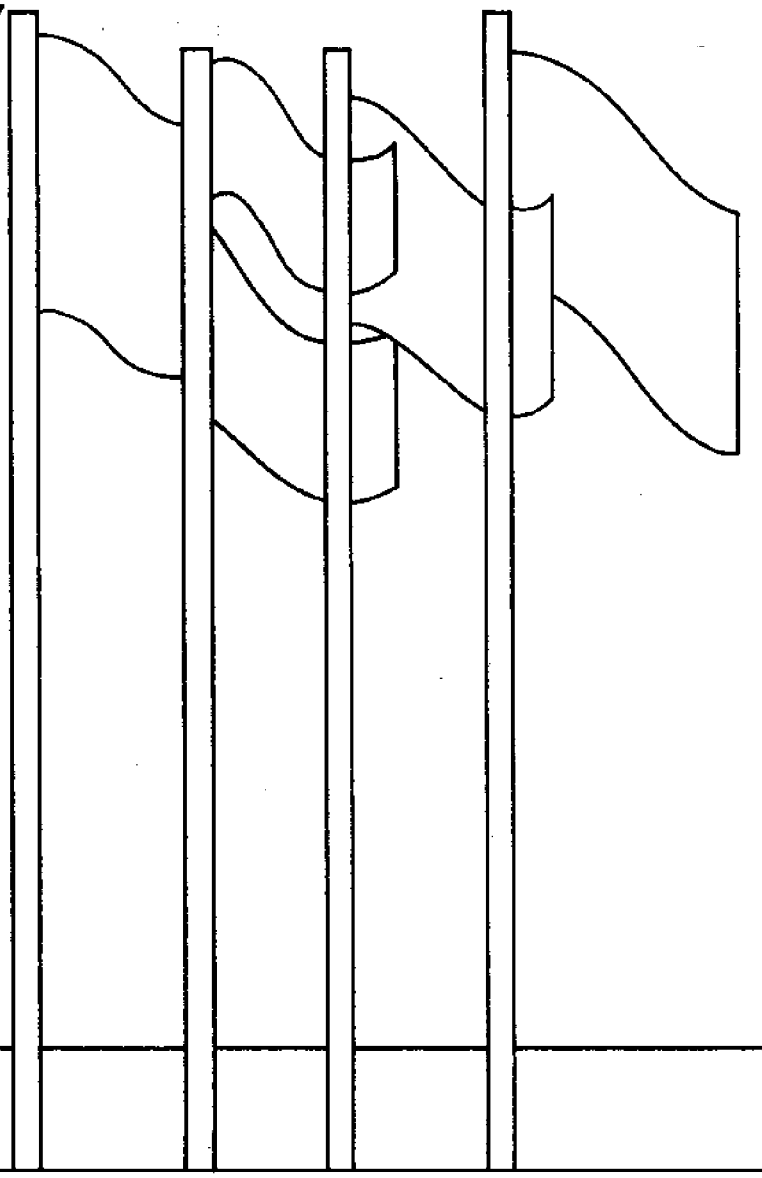

The Settlement of International Environmental Disputes

by Richard B. Bilder

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THE SETTLEMENT OF INTERNATIONAL ENVIRONMENTAL DISPUTES

A Series of Lectures Delivered at the
Hague Academy of International Law
Summer 1975

by

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INTRODUCTION

These lectures are on the subject of international environmental disputes. My objectives are: (1) to examine the nature of international environmental disputes and their significance for international order; (2) to survey and analyze relevant law and experience, with particular attention to environmental problems relating to international rivers and lakes, the oceans and the atmosphere; and (3) to suggest some of the principles, approaches and techniques through which international law and institutions may be able most effectively to contribute to the avoidance and adjustment of international environmental disputes and to the protection of the international community's interest in the environment.[1]

Some introductory comments may be helpful in placing the topic of these lectures in context.

First, the idea that international environmental problems constitute a distinct area of interest is a relatively new one. It is only recently that governments and peoples have come to recognize the significance of international environmental problems and to view them as appropriate subjects of international concern. The landmarks in this growth of ecological awareness are generally familiar. They include: the development of nuclear weapons, demonstrating man's awesome powers to alter the environment; the view of earth from space, with its indelible impression of the essential fragility of the human condition; the Torrey Canyon and Santa Barbara Channel oil spills of 1967 and 1968, dramatizing current dangers to the environment; and the gradual recognition that major development projects, such as the Aswan Dam, may involve serious ecological problems. As attention has focused on the environment, new problems have been discovered, underlining the environmental challenge and spurring growing efforts, particularly in industrialized countries, to meet it.

