fisheries and Forestry

on

Bill C-224

(Clean Air Act)

Delivered in the House of Commons

on February 19, 1971

CANADA

House of Commons Debates

GOVERNMENT ORDERS

CLEAN AIR ACT

MEASURE RELATING TO AMBIENT AIR QUALITY AND CONTROL OF POLLUTION

Hon. Jack Davis (Minister of Fisheries and Forestry) moved that Bill C-224, relating to ambient air quality and to the control of air pollution, be read the second time and referred to the Standing Committee of Fisheries and Forestry.

He said: Mr. Speaker, I take pleasure today in introducing the second reading of Bill C-224, an act relating to ambient air quality and to the control of air pollution in Canada. The short title of the bill is the Clean Air Act. It deals with the quality of our Canadian atmosphere. It deals with the setting up of a number of monitoring stations across the country, research into air pollution, arrangements for the setting up of air pollution abatement projects, and the enforcement of air quality emission standards from coast to coast and from the international boundary line to the high Arctic.

There are frequent references in this new clean air bill to national air quality objectives, national air quality guidelines, and national air quality emission standards. The word "national" turns up again and again. This is deliberate. We want our clean air regulations to be truly national in scope. We must insist on their enforcement in every province in Canada as well as in the Yukon and Northwest Territories. These regulations dealing with air quality objectives, air quality guidelines and air quality emission standards will, therefore, be truly national in scope. They will not be regional; they will not be provincial; they will not be local. They will be Canada-wide in their extent; they will be Canada-wide in their application.

I stress this point because a number of members opposite have expressed some skepticism. They have accused the government of taking a fragmentary approach to pollution abatement in Canada. I have denied this. I have denied it repeatedly in this House. I can now point to numerous clauses in our new clean air bill to prove my point.

As I said last week during the debate on the government organization bill, this government is opposed to the creation of pollution havens in this country. We want

industry—and particularly new industry—to meet truly national standards. We want these industries to design their plants and run their operations in such a way as to meet national norms. We want them to meet our national standards at all times. We want to prevent big industry from exploiting the economic weaknesses in some parts of the country. We want to stop pollution havens from being created in the less fortunate and less affluent parts of our nation.

I have already used several terms which require further definition. I mentioned national air quality objectives, national air quality emission guidelines and national air quality emission standards. I should like now to say what I mean when I use the words "objectives", "guidelines" and "standards", and to do so before I go on to discuss some of the major powers and institutions referred to in this bill.

Air quality objectives relate to the great outdoors. These objectives are standards writ large. They are—

Mr. Speaker: Order, please. I apologize to the minister but I understand that the hon. member for Comox-Alberni wishes to rise on a question of privilege.

Mr. Barnett: Yes, Mr. Speaker. Some of us are really quite interested in what the minister is saying. I am wondering whether he could be given the courtesy of a less noisy background in this chamber.

Mr. Davis: Mr. Speaker, I began by saying that air quality objectives relate to the great outdoors. These objectives are standards writ large. They are standards applied to large volumes of air over large areas of Canada. When we talk about objectives we are talking about ambient air. We are talking about large quantities of air. We are talking about the quality of air in general. We are talking about air in which there may be a number of pollutants. These may be widely dispersed. They will be dispersed as they are in the air we breathe, whether it be downtown in a major city like Toronto or out on a mountain peak in the Rockies.

Air quality objectives, then, relate to the big air and to the average air sample in a sizeable area, zone or region. Objectives, to repeat, relate to ambient air or air in general. They do not relate to particular points of emission—points of emission such as the top of a smokestack or the jet pipe of an aircraft taking off from Malton airport near Toronto.

Air quality emission standards do relate to points of emission. Standards, in other words, apply at the source of the pollution itself. They are measured at the outlet point. They are measured at the top of a smoke stack or at the tail end of a jet pipe of a DC-8. So standards are definite as to location. They nail down the quality of the effluent at its source. They are more precise. They are enforceable by regulation.

I have left the word "guidelines" to the end. Guidelines are standards of a sort. They also apply at the point of emission, at the top of a smoke stack or at the end of the jet pipe of a DC-8. But they are not enforceable. They are recommended standards. They are standards that we should like to see enforced. They are standards which may well be enforced in the future. They are a guide to future action. They are an indication that, sooner or later, we may be declaring these same guidelines to be standards and enforcing them at the source of the pollution itself.

• (12:00 noon)

I referred earlier to air monitoring. Bill C-224 enables the federal government, to quote the bill, "to establish, operate and maintain a system of air pollution monitoring stations throughout Canada". It will permit the federal government, in other words, to flesh out our present national air sampling network. Federal and provincial efforts in this direction will be further integrated and the data flowing from this improved network will give us a comprehensive picture of the incidence of air pollution, not only in urban centres, but also in the great Canadian outdoors. This data from the air monitoring network will be used not only for spot purposes in particular locations, but also to give us a better idea of long term trends. We will be able to forecast what is likely to happen over a period of time. We will be able to trace the effectiveness of special abatement programs aimed at improving the quality of the ambient air in our big and great outdoors.

Referring again to our proposed air quality objectives—the objectives which apply to the big air outdoors—I should like to say this: these objectives will apply to individual pollutants. Take sulphur dioxide, for example; we will have uniform ambient air quality objectives established for the entire country. These objectives will name the concentrations in terms of hard numbers, indicating what is desirable, what is acceptable and what is tolerable in this country. These objectives will be developed using all the scientific data we can gather from domestic sources and from other countries. We already have a considerable expertise of our own. By using all this data and all this expertise in respect of sulphur dioxide, for example, we will come up with a framework of air quality objectives regarding one pollutant after another.

The framework to which I refer is described in a position paper on air pollution which I will shortly be distributing to hon. members opposite, if I have not already done so. It will be made available in quantity to members of the Standing Committee of the House of Commons on Fisheries and Forestry which, I hope, will be reviewing Bill C-224 on a clause by clause basis. Our framework for national air quality objectives postulates three ranges; they are "desirable", "acceptable" and "tolerable". The desirable band of the range describes the lowest range of concentration of a pollutant which is desirable in this country. The next describes a middle range or less desirable range of concentration of a pollutant. This is the acceptable range. Finally, there is the tolerable range which reports the highest concentration tolerable in this country. To go beyond the tolerable range, by definition, gets us into the intolerable. Once a situation becomes intolerable, insofar as an individual

pollutant in this country is concerned, all our resources national, provincial and local, must be brought to bear on the cause of the problem. These resources must be brought to bear to correct a situation which exists.

These three broad bands of ranges, in rising degrees of concentration in a community, will be worked out for each pollutant, and specific mixtures of various pollutants. They will deal with average concentrations of these pollutants in the big air outside. They will deal also with long and short-term considerations. The lower limit of the desirable range will correspond to the normal background concentration, or detectability of a pollutant. The upper limit of the tolerable range is the maximum tolerable concentration of the selected pollutant, and whenever and wherever it is experienced this would place an unacceptable or intolerable burden on the people of Canada.

Our long term national goal is to have ambient air in all parts of Canada falling within the desirable or lowest range. This will take many years to accomplish. It, therefore, represents a long term goal for many parts of Canada. It forms a sound basis for an anti-degradation policy for the unpolluted parts of Canada. It clearly indicates the long term target for our more heavily built up and industrialized areas of the country.

The use of these three ranges, in rising degrees of concentration from desirable through acceptable, and through acceptable to tolerable, fits in with our need to establish priorities in tackling the problem of air pollution. The areas which show the highest concentrations are the first to attract our attention and concern. The areas in which deterioration is continuing to take place must also be given high priority. Of course, we will be publishing much of this information on a day-to-day or a month-to-month basis so the Canadian public will also have an idea of what is going on in this regard.

Our surveillance programs will also be linked to these ranges. The extent and sophistication of our surveillance will increase as the pollution levels increase from the desirable through the acceptable and to the highest or tolerable range. In this range, the surveillance will be designed not only to identify time trends, but also to locate the major sources of pollution as well.

Control standards and methods of enforcement pose other problems. Strategies will have to be developed for each stage of production; that is to say, for the raw material stage, the actual processing stage and the waste dispersal stage for each industry. Control at the raw material or processing stages in industry is usually most effective. These controls are usually more effective because they are more easily and readily administered, and also go to the source of the pollutant. It is further envisaged that, in addition to setting formal control standards, that is to say standards at the chimney top or at the outlet of a jet pipe, all three levels of government will attempt to convince industry to follow the practice of using the best available technology approach. This will apply with particular force to new installations, new plants and new additions of machinery and equipment used by industry and by government in this country.

[Mr. Davis.]

I have been talking so far as though the main polluters were industrial plants and government institutions. The Canadian public is also a major offender. Take our use of the automobile, for example. We will have to bear down on regulations in respect of engines that are installed and the fuel they use. We will have to get the lead out, so to speak. We will have to move in on the various kinds of fuel which we as individual Canadians burn. We can do this by controlling the quality of the fuel at its source. We will have to get the lead out of our gasolines, and we can do this by using the new sections of the new clean air act which focus on fuel of all kinds.

It is possible for us to decree at the federal level what kinds of fuel are manufactured in Canada as well as the design of fuel burners. We can control fuel and fuel-using engines at the manufacturing or factory level. We can also stipulate that imports of fuels and imports of machines meet our new Canadian standards. Again, we can deal with this big air pollution problem at a relatively few points of manufacture and points of entry.

The bill we have before us today will provide us with yet another weapon to add to our arsenal of Canadian laws dealing with pollution of all kinds, air, water and soil. We already have the Canada Water Act, which was passed during the last session of Parliament. We have amended the federal Fisheries Act and we have put more teeth into the Canada Shipping Act. Our main thrust so far, however, has been directed towards the quality of water in this country. Now, we are turning to air in the belief that air pollution also poses a serious threat to our environment. While it is not as obvious as water pollution, it may be more insidious in many ways. It may well be a greater threat to human health than water pollution. It may also be more pervasive and more embracing than many of us think.

• (12:10 p.m.)

Let me give you an example. Let me focus on oil pollution for example. I am told that the amount of oil dumped or lost in the seas and oceasn in the world amounts to around two million tons a year. Fifty million tons a year evaporate and are otherwise discharged into the atmosphere. In other words, we are pumping 25 times as much oil into the world's air mantle as we are into salt water. Much of the oil which goes up also comes down. Much of it comes down into the oceans themselves. Our experts tell me that at least ten million tons comes down in the seas around us. In other words, air transported oil is five times as effective in polluting our oceans as are the oil tanker spills and other kinds of spillage. This is a very round figure. It may be out by an order of magnitude. But it proves that air pollution is a serious matter. It also indicates that air pollution is a major source of our environmental difficulties, not only locally in our cities, but also at the far ends of the earth.

What I have said about oil applies equally to heavy metals. It applies, also, to the chlorinated bi-phenyls such as DDT and PCB's. No wonder our scientists are finding DDT in the flesh of penguins caught in the Antarctic. No

wonder fish are showing high concentrations of lead in the waters off southern California.

As hon members know, we have proceeded first in our attack on pollution in water. Canadians generally have recognized that the pollution of our rivers, lakes and ocean fronts needed action. The froth, the scum, the closed beaches, the dead fish, were there for all to see. But now they are becoming increasingly concerned with air pollution. They are beginning to notice the smog. They are beginning to look on smoke, not as an indication of industry in progress, but of inefficiency, slothfulness and a wilful disregard for the quality of life around us.

Most provinces, today, have water authorities. They have provincial departments concerned with water management. They have water pollution control boards and they have water commissions. Now, they are beginning to ask their pollution control boards to look at air as well. They are also beginning to develop their own clean air acts. It is appropriate, therefore, that we take the lead at the federal level; that we provide a basic framework within which the provinces, and the municipalities, can develop their own laws and their own local standards.

Knowing of their interest in, and their concern about, air pollution. I have visited all our provincial capitals in recent days. Without exception our provincial authorities, who are concerned with air pollution, have welcomed our federal initiative in respect of clean air. They have welcomed the idea of national ambient air quality objectives. They like the idea of national guidelines. They are prepared to accept national air quality commission standards set at the point of emission. All they ask is that they be consulted, that they have some say in the development of these particular objectives, guidelines and standards. I have given them that assurance. And, having been given that assurance, they have encouraged us to do all we can, not only to eliminate the worst examples of air pollution in this country, but also to project our own Canadian thinking on air quality to other countries and into the international sphere as well.

As I said earlier, Mr. Speaker, we are placing considerable reliance on our federal concern about human health in the clean air bill. Air pollution can strike directly at the health of human beings. Man has no choice but to accept the air he breathes. He has to breathe it whether it is polluted or not. By contrast, man can avoid polluted water. He can drink other things. He can process polluted water and make clean water fairly easily. But, in respect of air pollution, man is in the same vulnerable position as a fish in a polluted lake. He has to live with the pollution. He has to live with it and adjust to it as best he can.

Again, air moves. It moves from place to place, from region to region and from nation to nation. It sweeps across continents and oceans as well. It carries many foreign substances along with it and some anti-life substances. It carries them over great distances. If, by any chance, some of these pollutants get into the upper atmosphere they may stay there for years. Eventually, they can fall out again. But when they fall out again they may well land on another continent or end up in the oceans themselves. They may go indeed to the ends of the earth.

Air pollution presents us with yet another problem. It is sometimes difficult to pinpoint the sources of pollution itself. Changes in weather and in the direction of air currents make it difficult to put the finger on specific points of emission. They can only be identified over time. They can only be identified as a result of a great deal of research and as a result of a great deal of effort particularly at the national and even at the international level, and this costs money.

We know that the economic burden of air pollution is very high indeed. Our economists tell us it costs Canadians somewhere between $1 billion and $2 billion annually. If you add up health costs, building maintenance costs, corrosion costs and cleaning costs, you end up with a very impressive figure indeed. It amounts to several per cent of our gross national product. It is worth eliminating, not only in terms of human health and comfort, but also in terms of economic efficiency as well.