The climax in this growth in international recognition of the importance of environmental issues was the United Nations Conference on the Human Environment held at Stockholm in 1972. At this conference, 113 nations reached agreement on a Declaration on the Human Environment, an Action Plan of 109 recommendations for specific environmental action by national and international bodies and a proposal for permanent U.N. involvement in these problems.[2] The conference signalled recognition by the international community that environmental issues constitute a unique class of international problems which require distinct approaches and collaborative methods of solutions. As Maurice Strong, Executive Director of the U.N. Program pointed out, it has now become "axiomatic that these problems transcend the capacity of any nation to handle or to avoid.... Inevitably, environmental considerations have become basic factors in the whole structure of international relations."[3]

Second, this is a very broad, complex and rapidly developing area. During only the last few years, environmental activities have

mushroomed. Many nations have enacted legislation, adopted regulations, and taken other measures to protect their environment. A network of bilateral environmental arrangements has been established, ranging from general arrangements for cooperation[4] to complex and innovative agreements such as the 1972 U.S.-Canadian Great Lakes Water Quality Agreement.[5] Regional organizations and other special groups have adopted a variety of measures, such as the 1973 Nordic Pollution Convention,[6] the 1974 Baltic Pollution Convention,[7] the 1974 Declaration on the Program of Action of the European Communities on the Environment[8] and the 1975 Declaration on Environmental Policy of the Organization for Economic Cooperation and Development.[9] On the global level, the United Nations and its specialized agencies, such as the Food and Agriculture Organization (FAO), the Intergovernmental Maritime Consultative Organization (IMCO), the World Health Organization (WHO), and the World Meteorological Organization (WMO), are moving on many fronts to cope with environmental challenges. A number of major recent agreements have been concluded under international organization auspices, including the 1972 Ocean Dumping Convention,[10] the 1972 World Heritage Convention,[11] the 1973 Ship Pollution Convention[12] and the 1973 Convention on Trade in Endangered Species.[13] The proposed Law of the Sea Treaty, currently under negotiation by the U.N. Law of the Sea Conference, will almost certainly include provisions for the protection of the marine environment. Important global projects for environmental monitoring and surveillance have been established, such as Earthwatch, the Global Environmental Monitoring System (GEMS) and the Global Atmospheric Research Program (GARP).

Perhaps the most important recent development in this field has been the establishment in 1973 of the United Nations Environmental Program (UNEP) as a special intergovernmental body within the U.N.[14] UNEP consists of a Governing Council of 58 member states; an Executive Director and secretariat based at Nairobi, Kenya; and an Environment Fund, which has now grown to over $100 million. UNEP's functions are to maintain a continuing overview of the state of the global environment and the development of public policy with respect to it; to recommend and initiate policy and programs in the field of environmental protection; and to coordinate the activities of the U.N. system as a whole in this area.[15]

Third, international environmental differences are of growing practical importance. With the recent surge in ecological awareness, governments are acquiring a special sensitivity to these problems and are more likely to make international issues of them. Thus far, international environmental differences have arisen in a number of areas—competing uses and pollution of international rivers and lakes; pollution of the seas and oceans; the testing of nuclear weapons; the conduct of scientific experiments on land or in outer space; and the use of herbicides in warfare. Other differences have developed concerning unilateral measures taken by states designed to protect their own national environmental interests and policies, sometimes with effects damaging to the interests of other states.[16] With advancing technology, new problems which could occasion disputes are emerging—the issue of supersonic air transports and ever-larger supertankers; acidic rains in Europe; prospects for the manipulation of weather and

modification of climate; threats from nitrogen compounds and aerosols to the ozone layer of the atmosphere; proposals for diverting rivers and ocean currents and damming straits; and even threats of environmental aggression and ecocidal warfare. Indeed, UNEP director Maurice Strong has suggested that present environmental problems are "of fairly marginal significance compared with those yet to be confronted."[17]

More broadly, it has become clear that there are important differences of attitudes and perceptions concerning environmental issues as between industrialized and developing countries.[18] The industrialized countries, where environmental problems are most acute, tend to favor strong national and international measures to protect the environment. Many of the developing countries, on the other hand, are concerned that such measures may have adverse impacts on international aid, trade and the realization of their economic development and welfare objectives. They have sought both to expand the concept of environmental goals to include their development concerns and to ensure that measures and programs reflect and do not impede their development efforts. Thus, international environmental policy has become involved in ideological differences concerning demands for a new international economic order.