In developing the bill before you now, the government has been guided by certain principles. We recognize that the provinces have a direct responsibility in respect of air pollution. Considerable emphasis must therefore be placed on co-operation between the federal government and the provinces. This can be best accomplished by the federal government entering into formal agreements with the provinces for the purpose of designating air quality problem areas, for the development of special air control measures, and for the development of air quality enforcement procedures. There is also recognition of the need for direct federal action in the event of the failure of other levels of government to take the necessary corrective measures to control air pollution where such pollution affects or is likely to affect health and indeed life. We also see the need for national air quality objectives to serve both as long term goals and to prevent further deterioration of existing air quality.

In drafting the legislation we have come to grips with the basic problems involved in trying to protect the quality of air. I will now try to briefly describe some of these problems. We need to know more about the causes and effects of air pollution and the bill will allow us to work closely with the groups within Canada and in other countries that are involved in this vital area. I should note the valuable work done by the Department of National Health and Welfare—which laid much of the groundwork for Bill C-224—by the Department of Agriculture, the Department of Fisheries and Forestry and others, was basic to the development of this legislation.

From these departments, and as a result of close co-operation with other segments of our scientific community in Canada, we have begun to close the gaps in our scientific knowledge about the effects of pollution on

various receptors—man, vegetation, wildlife and so on. As our technology advances and as society continues to inject enormous quantities of waste into the air, soil and water environment we must be ever more alert to potential hazards. We must therefore, ensure that we are before the fact in respect of our research. We must anticipate. We must make sure we are heading off emergency situations and not dealing with them after they occur.

• (12:20 p.m.)

Finally, Mr. Speaker, we believe that the public's concern, combined with industry's new awareness of its responsibilities, will lead to enthusiastic compliance with the major provisions in this bill. But we must have methods to ensure its compliance. Thus, there are inspection provisions and substantial fines incorporated in the text of Bill C-224 as well. If the bill stopped there, I think we could say that it was a good piece of legislation, but one essential element would be missing. I do not believe that this or any other government has the right to impose pollution controls on industry and the ordinary citizen unless it is prepared to live by the same rules. Bill C-224 makes clear this government's intention to put its own house in order, to make sure that federal establishments meet our national standards and exceed them by a considerable margin wherever possible.

This brief outline of the provisions of the bill will be expanded when the bill comes before the standing committee. I hope that at that time a number of our officials will be available, especially those who have not only helped to develop the text of this act but who have also had considerable experience working with our provinces, municipalities and industries over the years.

In my opening remarks on the new government organization bill recently, I stressed the interdependence of life forms on this planet. I said that there was little sense in shutting off air pollution emissions from a factory stack, only to find that they were being dumped into the river or ploughed into the soil. Within our new department, whatever its name may be, we will be taking an over-all approach to pollution. We will have the technical expertise to deal with it in all its forms.

In summary, I believe that our main problem is to deal with man and his habits, essentially with man's greed for material gain. This is really at the root of our environmental problem. Psychologists tell us that man has a hierarchy of needs ranging upward from those associated with basic survival, through security needs and social needs, eventually to recreational needs. It is ironic that our interest in air pollution control begins at the top of the scale, essentially with a concern by the general public for aesthetics, people who can no longer enjoy the view of Mount Royal from Sherbrooke Street or Grouse Mountain from Hastings Street in Vancouver. But now our concern is related to our most basic needs.

This bill focusses more directly on human health and indeed survival. The bill will provide us with the framework and the mechanism to carry out this fight for our survival. It warrants the support of all Canadians, and it certainly warrants the support of members from all corners of the House. I hope we can clear second reading of the bill this afternoon and get on to the detailed committee stage of the bill in the Standing Committee on Fisheries and Forestry next week.

CANADA

House of Commons Debates

Speech

of

Hon. Jack Davis

Minister of Fisheries and Forestry

on

Bill C-207

(Government Reorganization Act, 1970)

Delivered in the House of Commons

on January 27, 1971

CANADA

House of Commons Debates

GOVERNMENT ORGANIZATION ACT, 1970

PROVISIONS RESPECTING DEPARTMENTAL REORGANIZATION, MINISTRIES OF STATE, PARLIAMENTARY SECRETARIES, ETC.

Hon. Jack Davis (Minister of Fisheries and Forestry): Mr. Speaker, the bill before us today, Bill C-207, sets up a new department. It sets up a new Department of the Environment. This new department replaces the present Department of Fisheries and Forestry. It also brings a number of related services, branches, and divisions together to deal with pollution. These include wildlife from Indian Affairs and Northern Development, water from Energy, Mines and Resources, meteorology from Transport and the environmental health unit from National Health and Welfare.

Our new Federal Department of the Environment will be concerned with Canada's renewable resources. It will be concerned with wild, living things, resources like trees, fish and wildlife. It will also concern itself with their life support systems, other resources like air, water and soil. Taken together these living and life related resources make up a natural whole. They are interrelated. They are mutually self-sustaining. They must be managed and they must be guarded in a comprehensive way. They must be operated on a sustained yield basis, now and in the future.

Our new Department of the Environment has two common elements. One is living and the other is essential to life. One will deal with living organisms. The other will deal with their environments. Together, they constitute our earthly biosphere, and our earthly biosphere is very fragile indeed. Looked at from outer space our biosphere is thin to the point of vanishing. It is a thin envelope encircling this tiny planet of ours. Reaching a few thousand feet up our mountain sides into the air and dipping a few hundred feet down into the water, it sustains all the life we know. Yet it, too, has its deserts and its dead spots. So, the preservation of our biosphere, of which Canada makes up a very important part, must be of great concern to us all.

Our new Department of the Environment is a resource management department. But it differs, in one very important respect, from our other resource departments. It deals with the animate. It deals with the living. It deals with the renewable. It is primarily biological in its orientation. It puts the accent on quality rather than quantity. It must often be soft nosed, not hard nosed. It must put ecology ahead of economics whenever a choice has to be made between the two. However, ecology and economics are not always opposed. We can have economic growth and a healthy environment, too. But to have maximum economic growth and a sound environment will take a lot of doing. It will take a lot of monitoring, a lot of careful planning;

the best possible management plus considerable give and take on both sides.

Economic growth in the old-fashioned, quantitative sense is an illusion. It is shortsighted. It is narrowly conceived. It recognizes certain private costs but ignores others. It passes hidden charges onto others. And these hidden charges can later turn up in the form of barren soil, smoke laden skies and waters which are repulsive to us all. A fuller accounting of costs, and especially of costs and benefits over the long run, inevitably turns up a different balance sheet. Blighted landscapes and unhappy hours are negative factors which must be taken into account. More public costs must become private costs. The cost of pollution abatement must be met, increasingly, by the private sector. After all, private enterprise has proved that it can deal efficiently with many things. Why not see to it that our industrialists, and our scientists, deal with many of our environmental problems as well?

Let me refer to what I regard as a classic case. Let me refer to the drilling for oil in our beautiful Strait of Georgia in B.C. If the oil companies were allowed to go ahead I doubt if the price of petroleum products would come down in Vancouver. Of course, the local fishery would be threatened, pleasure boating would be less pleasant and waterfront properties would not be as valuable as they used to be. These minuses, I am convinced, would outstrip the value of the new jobs on west coast drilling rigs by a factor of more than ten to one. Natural apprehension, the public's concern about the destruction of the local environment, and the threat to our tourist industry would be too great. Economists refer to many of these considerations as "intangibles". But they have their own inherent value in our human scheme of things. No politician worth his salt can ignore them. No local ecologist or no global environmentalist would, either.

Recently, the Science Council of Canada referred to the Strait of Georgia. It suggested that an Ottawa based economist take a dispassionate look at the pros and cons of drilling for oil there. Reading between the lines, one gets the impression that the Science Council thinks that such an investigation might even come down on the side of the oil companies. I doubt very much whether it would, Mr. Speaker. I doubt it very much.

Anyone with any idea of the quality of life could not help being skeptical about the idea of oil derricks in the Strait of Georgia. Anyone with a feel for "intangibles" would guess that a careful cost-benefit analysis would turn thumbs down on the establishment of an oil industry in the midst of this recreational mecca. There isn't another area in Canada quite like it. I doubt if there is really another area anywhere in the world which has a greater potential for human enjoyment and the wise use of leisure time. This is why I am convinced that it will make a mangificent national marine park, perhaps the first in Canada; undoubtedly, the biggest and the best in the word! Ecologically speaking, drilling for oil in Georgia Strait is sacrilege. Environmentally speaking, it does not make sense. Scientifically speaking, it shows a callous disregard for human values. I am surprised that the Science Council would stub its toe on that one!

I must not imply, Mr. Speaker, that offshore drilling is all bad. Canada has a long shoreline. It has the longest shoreline in the world. We also have a vast Continental Shelf. It reaches 400 miles out into the sea off Newfoundland. It underlies all of Hudson's Bay and most of our straits and seas in the High Arctic. So we have a choice. We have a choice of location from an environmental point of view. So, let us choose our offshore drilling sites with care. Let us make sure that we do not set up oil drilling platforms where they are bound to be offensive, where they hurt real estate values and where they will be detrimental from a recreational point of view.

Of course, our new Department of Environment will have to keep a close eye on the oil industry. It will have to keep a close eye on Canada's natural gas industry. It will have to watch coal mining, uranium mining and copper mining. It will have to make sure that natural leaching processes do not distribute too many copper ions around for they, like many exceptional concentrations of trace metals, are poisonous to fish and other forms of wildlife. It is true that man needs more energy and cleaner energy. He needs better construction materials and he needs chemical products which fertilize the land. But he can pay too high a price. He can churn out too many substances which are anti-life. He can produce too much that is harmful, that is toxic, that is suffocating, that blunts our senses, that shortens our lives.

I have singled out the oil industry as a starter. But I could have mentioned the pulp and paper industry instead. Using Canada's magnificent forest cover, it generates more employment than all of Canada's mining industries combined. But our pulp and paper industry is a polluter, too. It passes some of its costs on to others. Half or close to half of all the wastes being dumped into Canadian waters by industry originate in our pulp and paper mills—50 per cent or close to 50 per cent in bulk, in tonnage terms. This is why the pulp and paper industry has been singled out for special treatment under the Fisheries Act. This is why it is facing new regulations, new regulations under the Fisheries Act which are nationwide in their effect.

• (4:20 p.m.)

This is why we are joining with the provinces in our efforts to clean up our pulp and paper mills before it is too late. Our approach to industry may interest you, Mr. Speaker. First, we comb the literature; then we talk to the consulting engineering companies, and ours are the best in this business. Then, we sit down with the industry itself. We learn all we can about the best plants, how they have been built and how they operate. The best is the test. From the best, we develop a set of standards which we know can be met and practiced. These new standards are embedded in our regulations. Coupled with the deadlines, we put the laggards in industry on notice. We put the polluters in industry on notice from one end of the country to the other.

This massive clean up, of course, will cost money, a good deal of money. It will cost the pulp and paper industry, and consumers, several million dollars for every $100 million dollars of new pulp and paper mill construction. It will cost roughly half as much as the industry's annual wage increase settlement with labour. It will be barely offset by one year's increase in productivity. I do not want to make light of these increased costs. Our forest based industries have been going through a difficult time. Prices are only a little higher than they were in the mid 1950s. Wage rates have been going up by leaps and bounds. The Canadian dollar has been revalued and Canada's pulp and paper industry still faces a battery of income and income related taxes which, in total, are among the highest in the world.

Still, pollution abatement must be given top priority. New mills must not be built unless they contain the necessary in-plant facilities, catchment basins and biological treatment ponds. They must pass muster with government inspectors and engineers. Sound operating procedures must be followed to the letter. Nothing which is toxic to fish must get out of the systems of these plants. Nothing must be allowed to escape from these plants which is deleterious to aquatic life of any kind.

Old mills, understandably, are in a different category. Each one tends to be a special case, each one calls for special treatment. Some are already obsolete, others do not have enough space in which to install the necessary facilities. So conversion presents a problem. This is why our new department of the environment has to look at each plant in turn, and this is why we cannot expect many of these older mills to be cleaned up overnight.

The technique is to schedule a series of changes, each with its own particular deadline. The sequence of adjustments leads up to a final deadline. Failure to comply with the schedule can result in a series of fines. The longer the lag, the bigger the bill. Running at $5,000 a day, it can add up to a lot of money, to more than $1 million a year if the company is unlucky enough to be found breaking the law for that length of time.

Some hon. members have asked when our new regulations dealing with the pulp and paper industry will be published in full. My answer is, in a few weeks time. We still have to hear from some of the provincial pollution control boards. We still have to have a final meeting with the pulp and paper industry itself. But no one with any competence will be able to say they were not consulted first and consulted thoroughly.

We have leaned over backwards to make sure we were reasonable. In so doing, we have created a precedent. For the first time in Canada, and perhaps in the world, the best brains in industry, in government and in our universities have sat down together to tackle pollution in an entire sector of our national economy. They are pooling their knowledge and revealing their plans with a view to giving Canada the best treatment facilities and the best treatment procedures so far known to mankind. One of our problem areas is the Ottawa River from the national capital downstream to Montreal. Half a dozen pulp mills have been using it for decades as a big industrial sewer. Once our federal Fisheries Act regulations are in place, these mills will have to sit up and take notice.

Some hon. Members: Hear, hear.

Mr. Davis: They will have to do this because we will have a single standard to which they must conform on both sides of the Ottawa River, and from its headwaters to the sea.

Ontario administers the federal Fisheries Act in Ontario. Quebec administers the federal Fisheries Act in Quebec. Relying on the same Act and enforcing the same regulations, we should be well on our way toward solving a problem which has been baffling both levels of government for years.

Using our federal Fisheries Act, we will be able to stop the polluters. We will be able to stop these local pulp and paper mills from treating the lower Ottawa River like an industrial sewer. Facing a common set of regulations and enforcement procedures, they will have no choice. With Quebec, Ontario and Canada breathing down their necks, they will have to make the Ottawa River a fit place for fish to live.

Before I leave water and begin to talk about air I should, perhaps, say a word about mercury. Canada is far ahead of the United States in this connection, and well ahead of most countries in western Europe. Unlike Japan, and to a lesser extent Sweden, we have caught our mercury pollution problem in the nick of time. We are well on our way to solving it, without having to face a human health problem in this country.

The main offender has been the chlor-alkali industry. It used to dump thousands of pounds of mercury each year into our rivers and streams. As soon as we began to detect high levels of mercury in wild birds and fish, we called in the companies. They were told to stop polluting and to recycle their effluent. They were instructed to keep their mercury bearing wastes inside their factory fence. The companies moved quickly to put things right. They built settling ponds and began pumping surplus fluids back into their plants. This recycling process has been highly successful. It has already cut the amount of mercury getting into our rivers by more than 90 per cent.

The record, on a plant by plant basis, makes interesting reading. It is documented in a table which I have here, Mr. Speaker. I wonder if I could have the permission of hon. members to have it included in today's *Hansard*.

Mr. Deputy Speaker: Is this agreed?

Some hon. Members: Agreed.

[*Editor's Note: The table referred to follows*]

STATUS OF MERCURY LOSSES IN LIQUID EFFLUENTS FROM CANADIAN CHLOR-ALKALI PLANTS

PLANT	Production Chlorine Tons/Day	Effluent Mercury Losses			Anticipated Losses on Completion of Current Abatement Program	
		1969 lbs/ton chlorine produced (a)	Dec. 1970 lbs/ton chlorine produced (b)	Reduction Percent 1969–1970	lbs/ton chlorine produced (c)	Completion Date
FMC Chemicals Ltd., Squamish, B.C.	170	0.15	0.0118	92.1	0.0029	Feb. 1, 1971
Interprovincial Co-operatives Ltd., Saskatoon, Sask.	85	0.30 (c)	0.001–0.002	99.3		
Dryden Chemicals Ltd., Dryden, Ont.	33	0.21 (c)	0.007	96.7	0.005	June 1, 1971
Dow Chemical of Canada Ltd., Thunder Bay, Ont.	80	0.15	0.0009	99.4		
American Can of Canada Ltd., Marathon, Ont.	37.5	0.27 (c)	0.012	95.6	0.01	April 1, 1971
Dow Chemical of Canada Ltd., Sarnia, Ont. No. 1	160	0.15	0.0017	98.9	0.0009	Dec. 31, 1971
No. 3	250					
CIL, Hamilton, Ont.	88	0.10 (c)	0.0008	99.2		
CIL, Cornwall, Ont.	120	0.10 (c)	0.007	93.1	0.0008	June 30, 1971
Standard Chemical Ltd. (d) Beauharnois, P.Q.	110	0.15	0.016	89.3		
CIL, Shawinigan, P.Q.	100	0.10 (c)	0.006	94.0	0.001	June 30, 1971
Aluminum Company of Canada Ltd., Arvida, P.Q.	110	0.20 (c)	0.026	87.0	0.01	April 1, 1971
Domtar Ltd., Lebel-sur-Quevillon, P.Q.	72	0.15	0.0416	72.3	0.0097	April 1, 1971
CIL, Dalhousie, N.B.	85	0.10 (c)	0.0024	97.6	0.0003	June 30, 1971
Canso Chemicals Ltd. (e) New Glasgow, N.S.	55	—	0.00035	—		

NOTES:

(a) Based on Departmental estimates of mercury losses in liquid effluent of 0.15 lbs per ton chlorine produced.

(b) Based on measured effluent concentrations.

(c) Based on estimates by the Company.

(d) Standard Chemical Ltd. will have a new plant on line early in 1971 which will replace the existing one. Their mercury losses are estimated to be 0.01 lbs per ton chlorine produced.

(e) Plant commenced production in 1970.

Mr. Davis: In looking over this table, you will note that some plants have done better than others. Some have already reported a loss figure of less than 0.005 pounds of mercury per ton of chlorine produced. This is excellent. It is well below the target figure which Swedish experts recently considered to be the limit of modern technology, namely 0.01 pounds per ton of chlorine produced.

Our ultimate aim, nevertheless, is perfection. We want to make our Canadian chlor-alkali industry as antiseptic as possible. We want to bring the mercury content of its effluent down to the point where there is no net addition to the background levels already present in nature. In other words, our target is for the industry to tend to take mercury out of its natural water supply rather than add new mercury. This is actually happening in one or two Canadian localities now. It must become the objective of all chlor-alkali plants in Canada and our fisheries regulations will be drafted so as to make this performance compulsory from coast to coast.

To be even more specific, the target set in our regulations is 0.01 pounds of mercury per ton of chlorine by April 1, 1971. The target for September 1, 1971 for all plants is 0.005. The target for the end of 1971 is the local background level or better. A year from now all our chlor-alkali plants should, in effect, be improving on nature. They will be taking mercury out of their natural surroundings rather than adding mercury to them.

Now, let me turn to the question of clean air. We have a lot of new teeth insofar as water is concerned. We have an amended Fisheries Act, an amended Canada Shipping Act, and a brand new Canada Water Act. These were all put in place in 1970. Now, we need a new clean air act. We need it in 1971. We need to supplement the powers which the federal government already has in respect of water and soil. We need it because the potential polluter has a choice. He can choose to burn his waste products and send them up the chimney rather than dump them in a neighbouring stream or bury them in the ground.

As in the case with water, we are working closely with the provinces. We are asking them for their advice. We are asking them how our new federal clean air legislation can complement their own provincial laws. We are asking them also how they would like us to deal with motor vehicles and other products which are sold throughout Canada and which can be a serious source of atmospheric pollution unless they are designed and equipped in the proper way at the factory itself.

I have already been talking to my opposite numbers in the provinces about transborder situations and international situations. I have been trying to head off jurisdictional wrangles. I have stressed our willingness to complement provincial law and to avoid unnecessary duplication. I have stressed the need for national ambient air quality objectives, and on all these scores, Mr. Speaker, I have met a favourable response in one provincial capital after another.

• (4:30 p.m.)

That there is a federal role in respect of air, I have no doubt. Its movements are broadly continental in their

sweep. They are generally from west to east. Coming in from the Pacific and sweeping down across the prairies, they lose moisture and pick up moisture. Crossing along over Ontario and Quebec, they may also pick up fumes from thousands of factories and millions of automobiles. These outpourings, along with those emanating from great American centres like Chicago and Detroit, are bound to affect the quality of our atmopshere. They are bound to affect the quality of the air we breathe in the area of the St. Lawrence and in the Atlantic region as well.

Air, even more than water, is indifferent to man made boundaries. It sweeps from province to province and from nation to nation. It can weave its way across the internatimnal boundary line and back again. It can be upgraded by plankton in the ocean and young trees on land. It can be quickly downgraded again by industrial man at work and at play. Renewed by plant and animal life our worldly air mantle has great recuperative powers. But these powers, like those of our rivers and streams, are finite. They are by no means unlimited. They can be over-taxed, much as Lake Erie has been over-taxed by the outpourings of the main industrial heartland of North America. They can be over-taxed by industry and municipalities alike, and they can only be brought back again at great cost to others, some of whom may live hundreds and even thousands of miles away.

I would like to make an important point here. I am opposed to a patchwork approach to pollution. I am opposed to different standards in different places. I am opposed to pollution havens. I am opposed to big industry picking on our weaker provinces and our weaker municipalities. I am opposed to sloppy housekeeping anywhere, because it is bound to hurt the local citizenry in the end. I am prepared to argue against those who say that each industry and each municipality should be able to rely on the so-called "assimilative capacity" of its local waters and its air. If they are allowed to do this the effects are bound to be cumulative. What do they say to the next industry that comes along? And to the next and the next? What do they say to a doubling and a trebling of the output of the initial industry? When does the regulatory authority cry halt? And when does it begin to discriminate against late comers saying that the rules of the game have to be changed after all?

Why not insist on the best clean up procedures at the outset? And why assume that we must really spoil our environment before we begin to clean it up again? Why act as if we know all about the assimilative capacity of our surroundings in the first place? The scientists, and you and I, Mr. Speaker, do not know very much about assimilative capacity at all. Those who take the patchwork approach to pollution do not know much about ecology. They do not know much about living things. Perhaps they have never heard about the synergistic effects of one pollutant piled on top of another. Individually, they might not have much of an effect, but in combination several pollutants can kill several times over, and who knows what combinations and permutations will result from several industries and several municipalities dumping their wastes into the same local environment?

So, why run the risk of losing everything when uniform national standards can provide us with all the protection we need? Why run this risk when recycling within the factory fence is possible in most cases? And why settle for anything less than the best when new industry can be made to take every precaution as long as everyone is being treated the same everywhere in the country?

Earlier in my speech, Mr. Speaker, I took a swipe at the Science Council of Canada. I took a swipe at the technocratic gobbledygook which it published recently about oil drilling in the Strait of Georgia. But I should add, Mr. Speaker, that the recommendations of the Science Council of Canada are not all bad. Some of them are excellent, and many of them we have already acted upon. Others we intend to adopt in the very near future. The Science Council says that we should have a federal-provincial review board. We already have a forum for consultation on these issues. We have the Canadian Council of Resource Ministers, and I might loosely refer to it as the Council of Renewable Resource Ministers. The Canadian Council of Resource Ministers met recently in Winnipeg. It discussed forestry for three full days. In previous years it had discussed fisheries, recreation, and the development of river basins. It has concentrated on pollution at times, and on land use at others. Frankly, I think it is more than a review board. It has the ability to look ahead as well.

The Science Council says we should set up special advisory committees and consult frequently with the top brains in industry and in our universities. It says this with particular reference to forestry. But we, in this department, have already asked Mr. T. N. Beaupré of Domtar to chair our new Forestry Advisory Council. Its first task is to review our forestry research priorities. Later it will concentrate building a two-way bridge of ideas between our Canadian Forestry Service and the companies themselves.

The Science Council believes that we should contract out more of our research work. Less development should be done "in house" and more should be done in company plants and graduate schools. I agree with this. We in Ottawa have tended to be too inbred. Too much of our work has been done behind closed doors, and too many studies have been filed away without being read by people who could make some practical use of them. The Science Council says that we should concentrate on certain areas of research and avoid spreading ourselves too thin. I agree with this also. I agree that more of our work should be mission oriented. I agree that it should be tailored to suit Canada's particular needs. I agree that our environmental endeavours should fit our own Canadian situation. Let me give you a particular example of what the Science Council means and of what I mean.

The Science Council says that we should build a big new environmental centre on the west coast, dealing with the marine-atmospheric interface and employing biologists as well as oceanographers and climatologists. It would be located facing the Pacific. Already we are developing a tidy nucleus in West Vancouver but more, much more remains to be done on the air side, and it is

B.C.'s turn in so far as the building of a big new environmental institute is concerned.

The Science Council makes a good case for ice studies and ice removal in the lower St. Lawrence. I have no doubt that environmental studies aimed at clearing this great waterway in the winter months will pay off handsomely. Here is another task which our environmentalists should tackle with determination.

I could go on, Mr. Speaker, and tell the House about our testing of pesticides in Halifax, about our eutrophication studies on the Great Lakes, about fish farming on the prairies, and about our efforts to rescue the wildlife habitat on the Athabasca-Delta. But suffice it to say that our scientists and our engineers are hard at work. They are working flat out on pollution problems and renewable resource management problems form coast to coast, and from the Great Lakes to the Arctic Archipelago.

Our new environmental department is a decentralized department. Less than 10 per cent of its work force is located in the Ottawa area. The rest are to be found out where the fish are, where the trees are, where the lakes are and where the problems are. Our biggest wildlife centre is in Edmonton. Our biggest fisheries research laboratory is in Nanaimo. Our big centres for inland waters are in Winnipeg, Manitoba, and Burlington, Ontario. The headquarters of our meteorological service is in Toronto. Our main oceanographic institute is in Dartmouth. We are planning a new centre for Arctic studies in the Northwest Territories. Here is decentralization with a purpose. It is decentralization with an eye to the expansion of our resource base, and with a view to enhancing our environment in the long run.

In this wide ranging speech, I have covered a lot of ground. But I must be careful, Mr. Speaker. Our new Department of the Environment will not embrace all of the activities of the federal government relating to pollution control. Other departments like Agricultural, Urban Affairs, Northern Affairs, Transport, Regional Economic Expansion and Energy, Mines and Resources will also have important responsibilities in the environmental field. They will deal with particulars, while the role of our new Department of the Environment is more general. It is more sweeping, and it includes the role of a coordinator. It must make sure that our plans do not have any gaps in them, that our programs are as broadly based as possible, and that the quality of life in Canada is preserved for all time to come.

Reading our daily press and watching television one is often gripped with a sense of apocalyptic doom. Handed a sordid dossier of man's mishandling of his surroundings, we are bound to be depressed. I agree with those who are sounding the alarm. If things keep on this way we will be in a real mess. We will be in a real mess by the year 2000. But let us not blame science and technology for all our ills. Man's greed is the real culprit. It is his greed in the material sense which is to blame for the present state of things.

Of course, we have to mend our ways. We have to stop doing those things which the scientists tell us are harmful to our environment. Since greedy practices have become a habit, this will not be easy. But, knowing the facts, we have the will to change. We have the will to use modern technology in such a way as to ensure our own survial and that of all other living things.

• (4:40 p.m.)

Of course, Canadians will have to make some hard decisions about the kind of world which we want our children and their children's children to inherit from us. Environmentally speaking, we all want it to be a better world than we now know. So, we must make sacrifices in the 1970's. We must make sacrifices, especially on the economic front. But armed with more scientific know-how, we can enhance our environment. Our new department of the environment, properly manned, properly organized and properly directed, can help us on our way.

Some hon. Members: Hear, hear!

Mr. Davis: Before sitting down, Mr. Speaker, I should like to join the hon. member for South Shore (Mr. Crouse) in saying a word about our present deputy minister, Dr. Needler, who is to retire shortly. For many years he has been in the government service. He performed a yeoman's task, first on the Fisheries Research Board and, latterly, in the Department of Fisheries and Forestry. I hope we have not seen the last of him. I shall do my best to persuade him to act as an adviser to us, particularly on international matters and, more particularly, in relation to the next Law of the Sea Conference. I hope that these few words will allay the concern of the hon. member for South Shore about our ability to deal with fisheries problems, and especially international fisheries problems, in the months and years ahead.