Fourth, the concept of international environmental law is still very new, and its shape and content are still amorphous and undefined.[19] We have, of course, had international experience in some of these areas—for example, problems of international lakes and rivers; the U.S.-Canadian Trail Smelter arbitration;[20] the 1954 Oil Pollution Convention;[21] fishery conservation agreements;[22] environmental aspects of the Antarctic Treaty;[23] and the Nuclear Test Ban Treaty.[24] But it is only in the last decade that we have come to think in terms of a distinct and related body of environmental problems, exhibiting common characteristics and potentially subject to common principles and solutions. Consequently, it is not surprising that present international environmental law is embodied principally in written instruments, deriving its rules from particular treaties and agreements binding only the parties, and that the fund of customary law in this area is sparse.

However, there are some moorings. Thus, I would suggest that general international law now incorporates at least the broad, if somewhat vague, obligation stated in Principle 21 of the Stockholm Declaration, which provides that:

> States have, in accordance with the Charter of the United Nations and the principles of international law, the sovereign right to exploit their own resources pursuant to their own environmental policies, and the responsibility to ensure that activities within their own jurisdiction or control do not cause damage to the environment of other states or of areas beyond the limits of national jurisdiction.[25]

This principle crystallizes several earlier and related strands of doctrine and experience, such as (1) the doctrine of abuse of rights; (2) the principle of good neighborliness; (3) the doctrine sic utere tuo ut alienum non laedas ("one must use his own so as not to injure

others"); (4) the dictum of the International Court in the Corfu Channel Case, where it referred to "every state's obligation not to allow knowingly its territory to be used for acts contrary to the rights of other states";[26] and (5) the dictum, which we will subsequently discuss, in the Trail Smelter arbitration.[27] Since Stockholm, the substance of Principle 21 has been recited and referred to in a number of recent international agreements, resolutions and other international instruments, including Article 30 of the General Assembly's Charter of the Economic Rights and Duties of States.[28] In our subsequent discussion of the law relevant to various environmental problems, I will assume the broad applicability of the general obligation stated in Principle 21 without further specific mention.

It is worth noting, however, that the Stockholm Declaration speaks only very broadly to issues of specific liability and compensation. Thus, Principle 22 provides that:

> States shall cooperate to develop further the international law regarding liability and compensation for the victims of pollution and other environmental damage caused by activities within the jurisdiction or control of states to areas beyond their jurisdiction[29]

This implies that some law now exists, but the Declaration leaves its precise content unspecified.

As we shall see, shared attitudes are also being manifested in a variety of new environmental agreements and in other instruments, such as the Declaration on the Program of Action of the European Communities on the Environment[30] and the Organization for Economic Cooperation and Development's (OECD's) Declaration on Environmental Policy[31] and its recommended Principles Concerning Transfrontier Pollution.[32] Pursuant to General Assembly Resolution 3129,[33] UNEP is currently beginning work on a draft code of conduct concerning cooperation between countries for the conservation and harmonious exploitation of natural resources common to two or more states. Further, pursuant to General Assembly Resolution 2669,[34] the International Law Commission is embarking on an attempt to codify the law with respect to the non-navigational uses of international waterways. As this international experience accumulates, new and more precise norms may emerge.

Finally, this is a field which is difficult to separate into parts. We cannot talk usefully of dispute settlement without talking also about dispute avoidance and the entire body of law, institutions and practice concerning the way in which governments attempt to deal with environmental problems. Clearly it is better to anticipate potential disputes and prevent them from arising than to try to adjust them after they have emerged. Thus, we have to think in terms of an entire structure of dispute avoidance and management techniques involving both substantive and procedural law, and of approaches of various types and at various levels. Moreover, while I will for convenience treat them separately, environmental problems relating to the land, rivers, oceans, atmosphere and other contexts are ecologically interrelated, and, as our discussion will indicate, their solutions will often be interdependent.

I. PRELIMINARY QUESTIONS

I want to begin our discussion by raising some threshold issues concerning the nature of international environmental disputes, the relation of environmental dispute settlement to international dispute settlement more generally, and some of the options open to us for managing these environmental disputes. This will provide a framework for our subsequent consideration of these problems.