CANADA

House of Commons Debates

Speech

of

Hon. Jack Davis

Minister of Fisheries & Forestry

on

Amending the Fisheries Act

Delivered in the House of Commons

on April 20, 1970

GOVERNMENT ORDERS

FISHERIES ACT

AMENDMENTS RESPECTING "CLOSE TIME", DEPOSITING OF WASTE, MARINE PLANTS, ETC.

Hon. Jack Davis (Minister of Fisheries and Forestry) moved that Bill C-204, to amend the Fisheries Act, be read the second time and referred to the Standing Committee on Fisheries and Forestry.

He said: Mr. Speaker, today hon. members are being asked to consider several important changes in the Fisheries Act. These changes will strengthen the act. They will clarify it and they will put more teeth in it.

With these amendments, the Fisheries Act will become a better act and a more effective act. It will provide a greater measure of protection for our aquatic environment and it will enable Canadians to generate higher incomes from our commercial fishery, and our sports fishery in this country.

As most hon. members know, the Fisheries Act is a federal act. It is an act which is as old as confederation itself. Our Fisheries Act was passed during Canada's first session of Parliament. It was passed more than 100 years ago. The Fisheries Act has, of course, been revised and updated with the passage of time. It has changed in some ways but it is still national in character. It is still nationwide in its application. It applies, as our Canadian constitution says, to our "seacoast and inland fisheries". It applies from sea to sea—from the Atlantic to the Pacific. It also applies from our international boundary line in the south to the Arctic ocean in the north.

Perhaps I could put it another way. Fisheries are entirely a federal responsibility. Parliament, alone, makes the laws with regard to fish in salt water and fish in fresh water. The Fisheries Act, therefore, applies to Canadian waters everywhere. The only limitation is whether the water in question now supports fish life or has done so in the past. Parliament, under our constitution, passes all of the laws dealing with fisheries as a resource. Ottawa also writes all of the regulations drawn up under the Fisheries Act. It writes the regulations even when the administration of the act has been delegated to one of the provinces.

Let me give you an example. The administration of our federal Fisheries Act was delegated to Alberta in the 1930's. Alberta, in other words, administers the Fisheries Act in all of the waters of that province. But when Alberta wants to change any of the regulations under the act it must get our approval. It must ask Ottawa to approve every change in the rules in so far as they apply to the fresh water fishery there.

The situation in the four Atlantic provinces, British Columbia, the Yukon and the Northwest Territories is relatively straightforward. There, Ottawa not only makes the law and draws up its own regulations but also administers the fishery as well. We are legislators and administrators in salt water. But, inland, the situation varies from place to place.

Throughout the prairies and in Ontario and Quebec, the administration of the Fisheries Act is delegated to one or more provincial departments. They administer the act in so far as opening and closing dates, catch limits and other conservation measures are concerned. Still, they rely on our Fisheries Department. They rely on us for fisheries research, fisheries development programs, fish inspection and fish marketing services. Obviously our department is active everywhere in Canada. It is active throughout Canada, even though the administration of the Fisheries Act itself may be delegated to some province and not to others.

Both levels of government look on the Fisheries Act as a useful tool. It is useful, primarily, as an act to protect our living resources in water. But it can also be used as a device to protect the fishery and our own Canadian fishermen. It governs our own fishermen wherever they go on the high seas. It follows Canadian fishing vessels. And it is used to protect our aquatic environment, not only in our largest coastal bays but in our smallest mountain streams as well.

Our own administrative arm has lots of muscle. We have fisheries officers located on both our coasts, in the Arctic and along our salmon rivers. Their main responsibility is to protect the fishery there. It is to conserve fish stocks by looking after spawning grounds, preventing the destruction of streams by bad logging practices, keeping an eye open for toxic sprays and checking on the discharge of industrial wastes.

Some hon. members will be surprised to know that we have dozens of prosecutions under the Fisheries Act. They will also be surprised to learn that we have a thousand officers in our conservation and protection service. These men are well trained. Each is a

conservationist in his own right. Each is familiar with his own particular area. Each knows its commercial and recreational possibility. Each officer also knows who to contact when things go wrong as well as how to anticipate problems and head them off before they happen.

I would be remiss, Mr. Speaker, if I failed to mention the close working relationship which these officers have with their provincial counterparts. They co-operate closely with the local fish and wildlife people. They also consult with the local foresters and, together, they take a multi-purpose approach to the management of our renewable resources there.

Please notice that I have been using the word "fish" as if fish were the only form of aquatic life. But the term fish, by definition in the Fisheries Act, also includes marine mammals like seals. It includes shellfish like oysters. It includes crustacae like shrimp. It includes minute organisms like zooplankton.

In order to complete the chain, we must also include plant life. We must also include plant life, specifically, under the Fisheries Act. We must include aquatic plants because they are very important in the natural scheme of things. Marine plants are often food for fish. However, in excessive quantitites they can also be harmful to fish. In the right amounts they can be harvested commercially. Millions of dollars worth of marine plants are already cropped annually in this country. This is another reason they should be referred to, specifically, in the Fisheries Act.

• (3:10 p.m.)

Incidentally the inclusion of marine plants will bring the Fisheries Act into line with our Fisheries Research Board Act, our Fisheries Development Act and our Fish Inspection Act. All of these important pieces of legislation recognize the ecological reality—the reality that fish life and marine vegetation are interrelated. They are part of our wider marine ecology and should be treated as such in our legislation.

Again, there is a need to control harvesting of seaweeds in the interests of orderly growth in that industry. Because the jurisdiction over the resources of the sea bottom is federal, federal legislation is needed as a basis for management. In this field of marine plants we, of course, will have to work closely with the provinces. Working closely with certain provincial government departments on both coasts we see a great new seaweed industry ahead. It is an industry which is already generating products ranging from cosmetics to clothing on the one hand, and from chocolate milk to beer on the other.

Before leaving this subject of marine plants, I would like to say a few words about algae. Algae are also marine plants. They are also living organisms. They are forms of vegetation living in waters which can be enriched in various ways. Indeed, enrichment is often the key to the proliferation of algae everywhere.

Our current problem in Lake Erie, for example, is one of over-fertilization or over enrichment. Over-fertilization or over enrichment produces algae in tremendous quantities. Mark you, algae is not always a bad thing. It may be harmful to some kinds of fish and helpful to others. In large quantities, it is generally destructive to high energy fish like trout and helpful to plant eating species like perch and carp. Incidentally, the perch industry has been flourishing in recent years in Lake Erie and the dollar value of the catch has been mounting quite steadily. I might say parenthetically also that a problem in the Far East in respect of carp stems from a lack of fertilization in the water. The lack of enrichment means a lack of algae and a lack of food for the carp. Obviously, much depends on the particular balance that a society wants to create as between algae and vegetation in water and fish life.

All this proves is that the fortunes of our fish and our marine plants, including algae, are interrelated. They are interrelated in the natural scheme of things. This is a very good reason why they should also be related, closely, under our national Fisheries Act.

Hon. members will doubtless be interested in our marine plant research program. Most of this work is carried out by biologists with our Fisheries Research Board. The Board has its main environmental laboratories in Nanaimo on the West Coast; in Winnipeg, Manitoba; Burlington, Ontario and St. Andrews and Dartmouth on the East Coast. There, our scientists are studying the effects of various pollutants on algae both in fresh water and in the sea.

This brings me directly to the subject of pollution. Anything that harms fish or stimulates the growth of algae may be harmful to man himself. Marine life, indeed, is often more sensitive to pollutants than mankind is. It follows that the living resources in water are our first line of defence. Healthy fish mean a healthy environment and a healthy fishery is undoubtedly the best insurance policy we can buy in our battle against pollution in water.

The idea of preventing pollution in fisheries waters is, of course, as old as the Fisheries Act itself. The act has always contained clauses dealing with this subject. Indeed, a clause along those lines actually appeared in the Upper Canada Statute of 1860. Here is how the Fisheries Act has read for decades and still reads in so far as the discharging of waste into fisheries water is concerned. The act reads in part:

No person shall cause or knowingly permit to pass into, or put or knowingly permit to be put, lime, chemical substances or drugs, poisonous matter, dead or decaying fish, or remnants thereof, mill rubbish or sawdust or any other deleterious substance or thing, whether the same is of a like character to the substances named in this section or not, in any water frequented by fish, or that flows into such water, nor on ice over either such waters.

The present act goes on to say:

The Governor in Council may by order, deem any substance—

I repeat, any substance.

—to be a deleterious substance for the purpose of this section (of the Act).

We have these formidable powers now. We have these powers without amending the Fisheries Act. We have them without the bill today However, they are not specific enough. They are difficult to administer fairly. They don't deal with "wastes" in quantitative terms. By quantitative terms, I mean concentrations. Nor do they relate, directly, to other pieces of federal legislation such as our new Canada Water Act or the Northern Inland Waters bill.

The old definition, in other words, is not good enough. It needs to be updated. We need modern wording and we need phraseology which is consistent with that used in other federal acts. Besides, we need to place the emphasis on prevention rather than cure. We should use terms which look ahead, which are designed to prevent pollution before it occurs and which place the emphasis on upgrading our waters rather than simply punishing the offender after the damage is done.

We can achieve these objectives by defining "wastes" in the right way. We are attempting to do this in the present bill by using the same definition of "waste" as appears in the Canada Water Act. "Waste", according to the Canada Water bill definition and according to the Northern Inland Waters bill definition as well as according to the amendments proposed for the Fisheries Act, therefore means this. I quote from the bill:

—any substance that, if added to any waters, would degrade or alter or form part of a process of degradation or alteration of the quality of those waters to an extent that is detrimental to their use by man or by any animal, fish or plant that is useful to man, and

—any water that contains a substance in such a quantity or concentration, or that has been so treated, processed or changed, by heat or other means, from a natural state that it would, if added to any waters, degrade or alter or form part of a process of degradation or alteration of the quality of those waters—

This, then, is the definition of waste. It will be the same under the Fisheries Act as it will be under the Canada Water Act. The two pieces of legislation will be on all fours. What is deemed to be waste under the Canada Water Act will be waste under the Fisheries Act and vice versa.

Of course, we will be able to write detailed regulations. We will be able to identify substances and name concentrations which are permissible in water. Any amount of a waste substance which is in excess of those concentrations or which would kill juvenile salmon, for example, is out. It will be deemed to be waste. It will be deemed to be pollution under the Fisheries Act as well as the Canada Water Act.

Of course, if a pollutant is discharged into Canada's fisheries waters the offending party may be prosecuted. If we are dealing with an industry, it may be prosecuted without warning. Up until the present time, the maximum fine has been $1,000 under the Fisheries Act. The passage of this bill will increase the fine to $5,000. It could be $5,000 a day if the pollution continues after a warning has been given to the plant owners by our departmental officials. Hon. members will please note that the nature and amount of the fine will also be the same as under the Canada Water Act. Again, the Fisheries Act and the Canada Water Act are in step. They are in step in respect of the definition of waste and they are identical when it comes to the maximum penalty which can be levied under our new legislation.

The administration of both acts will also be devotailed. Officials from my department will be serving on the consultative committees and regional management boards set up under the Canada Water Act. They will do their best to make these consultative committees work and these over-all, federal-provincial management boards work. They have every reason to do so. Organized discussions and organized planning of this kind is likely to be much more helpful to our fishery than the catch-as-catch-can processes of the past.

When developments proceeded, willy-nilly, the fisheries were usually ignored. Power

dams were built without regard to salmon runs. New industries were brought in without regard to pollution and its effect on our fish. The environment suffered and the ecological balance in our waters was upset. "Hard" industry has flourished. But living organisms have frequently been destroyed. Our scenery has been blemished and our recreational potential has been wiped out.

The Canada Water Act should change all that. In our new water quality management areas, all parties will be brought together. All interests will be consulted. Provincial government departments will be involved and so will federal departments. Provincial water resources people and Federal fisheries people will sit down together. They will work out their differences in an organized way and the end result will be a better over-all scheme of development for all concerned.

• (3:20 p.m.)

Various techniques have been developed for dealing with these multi-faceted situations. One is benefit-cost analysis. Benefit-cost analysis was first developed in the planning of whole river basins. There, power dams and irrigation, navigation and flood control, fisheries and recreation, forestry and aesthetics all had to be reconciled. Also some of them could be reduced to dollar terms and others could only be referred to as "intangibles". The technique is still imperfect. But we know that the "intangibles", like recreation and aesthetics, are being given much more credence than in the past. Sports fishing and tourism have been moving up the scale. They have been given higher priority with the passage of time. They have been weighing more heavily in the balance of things. So it is with our fisheries.

It is for these reasons as well that I favour the establishment of water quality management areas in various parts of the country. Ottawa and the provinces will be brought closer together. We will also tend to avoid head on confrontations between single and individual federal departments administering federal laws in the same waters. It will provide a forum for resolving these differences. It will also give our own fisheries people, and our forestry people, a greater say in the over-all scheme of things. Using the Canada Water Act in this way, we can make sure their voices are heard. They were not always heard in the past—far from it. Often the opinions of our fisheries biologists were ignored to the detriment of our fishery in particular, and our aquatic environment in general. Often the voices of our fishermen were ignored as well.

I might go even further. I might insist that our fisheries scientists and our development engineers must continue to be the pace setters. They must be the pace setters in so far as the protection of the living resources in our aquatic environment is concerned. They must insist on the highest possible standards of water purity. They must insist that the same high standards are put into effect locally, and regionally, in the new water quality management areas which result from Canada Water Act agreements between Ottawa and the provinces. We, in this department, clearly have a vested interest in the success of the Canada Water Act. We want it to work because it can also help us to do our job in Fisheries and Forestry more effectively.

I have been talking as if regulations made under the Canada Water Act will apply immediately and in all areas of Canada. This will not be the case. The setting up of basin wide plans covering major rivers and streams will take time. Large sums of money will also have to be voted as well. In the interim, at the very least, we will therefore have to use the Fisheries Act as we have done in the past. We will have to use it pending the signing of ironclad agreements between the provinces and Ottawa, agreements which will cover all facets of water development and protect our fisheries as well.

There will of course always be rivers and seas in which fishing is the dominant activity. There will also be single industry situations along our coasts and in outlying parts of this country. In those circumstances the Fisheries Act, alone, may be sufficient to do the job. It is here, also, that we expect our people will have a dominant voice in making sure that our aquatic environment is maintained in a healthy state. Perhaps in the fullness of time, the Canada Water Act may apply in these areas as well. But, for the time being, we will have to use the Fisheries Act by itself, to police pollution as best we can. Policing may not be the right word. Co-operative action is preferable. We want to work with industry, not against it. We want to co-operate with companies building new plants and installing new processes. We know that these new firms can benefit from our expertise and we are sure that our fishery will be much healthier if we have their co-operation from the outset.

Our departmental experience on both coasts has been gratifying. Most companies intending to build new pulp mills or chemical plants are now coming to our fisheries experts and asking for advice. They ask what our standards are and how these can best be met. They ask about new treatment facilities and how

they have worked out in other locations in Canada.

We have scored some notable successes. Our new pulp mills on the greatest salmon stream on earth, the Fraser River in B.C., are among the cleanest in the world. Several chemical plants built in eastern Canada are also world leaders in this respect. Our insistence on high standards has also paid off in other ways. Several consulting firms, specializing in pollution engineering have now begun to sell their expertise in other countries. I am thinking of the Sandwell and Simons companies in Vancouver. They are now looked to by the Scandinavians and the Russians as having broken new ground by marrying pollution control and economy and by making a number of chemical process industries more compatible with our environment.

Co-operation with industry in this country, in other words, has turned what might otherwise have been a local disadvantage into an international advantage. We have been able to protect our fish and develop new export industries as well. We have insisted on high standards and they have been achieved at minimum cost. Sometimes by-products have been produced, sometimes not. But our rivers are cleaner and our seas are healthier. We have taken the intelligent approach to pollution abatement and we have scored a number of successes without costing the federal treasury large sums of money in the process.

While I can report considerable progress in some instances I must, regretfully, admit continuing failures in others. Some industries have been more co-operative than others. Some provinces have also been more energetic than others in the battle against pollution. It is because of this uneven pattern of development, this permissive approach to industrial development and regional expansion that we feel we must formalize our arrangements. By formalizing, I mean making it necessary for industries which generally give us trouble on the pollution front to file plans for their construction of new facilities and the introduction of new processes.

I might also say another reason for proceeding is to avoid the unhappy development of what I might loosely refer to as pollution havens in one part of the country because legislation is not uniform from coast to coast. I am sure changing our Fisheries Act will help to eliminate these so-called havens.

Hon. members will please note that we propose to change section 33 of the Fisheries Act thereby giving this department the power to:

(1) ask any firm about its plans for expansion;

(2) be informed about the anti-pollution measures to be taken in each case; and

(3) approve, or disapprove, of these plans and with the backing of the Governor in Council, in other words the cabinet, to require any modifications necessary to protect the fisheries waters of Canada.

Sometimes, we in the Department of Fisheries and Forestry will have to take the initiative. We will have to contact the firm in question. Once contacted it will be obliged, by law, to co-operate with our departmental officials in reviewing its plans for pollution control. I have no doubt that all, or nearly all, of these industries will work closely with us. I have no doubt that they will co-operate. They have been co-operative in the past. However, there may be exceptions. There may be exceptions, not only as a result of an honest difference of opinion, but also as a result of attempts to avoid cost which the company thinks it might be able to fob off on to the public in general.

Under these exceptional circumstances we in the department will have to take our responsibilities. We have to take up our responsibilities under the Fisheries Act and intervene in the public interest. We may have to intervene to the extent of holding up construction until the facilities are adequate from a pollution control point of view. We may also have to insist on the use of new processes for treating effluent which the company had not envisaged in the first place.

This is strong medicine. It is a drastic step to take. Before the Minister of Fisheries can actually hold up the plans of a company he will have to get full cabinet backing. He will have to get an Order in Council passed by the government. Of course, this is likely to be forthcoming in the kinds of cases which I have in mind. However, the firm in question has this further protection. All ministers, and not simply the Minister of Fisheries and Forestry, will have to be convinced that the company is falling down in its duty to look after our waters in the proper way.

o (3:30 p.m.)

To put it another way, Mr. Speaker, the Minister of Fisheries and Forestry may, with the approval of the Governor in Council, require the company in question to make such changes to its plant and/or its processes as are necessary to treat its effluent properly. This power continues over time. It continues in the sense that we will not give a full and final approval in each and every case. Instead,

we will reserve the right to make further changes in our specifications. These changes might, for exemple, become imperative as a result of increased production on the part of the firm, changes in stream flow or, hopefully, a marked improvement in the technology of pollution abatement itself.

Unfortunately, pollution is with us now on a large scale. We can all recall several recent examples. I hope we do not experience a repetition of the so-called "red herring" incident in Newfoundland. I hope we do not run into another mercury problem on the prairies or in Lake St. Clair in Ontario. But if we do, we will have to move, and move quickly. We will have to move in and buy fish, for example, in order to support our fishermen during the period in which the contamination persists.

This action will be taken on behalf of the Crown. It will be taken on behalf of the Crown to remedy the condition or reduce or mitigate damage or destruction to life or property. A further amendment in this bill gives the government this power. It gives the power to recover its costs incurred in looking after the interim arrangements. These costs, of course, will be recoverable from those who are responsible for pollution in the first place.

I could go on, M. Speaker, I could detail other changes in the Fisheries Act. I could, for instance, refer to the 12-mile limit for trawlers. Newfoundland, when it came into confederation in 1949, retained its old 3-mile limit. This will now be changed, at Newfoundland's request, and the 12-mile restriction which already applies to trawlers in Atlantic waters will be extended to Newfoundland as well.

There is more. But suffice it to say that the main thrust of this bill is against pollution. It is part of our overall effort to deal with this modern menace. We will soon have a tougher Fisheries Act—a better Fisheries Act. We will soon have a new Canada Water Act and a new Northern Inland Waters Act. We will have a better Canada Shipping Act. This is an impressive list. It is good legislation and it is sound legislation. We need these laws, these improved laws, these federal laws, to deal with pollution in an effective manner. We need them to keep our rivers fresh and our salt water clean. We need this legislation to make our aquatic environment in Canada fit for fish to live in.

This bill, Mr. Speaker, is a short one. But it is an important bill. I urge hon. members to support it. Improve it if you will, but support it. Unlike the United States, where the power over the fisheries resources is fragmented as between individual states, fragmented because it rests with the individual states, we have a unique opportunity here in Canada; we can pass national legislation dealing with our aquatic environment. I, therefore, ask you as Members of Parliament, acting in the national interest of Canada, to approve this bill and amend our Fisheries Act in these various ways.

Canada's Water Pollution Legislation Began with Fathers of Confederation

CANADA OF a century ago, with a population of less than 3,300,000 and abounding with beautifully clear lakes and streams, did not need to worry about water pollution problems such as plague the present era. However, the Fathers of Canadian Confederation were not unmindful of the threat of pollution and framed laws to protect Canada's water resources.

These laws were embodied in the Fisheries Act which was instituted in 1868. It contained two sections devoted to the control of pollution in Canada's coastal and inland waters. The legislation was interested chiefly in pollution inasmuch as it affects fisheries, but it was Canada's first national act providing legal machinery to protect pure water.

Under the British North America Act the federal government was given blanket legislative authority over all fisheries matters in Canada. In years to follow several of the provinces were granted rights to administer their own fisheries in whole or in part, but the power to legislate with respect to management and control of the fisheries remains a federal power which is exercised on the recommendation and with the concurrence of the province concerned.

Federal responsibility for the administration of fisheries also carries with it certain responsibilities for the control of pollution in fish-bearing waters. Today the Department acts under the Fisheries Act of 1932 which has an entire section devoted to the "Injury of Fishing Grounds and Pollution of Waters". This section was revised about six years ago, but it has changed little from pollution sections of the first Fisheries Act of 1868.

FEW POLLUTION PROBLEMS

In the earlier days when Indians and buffaloes still roamed the western plains, Canada had relatively few towns and the industries were small and scattered. As a result there were few pollution problems to interfere with fish life, and the control legislation at that time was sufficient to provide the necessary protection.

Canada now has a population in excess of 20,000,000. Large cities dot the country from coast to coast; airplanes and automobiles have opened remote areas formerly accessible only to the adventurous.

The control of water pollution has now been extended to several other Canadian Government departments in addition to the Department of Fisheries. While the acts which they administer are exercised within the particular sphere of interest of each department, the fishery resource benefits indirectly from such legislation.

During the passing years the protection of inland waters has also become the concern of provincial governments. In provincial statutes are multi-purpose regulations providing public health protection and the maintenance of water quality for all water users, including the fisheries resource. Most provinces now have water pollution control agencies. Frequently the federal Department of Fisheries has collaborated with these provincial bodies where control of some pollution source was the common goal of all concerned. The co-operation existing between the Department and the provincial agencies has been exemplified many times in a united approach to successfully negotiate satisfactory pollution control measures with industrial developers. Of great assistance to the department and provincial groups has been the staff of the Fisheries Research Board of Canada whose increased participation in pollution research has been invaluable.

STUDIES ON TWO COASTS

The Resource Development Service of the Department of Fisheries has established technical sections on the Pacific and Atlantic coasts to deal with pollution problems. Its scientific staff has spread itself as effectively as possible in those areas to conduct field studies, monitor programs, and to negotiate with industrial operators and other water users who might, through their activities, alter water quality to the detriment of fish.

The Department's pollution control programs are divided into three basic categories –

1. Those dealing with continuing sources of pollution
2. Those dealing with ad hoc problems
3. Those dealing with known or planned developments

Classified in the first category are long established industries, abandoned mine operations and other sources that continue to release toxic substances to fish-bearing waters. These situations are difficult to deal with, since in many instances the source of pollution, perhaps a long-established pulp mill, may be in no condition physically or financially to introduce suitable effluent treatment facilities. However, certain provincial governments and the federal Government have offered financial inducements to such industries in the form of low cost

loans or partial payment of costs for treatment facilities. The Department of Fisheries continues to monitor these installations.

FRUSTRATING PROBLEMS

More frustrating to cope with are situations that arise unexpectedly. Typical of these ad hoc pollution problems are unadvertised pest control spray programs and accidental or other releases of toxic substances. These situations are awkward because it is impossible to plan the attack beforehand and the problems are rarely resolved to the satisfaction of the investigating teams. Many times evidence is hard to come by since the affected water runs off quickly and autopsies on fish are inconclusive. The main hope in preventing these surprise situations lies in a greater public awareness of water pollution dangers. To that end the Department is increasing its efforts to educate the public to these hazards. For instance, concerted efforts are being made to educate farmers in the proper handling of pesticides.

Problems dealing with known or planned developments are the most satisfactory to cope with. In these cases the Department's scientific and technical staffs can assess the situation, meet with local pollution control authorities and eventually negotiate with development company officials. The result is usually a satisfactory arrangement for effluent treatment.

MAN IS THE CAUSE

The chances of fish being killed by natural pollution are small. In practically all cases, pollution damage to fish and their environment is caused by some man-made change. Physical and chemical additives to fish bearing waters may alter the environment sufficiently to cause irreparable damage.

Under natural conditions limited quantities of silt and other materials are deposited in streams. However, most unaltered flowing waters are able to clear the bulk of this material through natural cleansing processes.

For countless centuries the purity of our waters was relatively undisturbed. The test came when the white man's civilization began to spread across the land. Logging operators stripped timber lands which resulted in rapid run-off and widespread erosion. Road builders contributed to an already serious situation through the alteration of river banks, careless disposal of waste materials and the release of gravel washing effluent to streams.

The productive capacity of fish spawning and rearing in streams can be drastically reduced or eliminated by such foreign materials. Bark deposits from logging operations and sawdust from mills stifle bottom dwelling fish food organisms. This combined with silt may blanket stream bottoms making them useless as fish spawning areas. Silt from road building and gravel washing may totally destroy spawning beds by cutting off essential oxygen supplies to incubating eggs.

CONTROL IS POSSIBLE

Satisfactory control of chemical pollution is possible in the majority of cases. Today new industries are generally aware of the dangers of pollution and are willing to co-operate with the Department of Fisheries and other control agencies by installing proper treatment facilities. However, the problem still remains with some of the long-standing industries that continue to pour toxic effluents into the lakes and rivers. The main hope for abatement rests with financial assistance to provide treatment facilities.

Fish are affected either directly or indirectly by toxic substances in waters. Many industries discharge waste products that are highly poisonous to fish. Others release "oxygen hungry" substances that are capable of reducing oxygen levels sufficiently to cause massive fish kills. Domestic sewage is one of the latter, but in limited quantities it does no real harm to fish. The trouble today is that enormous quantities of raw sewage are discharged. The great increase in the use of sewage treatment facilities augurs well for future improvement of the situation.

Probably, the Department's greatest concern today is pollution from the introduction of pest control chemicals to fish bearing waters. This is a relatively new danger that has increased many fold within the last 10 or 15 years.

Mine pollution is another cause for concern in several areas from Newfoundland to British Columbia. Mine drainage and process waters contain high concentrations of toxic components. Without treatment and care by mine operators the release of these substances plus quantities of tailings create havoc with fish in lakes and streams. These pollution problems grow in direct proportion to mine production rates. Until recently no effort has been made to improve methods of treating mine wastes. However, Canada's Department of Energy, Mines and Resources has taken measures to deal more effectively with direct and indirect sources of mine pollution.

Existing federal and provincial legislation provides pollution control agencies with sufficient authority to protect Canadian waters from deliberate contamination. ✔

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AFTERMATH OF THE ARROW

Task Force Report Points Way To Avoiding Future Oil Spills

BY R.J. CHILDERHOSE

Summer silence was on the campus when the Royal Commission of Inquiry sat down in a Dalhousie University lecture room to discuss the causes of the sinking of the oil tanker *Arrow* in Chedabucto Bay.