A. Characteristics of International Environmental Disputes

Let us start by looking at some characteristics of international environmental disputes.

1. Defining International Environmental Disputes

First, what do we mean by "international environmental disputes?" In these lectures, I will use this term to mean any disagreement or conflict of views or interests between states relating to the alteration through human intervention of natural environmental systems. In practice, these differences primarily involve issues of pollution. Let me briefly comment on some aspects of this definition. We will be interested in the entire process of environmental dispute management, including differences which may still be inchoate and have not yet been clearly formulated, articulated, or advanced as specific claims or contentions.[1] However, our concern is limited to problems involving man's natural environment. This is a narrower concept than that employed by the Stockholm Conference or by UNEP, where the concept of environment has been used to embrace a number of the social, as well as natural contexts of man's activities—for example, human settlements, health care, housing, education and jobs. Moreover, I will not discuss differences concerning the management of natural resources, such as problems of fisheries, energy or the mineral resources of the seabed. These are very important and related problems, but they also raise many complex and distinct issues which deserve separate treatment.

2. Special Aspects of International Environmental Disputes

Second, what is special about environmental problems and disputes? How do they differ from other kinds of international problems? One possibility, which should be kept in mind, is that they are not really very different. But let me suggest some possible distinctions.

First, environmental problems tend to involve situations in which our knowledge of the facts is particularly limited and our assessments of risks particularly uncertain.[2] We still know little about pollution—the types of pollutants our activities are producing; their magnitude; where they come from; where they go; how they get there; or what consequences they have. We know little about the absorptive capacities of various media or organisms; environmental interdependence and interactions; or the most effective methods of

control. Moreover, since the effects of pollution are often subtle, interacting, and long-run, the facts may be hard to obtain and we may not be aware of dangers until it is too late to do anything about them.

Second, environmental problems tend to require, perhaps more frequently than other types of international problems, special types of collaborative action for their solution. This is particularly the case when the problem relates to common or shared areas or resources, such as the oceans, which are outside of the exclusive jurisdiction or control of any one state. Where several or many nations jointly contribute to the problem, it cannot be resolved unless all who are involved change their ways. In these situations, no one nation may have any incentive to take action to protect the environment unless all others do likewise—the so-called "Tragedy of the Commons."[3]

Third, environmental problems tend to raise particularly complex and difficult questions of social choice—problems of balancing benefits and gains, of apportioning costs, and of "tradeoffs." This is illustrated by the difficulty of defining pollution and of deciding what kinds and levels of pollution to control.[4] Almost all human activity and technology may affect the environment. The problem then is to weigh the benefits of such activities and the costs of controlling them against the probable environmental consequences. The making of environmental policy decisions requires that we attempt to strike some reasonable balance as to those consequences we are prepared to accept and those which we should try to do something about. Obviously, these are questions upon which nations or individuals may differ. Thus, they may differ as to the desirability of different activities, such as the use of automobiles, supersonic transports, DDT, or nuclear energy, or in their assessment of the risks which such activities entail. They may differ as to the wisdom of costly preventive measures, such as sewage treatment plants, double-bottom tankers or pollution control devices. They may differ as to where to put the wastes which are the inevitable by-product of human activity, and which have to go somewhere, either the land, the water or the atmosphere. And, if costs are to be incurred, they may differ as to who is to pay these costs or how they are to be shared.

Fourth, there are reasons, which we will subsequently explore in more detail, why it may be difficult to deal with environmental problems through traditional legal approaches. Prevention will typically be more important than indemnity. There will frequently be multiple sources and multiple victims, causation may be hard to prove, and damage may be hard to establish or calculate. Consequently, as we shall see, governments have tended to avoid judicial and liability-based methods of dealing with these questions.

Finally, environmental problems pose threats of a unique kind, in terms of the numbers of people affected, the importance of the interests at stake and the long time periods which may be involved. At the extreme, they raise threats to human survival. This is a wholly different order of problem from those with which international law is usually concerned.

3. Types of International Environmental Disputes

Third, let us look at some of the various kinds of international environmental disputes. How are these disputes likely to differ from one another? The question is important since dispute settlement approaches, institutions or techniques appropriate for one kind of dispute may not be appropriate for another. There are a large number of ways in which we might classify environmental disputes. For example, we might wish to distinguish between them on the basis of factors such as the following:

(i) What the dispute is about—facts, the assessment of these facts, the interpretation or application of existing rules, or what the rules should be.