At one end of the platform sat Captain George Anastassopoulos, master of the steamship tanker *Arrow*. He looked glumly back at three full rows of officials – mostly lawyers – there to listen to, and pick at, his story.

The lawyers belonged to the ship's owners (Sunstone Marine S.A. Panama), the commission itself, the federal Department of Transport, and Imperial Oil which had chartered the ship to carry cargo from Venezuela to Port Hawkesbury, N.S.

The *Arrow* loaded 16,010 tons of Bunker C fuel oil and 79.5 tons of a lighter fuel at Amuay Bay, Venezuela, January 28, 1970, and left the same day for Nova Scotia.

Landfall was made approaching Chedabucto Bay "...prior to 0800 on February 4th, 1970..." according to the Inquiry report.

A SULLEN SEA

It was an Atlantic winter day, grey mist and rain. Beneath a sullen sky a still more sullen sea. Foam-streaked swells clutched at the tanker's sides, four-foot waves on ebb tide. A gale force wind was pushing at the *Arrow's* port beam.

Visibility was "...between five and six miles...in mist and spray..." when the captain assumed command at 0800. The *Arrow* continued at full speed under visual direction from the bridge.

At 0935 hours, a mile and a half off course, making 12.6 knots through the water, the *Arrow* ground herself onto Cerebrus Rock...the sole hazard to navigation in the deepest ice-free harbour on the Atlantic coast of North America.

The Inquiry concluded its report: "The grounding and subsequent sinking of the S.S. Arrow was caused by the improper navigation of Captain

Oil from the wrecked tanker "Arrow" coated 190 miles of shoreline. This scene is near Canso, N.S.

George Anastassopoulos in failing to maintain his plotted course for over an hour while he was proceeding at virtually full speed through waters unfamiliar to him."

The accident was almost identical to that of the Torrey Canyon "whose captain ran her onto a well-marked granite reef off England in broad daylight."

The Torrey Canyon was carrying 117,000 tons of Kuwait crude, compared to the mere 16,000 tons carried by the *Arrow*. But just as happened with the British in 1967, no one in Canada was prepared for a major oil spill.

The scene along the shores of Chedabucto in the days following the skewering of the *Arrow* on Cerebrus Rock was one of chaos and confusion.

An exception was the quick reaction of Captain J.L. Guimond, master of the fisheries patrol vessel *Shediac Bay*, who successfully came up alongside the stranded *Arrow* to rescue 21 of the Greek crewmen.

Shellfish from the bottom of Arichat harbour are examined by Ken Lord, of the Department's Resource Development Branch.

Seine net for containing oil slicks devised by the Industrial Development Branch of the Department of Fisheries and Forestry.

But on the shore, uncertainty. Giving orders were salvage operators, Imperial Oil representatives, and Department of Transport officials. There was no single identifiable authority.

The problem was identifiable. It was 529.4 feet of gutted tanker oozing entrails of thick brown goo into a frigid sea.

How to control it?

Differing ideas were heatedly argued until the next gale splattered the oily goo across the beaches of Chedabucto Bay from Canso to Petit-de-Grat.

It was this storm which ended initial hopes of using salvage company tug boats to split the tanker and to haul the stern section – which held most of the 3.8 million gallons of cargo – out to sea for sinking beyond the continental shelf.

Pounded by heavy seas, the *Arrow* slowly split apart. The stern section swung ninety degrees to the bow and hung, teetering, on the rock. A few days later it dropped off into 60 feet of water.

The problem then, for the people on the shore, was one of removing the submerged cargo of fuel oil without adding to the pollution problem.

The pollution problem was already with them. The beaches, wharves, jetties and boats of Chedabucto Bay were already fouled with the oily slime.

Attempts were made at burning the oil off, but the 60/40 slush-to-oil ratio of the goo made burning impossible.

On February 19 the executive director of the Science Council of Canada, Dr. P.D. McTaggart-Cowan, was asked to form a task force to take care of the oil in the wreck, to clean up the shoreline, and to compile a report telling how it had been done.

The major responsibility for the work was carried by the Department of Transport. But other departments – including Fisheries and Forestry – were involved in supporting roles.

An Esso International salvage master – Captain S.A. Madsen, of New York – devised a "hot tap" method of driving steam into the tanks of the sunken stern section and pumping the warmed oil to the surface.

The valves and hose connections were installed by Canadian Navy divers working under difficult conditions of freezing cold and oil-fouled gear.

The problem of floating oil was attacked from several directions. The idea of burning oil slicks was attractive, but, in the Chedabucto Bay spill, all

methods of ignition were found unsuitable.

Chemical dispersants – as were used in the Torrey Canyon disaster in 1967 – were not used due to the hazards of toxicity to marine life.

Similarly with sinking agents such as chemically treated sand or chalk. The French government used chalk in the Torrey Canyon spill, but Task Force – Operation Oil decided it was "merely sweeping the dirt off our own doorstep onto the doorstep of the lobster."

Garden-type peat moss was chosen over straw as an oil absorbent material. It is of value only if applied to fresh oil, having little absorbent effect on weathered oil-and-water emulsion.

A mechanical means of skimming the oil off the surface was required. A prototype "slick licker" was flown in from the West Coast, tested, and three more ordered for immediate use in Chedabucto.

The slick licker, according to the Task Force Report "...consists of a 3-foot wide continuous conveyer belt which dips into the surface; oil adheres to the oleophilic surface of the belt while water runs back down so that oil with very little water comes off at the upper end of the conveyer into suitable containers."

More basically, the "licker" is a terry-cloth covered conveyer belt. At the top end is a wringer to squeeze the oil out of the terry-cloth.

DAMS CONSTRUCTED

Two dams – Lennox Passage, Canso Tickle – were built to protect settlements from oil contamination once the ice which was blocking the passages had melted. These dams were removed late in the summer.

A forward defence line was the boom made of spruce-boughs and chain-link fencing strung on empty 45-gallon drums as floats.

This make-shift boom did an excellent job, but the Task Force wanted something more readily available for future use. The request went to the Department of Fisheries and Forestry's Industrial Development Branch. The result was a 'Seine Net for Containing Bunker C Oil Slicks'.

"As a component of the Task Force's Contingency Plan, a seine net boom was developed for deployment between two fishing vessels to contain a large oil slick. The 3/4-inch mesh net, 1,000 feet in length and 30 feet deep, has a float arrangement to provide sufficient freeboard and was quite capable of retaining the viscous cold Bunker C."

The Industrial Development Branch was also involved in devising a 'Net Laundry for Oil Contaminated Fishing Gear'. The "laundromat" was required to clean four commercially-owned purse seine nets which had been fouled with oil escaping from the foundered tanker.

The steam laundry specially constructed to clean oil from seine nets, shown in action at Point Tupper, N.S.

The huge seine nets – 1,500 feet long, 300 feet deep, weighing 11 tons – posed a difficult problem.

The "laundromat" took three weeks to plan, manufacture and set up for net cleaning operations. Said the Report:

> "This device consisted of three tanks, the first lined with steam jets, the second containing diesel oil and an emulsifier, and the third providing a hot water wash. The nets were drawn through the tanks by means of a power block similar to those used on the seiners. Each net was cleaned in this way in about six hours..."

The remaining clean-up problem was that of the oil-soaked beaches and jetties. An Armed Forces beach-cleaning team – using peat moss to absorb the oil – tackled the beach mess.

Later, removal of contaminated material using both mechanical and manual labour was carried out on certain beaches using contract help.

> "When this work is completed by mid-September, approximately 30 miles of tourist and community beaches will have been cleaned, with the remaining shore contamination left to weather naturally. Biodegradation experiments using organisms native to the environment will be conducted to determine the rate of clean-up via this mechanism."

CLEANING THE JETTIES

Cleaning of the fishermen's jetties using high-pressure water jets was tried on an experimental basis before the Task Force decided on steam cleaning.

> "Four steam generators were mounted on the catamaran and, with two steam jets operating on each side of a jetty, cleaning could be accomplished in a few hours. The oil removed was collected on floating peat moss inside a net boom and then picked up by dip nets. Fifty-eight jetties and wharves were effectively cleaned in this manner."

Fisheries Research Board personnel were involved on a continuing basis in the aftermath of the Chedabucto oil spill. Field teams of FRB staff from St. Andrews and Dartmouth, and the Resource Development Branch were organized by mid-February to evaluate the effects of the oil pollution on fishing in the area.

Fortunately, the teams discovered no evidence that the "oil spill has altered the yield of commercial fisheries in Chedabucto Bay."

Studies are continuing on the long-term effects of oil in animals such as clams, scallops, periwinkles and sea urchin.

During the busiest days of Chedabucto, the Department had 34 personnel on site. Five fisheries patrol vessels were involved, including the *Shediac Bay, Lacuna, Cratena, Sabella* and the *Scatari Light*.

The achievement of the McTaggart-Cowan task force was remarkable. The effects of the oil spill was mitigated, the damage to marine life is considered minimal.

LOBSTERS NOT AFFECTED

Lobster fishermen in Chedabucto Bay enjoyed an "average to better-than-average" season; no lobsters have been found with oil-tainted flesh. The same is true for fish caught in the area.

Approximately 7,000 birds – mostly loons, gannets and gulls – were killed by the oil, the greater portion of these being in the region of Sable Island. The other casualties were clams, suffocated by oil as it washed up on the beaches.

Of the loss of the birds the Task Force Report said:

> "While these kills are most regretable, the Wildlife authorities assure no serious long-term effects on any particular species will result...It is concluded that, despite the relatively large amount of oil released from the wreck, the overall or lasting effect on the wildlife and fishlife in the Bay was not significant."

The aftermath of the Chedabucto oil spill, the rapid and concerted response of the government agencies called upon by the Task Force, could lead to self-congratulations and quick forgetfulness of the problem. However, the

To contain the spread of oil at Lennox Passage, a boom of spruce boughs and chain link fencing was erected and a temporary dam constructed (seen at right of bridge).

Captain B. Boudreau, of the Fisheries patrol vessel 'Scatarie Light', with crew member, checks seaweed rakings to determine oil contamination.

A group of the Department's "Operation Oil" task force. Left to right, D.P.O. Dan T. MacNeil, Warden A. Bourque, F/O E.L. Power and Co-ordinating Officer J.E. Creeper.

problem of large oil tankers foundering in Canadian waters remains.

The entire thrust of the recommendations of the Task Force Report – Operation Oil concerns the question: what can be done to prevent another *Arrow* disaster?

The recommendations included the following:

International Action

It was recommended that:
consistent with the initiatives taken by the Government with respect to Arctic pollution and at the IMCO special conference on pollution in 1969, Canada take a parallel initiative to convene a conference of all those concerned to write a new international convention for the operation and control of shipping throughout the world and that this convention be patterned on the principles of the Convention on International Civil Aviation;
the convention should ban all deliberate pumping of oil, oily waste or tank cleanings, or bilge cleanings into the oceans or any other body of navigable waters;
Canada should take the initiative with the appropriate international bodies to seek agreement on a series of definitions and descriptions that will permit the reporting of spills in an orderly and understandable manner.

National Action

It was recommended that:
extensive pollution control zones be established to cover the rest of the coast of Canada consistent with the position taken by the Government in the Arctic;
the law should make it clear that those who pollute pay the complete cost of clean-up, including the cost of any Canadian federal or provincial personnel used in the clean-up, that the ship concerned be impounded until this has been accomplished or assured and that the legal penalties be in addition to this liability for the complete cost of cleaning up the pollution.

Other recommendations were:

1) with respect to tanker operations, in order to enter Canadian waters, they provide evidence that they are fitted with adequate and serviceable navigation equipment
2) Canadian pilots be required on all vessels entering Canadian waters unless the ship and its captain have been given special clearance by the federal authority
3) standards of competence of crews of ships entering Canadian waters should conform with our national standards
4) the same principles as in 2) and 3) above should apply to Canadian ships in Canadian waters
5) there should be a compulsory filing of samples of all petroleum products loaded on ships and a requirement that any spillage of petroleum products, regardless of whether they originate from a shore tank or a ship, be immediately reported and sampled
6) the federal government establish one or more central laboratories capable of "fingerprinting" petroleum products in a manner acceptable to the courts.

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The Fisheries Battle Against Pollution

BY G.J. GILLESPIE

A CANADIAN newspaper columnist recently applied to the problem of water pollution what Mark Twain was reported to have said about the weather: "Everybody talks about the weather but nobody does anything about it".

That newspaper comment is not entirely fair nor is it entirely true. Agreed, there is a lot of talk about water pollution – and there will be more – but there has also been action. And taking the lead in this action is the federal Government, through the Department of Fisheries of Canada and other agencies. Under the British North America Act, the federal fisheries department has jurisdiction over coastal and inland fisheries.

The Fathers of Confederation were not unmindful of the threat of water pollution and framed laws to protect the vital water resources more than a century ago. Those laws were embodied in the first Fisheries Act of 1868. It contained two sections devoted to the control of pollution in the nation's fishing waters.

The act confederating the nation gave the central government blanket authority over all fisheries matters in Canada. In the years following Confederation several of the provinces were granted rights to administer their own fisheries in whole or in part, but the power to legislate with respect to fisheries management remains a federal power which is exercised on the recommendation and concurrence of the province concerned.

In mounting the attack on water pollution, the chief burden of work falls on the department's Resource Development Service on both coasts. This service has set up technical pollution sections and has spread itself as effectively as possible to cope with problems created by water users.

This article is mainly concerned with the work of the Resource Development Service on the Pacific coast, but its problems have much in common with those experienced by pollution teams on the eastern edge of Canada. One of the agency's greatest concerns is the proliferation of bleached kraft mills in British Columbia along inland salmon-producing waters or in river estuaries through which salmon must pass.

Fisheries biologist Kenneth J. Jackson, of the department's regional staff in Vancouver, describes pulp

mills as the cause of the largest and most common problems affecting salmon waters in British Columbia. There are about 20 large mills in operation and most of these are situated on rivers inhabited by one or more of the five species of Pacific salmon. Four of these mills are situated on inland waters beyond the tidehead and three more are proposed for construction. This creates a more difficult situation because of the absence of tidal waters to help flush out harmful effluent before the oxygen in the water is depleted and toxicity problems are created.

Pulp mills operating in non-tidal waters must employ elaborate and costly biological treatment facilities to detoxify the water put back into the stream. This treatment – the only one known to be practical – speeds up the process of bacterial decomposition which otherwise would have to take place in the environment occupied by fish.

The biological treatment itself is relatively simple. Effluent from the mill is discharged into a pond or basin from 12 feet to 15 feet deep to which nitrogen and phosphorous are added. The basin is seeded with sewage bacteria which digest organisms in the mill effluent and hurries decomposition. The basins or ponds are supplied with copious amounts of oxygen, and the aeration eliminates the production of disagreeable odors in the treatment process.

The whole aim of the treatment is, of course, to render the effluent harmless to fish. This conforms with Section 33 of the Fisheries Act which prohibits the release of deleterious substances into water inhabited by fish. The Minister of Fisheries is vested with the responsibility of assuring that the method of disposal of any man-made effluent is such that fish are protected to the maximum extent justified in the public interest. By federal-provincial agreement, the British Columbia Department of Recreation and Conservation administers the Fisheries Act as it affects all species of sport fish in non-tidal waters, and has the option of acting with the Department or independently on problems coming within its own sphere of jurisdiction.

USE OF PESTICIDES

Many of British Columbia's pollution problems are associated with the use of pesticides. These chemicals are used extensively to reduce infestation of forest insect pests, control of mosquitoes, and to prevent booms of logs stored in fresh waters and log brows on land from being attacked by boring ambrosia beetles. Sodium arsenite is used in tidal areas to protect log booms,

Helicopter spraying benzenehexachloride in ambrosia beetle control program on logs. The beetle, if allowed to thrive unmolested, can seriously devalue logs, particularly, those to be used for highgrade plywood.

floats and other marine structures from boring insects, while copper sulphate is used in certain swimming and bathing areas to kill snails which are hosts to organisms causing swimmers itch.

In addition to insecticides, herbicides are used to kill brush along highways, railway and power line rights-of-way and they are being used increasingly by the forest industry to depress the growth of deciduous trees which retard the growth of commercially valuable conifers in reforested nursery areas.

Most of the insect control programs involve the use of chemicals that are highly toxic to fish. Thus, the Department of Fisheries finds it necessary to prescribe precautions where such programs threaten fish. Several factors are considered when introducing precautionary measures. One such step is to reduce the presence of insecticides in streams and river estuaries by avoiding spraying over them, while another measure is to exploit the factors in the life history of the fishes being protected. For instance, coho salmon fry of the year arrive in waters along the shores of Cowichan Lake on Vancouver Island before mid-April. Aerial spraying of log booms with benzenehexachloride to prevent ambrosia attack must precede this date. Similarly, copper sulphate applications must precede the presence of coho salmon fry.

In the case of forest insect spraying involving large acreages, treatment is restricted to areas in which an additional season of pest attack would cause tree mortality. This greatly reduces the area to be treated and affords the opportunity for natural factors of attrition to bring about a collapse of the pest population.

When chemicals are available which can be used at dosages which will achieve control of the pest and not arrive in concentrations which would be acutely toxic to fish, the use of these chemicals is recommended. As an example, phosphamidon is being used increasingly to replace the more toxic DDT in forest insect control. It has been found that this chemical can kill the insects and present a much lower hazard to fish.

A satisfactory working arrangement has been established between the Department's technical and field staff and companies, and municipalities and even individuals engaged in pest control programs. It is true there have been some fish kills in British Columbia due to the careless use of pesticides, but not when sponsors of the program have co-operated by complying with the recommendations of the Department.

Helicopter loading drums of insecticide for mosquito control operation.

By no means new, but becoming increasingly bothersome, are the pollution problems being created by wastes from mining operations. Wartime need for metals, plus the general expansion of mining in the post-war period, has greatly boosted the nation's production of minerals in the last three decades with resultant deleterious effects on fishing waters in most of the provinces.

Federal fisheries authorities, in co-operation with provincial agencies, are keeping abreast of the problems arising from mining operations, and notable successes have been recorded.

Mining operations can have several adverse effects on fishing streams if corrective measures are not taken. One of the most common of these "effects" is finely-ground crushed rock or "tailings" from base metal and

Biological-treatment pond for oil refinery effluent. Froth on water surface indicates aerator in action.

iron ore mining and milling. Some large mines discharge as many as 20,000 tons of tailings a day. If they are allowed to get into a stream, they settle and blanket the bottom of the stream. Such species of fish as salmon and trout deposit their eggs in "redds" or nests in the coarse gravel. Tailings block the percolation of water through the gravel and thus cut off the life-sustaining oxygen supply to the embryonic fish. Tailings also destroy the environmental river bottom dwelling of organisms on which fish feed. The turbidity of the stream is increased and the food web of all animals present is affected.

In addition to the physically detrimental factors present in tailings, there is also the possibility of the receiving waters being toxified by chemicals used in the treatment of the ore. As an example, sodium cyanide is added in the milling of sulfide ores to exclude iron pyrite from the ore concentrate. Although little cyanide solution remains in the tailings, a minute amount in the order of 0.025 parts per million is lethal to fish. Lime which is added to the flotation of sulfide ores may raise the alkilinity of the tailings to a level which can kill fish.

Certain ore bodies are susceptible to attack by soil bacteria when exposed. Metallic sulfide ores are insoluble in water, but they can be oxidized by bacteria to soluble forms with the resultant effect that most heavy metals in soluble form are toxic. Unlike eastern ore deposits, most British Columbia ore bodies are permeated with limestone and other alkiline materials which tend to inhibit bacterial oxidization.

To cope with the tailings problems, Resource Development Service pollution teams in British Columbia—and on the east coast, too—recommend the impounding of tailings in ponds adjacent to the mine mill site. Such ponds must be constructed so as to prevent erosion and to contain the tailings for sufficient time to enable the rock particles to settle to the bottom.

Modern milling methods tend to produce progressively more finely ground tailings. As a result from one-half to one per cent of the tailings do not settle in the impounding pond but remain suspended in the water. This can create a turbidity problem if the tailings are allowed to escape into the stream or lake.

In dealing with the "suspension" problem, Resource

Development biologists have found it practical to use polyelectrolytes to break these colloidal suspensions. The polyelectrolytes are electrically charged molecules which are attracted to the suspended particles and join together to form larger groups which are able to settle to the bottom of the pond impounding the tailage.

TOXIC EFFLUENTS

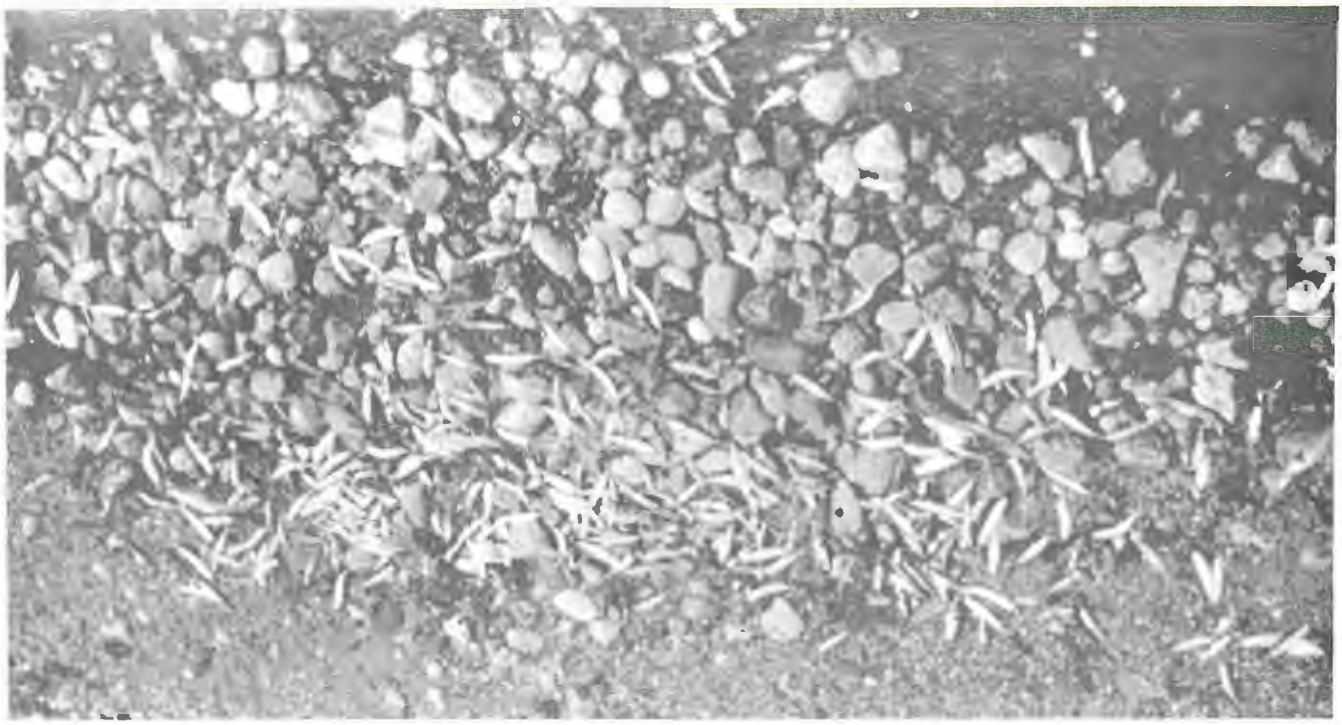
While pulp mill and mine-mill pollutions present the greatest problems to Resource Development teams on the west coast, toxic discharges of effluent from manufacturing plants also demand attention and corrective measures. Electroplating shops are an instance. In these cases, Resource Development biologists find it necessary to recommend that spent acid and alkali cleaning solutions be mixed to a degree of neutrality that is not damaging to fishing waters. To minimize the carryover into rinses of solutions containing heavy metals, dragout tanks have been provided. Facilities for the precipitation and neutralization of discarded solutions containing heavy metals have also been required.

For a chlorine and caustic soda manufacturing plant, sludges of calcium and barium carbonate are mixed with sulfuric acid used to dehydrate chlorine gas and discharged into a settling basis prior to discharge to a river estuary. Wastes from phenol manufacturing containing benzaldehyde, benzoic acid, phenol and formic acid are sent to a storage basin, and then are destroyed by a trickling biological filter followed by an activated sludge unit.

Flue dust from cement manufacturing is wetted, partly fed back to the kilns and the remainder is neutralized with the carbon dioxide from exhaust gases from the kiln prior to discharge. Wastes from vegetable canneries receive screening followed by biological treatment. These are some examples of the types of small industries which have been required to provide treatment at the request of the Department.

British Columbia's extensive lumber industry creates problems, particularly those caused by sawdust and shavings from sawmills and bark from logs in streams. As do untreated tailings from mine mills, these wood substances affect fish spawning grounds and stifle bottom dwelling fish food organisms. Silt from road building or soil erosion created by improper logging practices may totally destroy spawning beds by cutting off the essential oxygen supply to incubating eggs.

Then there is domestic sewage. This is not especially



Juvenile chinook and sockeye salmon on the shore of Shuswap Lake in British Columbia as a result of DDT spraying to kill mosquitoes.

Aerator in operation at B.C. pulpmill.

serious if it is discharged into a large receiving body of water. However, if the discharge of waste into a stream is large in relation to the amount of water in the stream, oxygen problems are created and undesirable changes in environment are produced.

While the amount of domestic sewage increases in proportion to the growth of the nation's population, sewage disposal facilities also increase. In British Columbia, for instance, the Resource Development Service maintains a liaison with the Provincial Pollution Board, and the Central Housing and Mortgage Corporation which helps to finance municipal sewage works. This keeps the Department informed of new domestic sewage disposal schemes, and is another example of the Department's co-operation with provincial agencies.

While existing federal and provincial legislation provides pollution control agencies with sufficient authority to protect Canadian waters from deliberate contamination, the effort to keep the waters safe for humans and for fish is a continuous one. The Resource Development Service of the Department of Fisheries on both coasts continues to study the effects of the various types of effluent and to distinguish between them so that the proper remedial measures may be employed.

(Reprinted from March, 1969, FISHERIES OF CANADA, issued by the Department of Fisheries of Canada.)

Canada's Lakes and the Phosphate Problem

Eutrophication – over-abundant water plant growth in lakes caused by nutrients from detergents, sewage systems and agricultural run-offs – is a problem with which federal fisheries scientists have become deeply involved. Working closely with other federal and provincial government departments and agencies, they have made a major contribution to new knowledge in this important area of inquiry. The following article is based largely on information supplied by the Eutrophication Section of the Fisheries Research Board of Canada's Freshwater Institute, Winnipeg.

Cool, clear lakes are part of Canada's heritage and image, but eutrophication – runaway water plant growth – is changing all that.

The problem has arisen in both Europe and North America from the fertilization of lakes with nutrients from man-made sources. These nutrients – notably compounds of phosphorous and nitrogen – have triggered the growth of algae and aquatic weeds, thus lowering the value of waters used for recreation, fishing and drinking water supplies.

The typical consequences of eutrophication include the fouling of beaches with plant slimes and weeds, oxygen depletion of bottom waters, taste and odour problems in drinking water, undesired changes in fish populations, clogging of filters on water intake lines, lowered property values and a general deterioration of the aesthetic aspects of the environment.

Eutrophication problems tend to be more prevalent in lakes than streams for a number of reasons: the longer residence times of water in lakes, the associated tendency for lakes to hold pollutants in one place for long periods of time, and the more favourable conditions of illumination and transparency, which permit better penetration of the sunlight needed for plant growth.

Man-made problem

Since rivers are most frequently the medium into which municipal and industrial wastes are discharged, lake chains along rivers that pass through areas of dense population or intensive farming tend to man-made or 'cultural' eutrophication.

As water courses of this type are a predominant feature of the Canadian landscape, new problems of cultural eutrophication can be expected to arise as our population grows and new technological uses for compounds of phosphorus and nitrogen are found – past examples being urbanization and the widespread use of fertilizers and phosphate-based detergents.

The full extent of present problems in Canada and the number of lakes that may be approaching critical points in the process cannot be stated in exact terms. Serious problems do, however, now exist in the lower Great Lakes, some lakes of the Okanagan, Muskoka and Trent Valley areas, and in numerous other lakes and embayments that have not been studied in detail.

Less than 10 per cent of the municipal sewage originating from all Canadian sources receives secondary treatment involving activiated sludge plants. Also, both this type of treatment and the most common and less efficient lagoon systems are relatively ineffective in terms of nutrient removal. As a result most of the fertilizing elements present in municipal wastes are liberated to the receiving water, causing accelerated plant growth in downstream areas.

Sewage treatment processes for phosphate removal alone have been found effective in controlling plant growth downstream from population centres. Although no such treatment processes are yet in full-time operation in Canada, some provincial and municipal agencies are taking active steps toward that end.

If appropriate measures are not taken to halt the problem of cultural eutrophication, an increasing number of Canadian water bodies will experience the same deterioration that has occurred in many lakes in Europe and the northern United States during the past 50 years.

What is eutrophication?

According to the trophic system of lake classification, oligotrophic lakes are poorly supplied with plant nutrients and support little growth. As a result, biological production is generally low, the waters are clear and the deeper waters are well supplied with oxygen throughout the year.

Eutrophic lakes, on the other hand, are rich in nutrients and support heavy growths of plants. As a result, biological production is generally high, the waters are turbid because of the dense growth of phytoplankton, and the deeper waters during periods of restricted circulation become deficient in oxygen as a result of the decomposition of the organic material produced.

The long-term effect of oxygen deficiency in the deeper waters is the reduction in numbers of cold water species of fish such as trout, whitefish and pickerel.

Natural eutrophication is associated with the progressive reduction in volume of water bodies as they fill in with sediments over long periods of time. The predominant cause appears to be related to funnelling of a constant supply of nutrients into an ever-decreasing volume of water, coupled with an increased recycling of nutrients from sediments to water in the terminal part of the process. Natural eutrophication is a slow process, requiring thousands to tens of thousands of years, depending on the original depth of the lake basin. For all practical purposes natural eutrophication is irreversible, since to reverse it one would have to scour out all of the accumulated sediment, a rather formidable process in any man's terms.

Cultural eutrophication, on the other hand, results from increased supplies of man-derived nutrients to a water body. In centres of dense population and industry it is a rapid process, measurable in years to tens of years. Cultural eutrophication is largely, if not completely, reversible following the reduction of nutrient inputs (e.g. by sewage diversion). To summarize, natural eutrophication is slow and irreversible; cultural eutrophication is rapid and can be reversed by reducing the nutrient supply.

The nutrients most commonly involved in the triggering of eutrophication are those present in the lowest supply relative to plant needs. In the vast majority of cases tested to date, compounds of phosphorus and nitrogen have been identified as the critical triggering nutrients, with phosphorus playing the predominant role as the overall growth-controller.

Cases are known of deficiencies in the supply of available iron, silicon, molybdenum, manganese, carbon and some other elements, but there is no evidence for attributing a principal role to any of these in either the causes or control of eutrophication.

It is important to note that the addition of small amounts of phosphorus and nitrogen can trigger greatly increased growth of plant tissue. The problem associated with cultural eutrophication is that the bulk of the phosphorus and nitrogen compounds present in sewage pass through the sewage treatment plant to fertilize the receiving water. In one year an average citizen contributes approximately three pounds of phosphorus (more than half from detergents) and 10-12 pounds of nitrogen to sewage – an amount that creates over a half a ton of living plant tissue when discharged to the natural environment.

Can eutrophication be controlled?

Cultural eutrophication can be prevented by restricting the supplies of man-derived nutrients. The principal sources of the nutrients involved are municipal wastes (human excreta and detergent phosphates), agriculture (run-off from over-fertilized lands and livestock-holding areas), and some industrial wastes (e.g. food processing plants).

Sewage diversion schemes that channel the wastes away from affected lakes to other less critical areas have been used in some instances, but the more commonly accepted approach in densely populated inland areas has been to attempt removal of the causal nutrients prior to discharge into the receiving water.

Particular attention has been focused on phosphates because they are the principal, overall growth-stimulating agents in lakes and, more important, they are controllable by man. Even if not originally growth controlling, phosphates can be made to be growth-controlling by their removal. The treatment of sewage with lime, iron or alum to remove phosphates markedly lowers the fertilizing capacity of sewage.

Heavy duty laundry detergents and automatic dishwasher detergents constitute the single largest source of all the phosphates present in municipal sewage (50 per cent to 70 per cent). The other major source of phosphates is human physiological waste.

As was recognized by the International Joint Commission in dealing with eutrophication problems in the lower Great Lakes, there are good reasons for exercising separate controls on phosphates arising from both sources. These reasons are:

(1) Phosphates from detergents are more amenable to rapid and direct control at the source rather than in a sewage treatment plant because the number of manufacturers of phosphate-based detergents is limited relative to the number of 'manufacturers' of human physiological wastes. This is largely a matter of timing and ability to deal effectively with one major aspect of the problem.

The removal of phosphates from detergents alone will not solve the problems of eutrophication in our lakes. Chemical precipitation of phosphorus from human wastes at

sewage treatment plants will also be necessary.

(2) In the case of alum treatment for phosphate removal, costs rise in proportion to the amount of phosphate removed. Annual additional chemical costs, based on the alum treatment, for removal of detergent phosphates in the lower Great Lakes basin alone have been estimated to be $5 million per year in Canada and $17 million per year in the U.S.A. In the case of treatment with lime and iron salts, it costs just as much to treat sewage high in phosphate as it does to treat sewage low in phosphate. Overall costs of this process (including sludge removal) could, however, limit its use in some areas.

(3) If phosphates are eliminated from detergents and 80 per cent of the remaining phosphates in municipal sewage are removed at the sewage treatment plant, the total removal amounts to 94 per cent. (Reduction from 100 per cent to 30 per cent by eliminating detergent phosphates at the source, and reduction from 30 per cent to six per cent by treatment of the remainder at the sewage treatment plant.)

To achieve comparable removal at the sewage treatment plant alone would demand an overall removal of about 97 per cent at large municipalities where such facilities are economically feasible. (The target of 97 per cent would be necessary to compensate for those cases in which phosphates from both major sources would not pass through treatment plants with phosphate-removal facilities, e.g. small municipalities, isolated houses and cottages, storm overflow.)

Cost per person

The costs for phosphate removal at the treatment plant range from 1/2 to 5 cents per thousand gallons of sewage. Since each of us contributes about 100 gallons of waste water per day, it costs between 18 cents and $1.80 per year per person.

In Volume I of the Report to the International Joint Commission on the Pollution of Lake Erie, Lake Ontario and the International Section of the St. Lawrence River, the capital costs for phosphorus removal are estimated at $ (Can.) 40 million, and $ (U.S.) 265 million for municipal and industrial waste treatment.

For the approximately 18 million people living in the Lower Great Lakes Basin of Canada and the U.S., the capital expenditure amounts to roughly $17 per person.

Due to the sharp increase of phosphate-removal costs as one approaches complete (100 per cent) removal, average efficiencies of the order of 97 per cent are not likely to be economically feasible in most instances.

Since phosphorus and nitrogen are the two predominant nutrients involved in triggering eutrophication, one naturally wonders whether phosphate removal from municipal sources alone, by any method, will be sufficient to contain the problem.

First of all, in areas of intensive agriculture and/or livestock holding, adequate measures must be undertaken to limit supplies of phosphorus introduced to streams by run-off.

Secondly, phosphate control must be recognized as the most direct and effective step that can be taken at the present time. Accessory problems resulting from nitrogen inputs may arise in future years, but the impact of eutrophication problems will be markedly reduced by phosphate control.

Warning on NTA

With respect to potential replacement for phosphates in detergents, the most promising compound prior to a warning issued by the U.S. Surgeon General in December, 1970, was nitrilotriacetate (NTA). Studies conducted at the U.S. National Institute of Environmental Health Sciences showed that although NTA has no effect on the health of laboratory animals when administered alone, it did enhance the production of embryonic malformations due to heavy metals when administered in conjunction with heavy metals. Further studies are being undertaken to determine whether these results are indicative of an actual health hazard under normal conditions of NTA use. NTA is being used on a small scale in Canada and Sweden. Major detergent manufacturers have stopped using it in the United States to comply with the Surgeon General's warning. NTA is degraded in normal sewage treatment processes, but the overall environmental impact of large-scale use has not been fully tested.

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Mercury in Freshwater Fish

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Mercury, or "Quick silver", is a rather peculiar substance in that it is a liquid metal. It is unusually heavy and it and its chemical compounds are noted for their poisonous properties. It is widespread in nature as red mercuric sulphide or "cinnabar".

Mercury production in Canada is limited to a mine at Pinchi Lake, B.C., which produces about 1,400 pounds of mercury a day. An open pit mine near Goldbridge, B.C., is due to go into operation this year. Spain and Italy are the world's leading producers of mercury.

We are all familiar with the use of mercury in thermometers, silent electrical switches, dental preparations, and in fluorescent lights. There are many other uses though, as in batteries, mildew proof paints, ointments for treating skin diseases, seed dressings and various fungicides in agriculture. Some electrical instruments contain mercury and it is used in the manufacturing of paper, plastics, felt, mirrors, and one of the oldest uses is in extracting gold and silver from ores. However, in Canada and the U.S., chlorine plants are by far the biggest users of mercury.

Last year, 300,000 lb. of mercury were used in all of Canada and two-thirds of this amount, or 200,000 lb., was used by chlorine plants. There are chlorine plants that do not use any mercury like the one at Brandon, but in those that do, it is estimated that they may lose close to one third of a pound mercury for every ton of chlorine produced. For a plant with a daily production of 100 tons of chlorine, this would represent a loss of 30 lb. mercury per day or approximately 10,000 lb. a year. Most of this mercury has, until recently, been discharged with waste water and ends up in our rivers and lakes. At today's rate of around $7 a pound for mercury, there is little difficulty in convincing chlorine plants that treatment facilities must be installed to prevent contamination of fish.

Dr. E.G. Bligh

Mercury compounds have been widely used in the pulp and paper industry as slimicides in the wood-preparation areas and in the vicinity of paper machines to control slime fungi which are a nuisance in mill operation. Organic mercury compounds like phenylmercuric acetate are extremely effective against these slimes. During the last 10 years, many countries including Canada have for the most part discontinued using these compounds in paper mills owing to regulations preventing the use of food-packaging materials containing mercury. Only about half a dozen Canadian mills were still using mercury slimicides in January, 1970, and most of these have now received formal notification that their use must be discontinued.

Canadian consumption of mercury in seed dressings has decreased slightly in recent years and now totals about 25,000 lb. per year. These compounds appear to be causing serious problems with birds like the pheasants in Alberta, but there is no evidence that they have affected fish.

DEATHS IN JAPAN

Fish and shellfish are noted for their ability to concentrate heavy metals like mercury. In fact they can readily tolerate mercury levels that are hazardous to human health if eaten. The Japanese problem at Minamata Bay in the 1950's is the best documented case where 111 deaths resulted from the consumption of fish and shellfish contaminated with mercury. We must bear in mind that Japan leads the world in fish consumption at about 61 lb. per person per year (compared to Canada's 13 lb. per person per year) and that the consumed fish and shellfish were heavily contaminated (up to 20 ppm mercury). In the case of those who died, it must be pointed out that they were eating some fish for almost every meal. Chemical plants using mercuric chloride and mercuric oxide were reported to have been responsible for polluting the Bay.

A similar incident occurred in Niigata, Japan, in 1965 where 26 cases

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of poisoning resulted in five deaths from the daily consumption of mercury contaminated fish.

Sweden has experienced problems with mercury in freshwater fish more recently. They established that the mercury originated from the widespread use of mercury slimicides in pulp mills and the use of mercury cathodes in chlorine plants. Although they have recorded levels in pike as high as 9.8 ppm, and the Swedes are also heavy fish eaters (45 lb capita/annum), there were no reported cases of mercury poisoning in humans. However, Sweden has closed many areas to fishing on account of mercury contamination.

It has been found that when mercury is discharged into a river or lake much of it goes to the bottom and stays there. However, some of it is gradually released into the water and any mercury in the water can be taken up directly by fish. In addition to this, fish will accumulate mercury in the muscle and in pike for example, the concentration in muscle can be 3000 times the concentration in the water. Pike, and other predator fish, can accumulate particularly high levels since they have a certain uptake from the water and they get an additional intake from any other fish they eat.

Accumulation if fish muscle can be very rapid (a few days) but elimination is slow. The biological half-life of mercury in pike muscle has been reported at 70 days (that is, the fish disposes of half of its mercury build-up in 70 days, half the remainder in the next 70 days and so on). Mercury levels in fish muscle vary greatly even when they are of the same species. In wild fish, highest concentrations are found in larger or older fish.

Although mercury compounds are highly toxic to fish, the author is aware of no reports of fish kills due to mercury pollution. Tests are being conducted at the Freshwater Institute to determine whether mercury can interfere with fish reproduction.

Dr. J.F. Uthe, research scientist at the FRB Freshwater Institute, Winnipeg, examines a newly-arrived batch of fish samples before they are prepared for analysis.

NATION-WIDE SURVEY

Meanwhile in co-operation with the Fish Inspection Branch the Freshwater Institute is carrying out a national survey on the mercury content of Canadian fish including both marine and freshwater species. Scientists are also attempting to learn how fast we can clean up contaminated rivers and lakes and whether we can in any way process our fish to remove mercury. Cooking does not significantly alter the mercury content but when Cedar Lake pike were processed into fish meal there was a mercury loss of about 25%.

The Department has been in touch with authorities in the U.S. and is guaranteeing housewives in Canada and the U.S. that Canadian fish released to the market is perfectly safe and wholesome.

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