(ii) Whether the dispute relates to conduct which itself has environmental consequences, or concerns claims of jurisdiction to control or regulate environmentally relevant conduct.

(iii) The interested parties—states, groups of states, international organizations, or private individuals or associations.

(iv) The geographical scope of the dispute—primarily local, regional or global.

(v) The sector or area of the environment affected—the land, an international river or lake, the ocean, the atmosphere, outer space, or several of these.

(vi) The nature of the polluting agent and where the source is located.

(vii) The character of the conduct giving rise to the dispute—intentional or unintentional, one time only or continuing, and so forth.

(viii) The character of the harm involved in the dispute—localized or widespread, direct or subtle, immediate or long-run.

(ix) The kind of remedy sought—money damages, an order to do or not to do something, or a declaratory judgement—and against whom it is directed—a state or some individual, corporation or association.

In general, the international community has tended to approach environmental problems on the basis of the environmental sector principally affected—dealing separately with problems concerning international rivers and lakes, the oceans and the atmosphere. While these lectures will follow that breakdown, it is worth remembering that there are many other kinds of characterization which may be useful.

B. Obligations to Avoid and Settle Disputes

Next, let us take at least a preliminary look at the question whether states have any broad obligations regarding the avoidance and settlement of international disputes, either generally,[5] or with respect particularly to environmental disputes.

1. The Obligation to Settle Disputes

First, do states have any international obligation with respect to the settlement of disputes? The answer I would suggest is that international law requires states to make at least good faith attempts to settle their more serious disputes by peaceful means. This obligation is reflected in Article 2, paragraph 3 of the United Nations Charter, which provides that:

> All members shall settle their international disputes by peaceful means in such a manner that international peace and security, and justice, are not endangered.

and also in Article 33 of the Charter which provides that:

> 1. The parties to any dispute, the continuance of which is likely to endanger the maintenance of international peace and security, shall, first of all, seek a solution by negotiation, enquiry, mediation, conciliation, arbitration, judicial settlement, resort to regional agencies or arrangements, or other peaceful means of their own choice.
>
> 2. The Security Council shall, when it deems necessary, call upon the parties to settle their disputes by such means.

This principle is also reflected in the General Assembly's 1970 Declaration on Principles of Friendly Relations,[6] a variety of other Security Council and General Assembly resolutions, and a large number of other bilateral and multilateral instruments providing for the peaceful settlement of disputes, both generally and in specific contexts.[7] For example, this obligation is embodied in the General Act for the Pacific Settlement of International Disputes,[8] the American Treaty of Pacific Settlement (Pact of Bogota),[9] the European Convention for the Peaceful Settlement of Disputes,[10] and relevant provisions of the Charter of the Organization of African Unity.[11]

This obligation to settle disputes by peaceful means is also reflected in various instruments in the more specific context of developing international environmental law. It is arguably implicit in Principles 21 and 22 of the Stockholm Declaration and in the spirit of the Declaration as a whole. As we will see in our later discussion, there are already a number of agreements and other instruments in this field containing provisions respecting peaceful settlement.

However, it is clear that neither the U.N. Charter nor general international law prescribe any particular methods of peaceful settlement. There are no broadly applicable procedures for determining whether a state has sought a settlement in good faith, and there are

no certain ways of imposing sanctions for failure to observe this duty. Article 33 of the Charter, for example, leaves the choice of possible means to the parties. In particular, international law imposes no legal obligation to resort to third party settlement of disputes. Thus, any duty to utilize specific techniques of dispute settlement, such as judicial settlement, must be provided by specific agreement.

2. Obligations to Avoid Disputes

Second, do states have any obligations under international law regarding the avoidance or prevention of disputes? I would suggest that the answer in this case is that international law does not presently impose any general obligation on states to avoid disputes, or, more particularly, to employ any particular methods to achieve this end. There are some indications that the law may be moving in this direction. For example, it has been suggested that the decision of the International Court of Justice in the Corfu Channel case[12] supports the existence of an obligation to give notice and consult regarding situations that may cause injury to another state. However, the evidence as to any general obligation in this respect is, in my opinion, still too sparse to support any general rule.

It is particularly interesting, therefore, that, in the special field of international environmental law, such a principle of dispute-avoidance may be gradually emerging. There is arguably a growing consensus that a state contemplating or carrying on an activity which may threaten other states' environmental interests should not act unilaterally—that it ought instead to give timely information and notice in advance to the state affected, engage in consultations, and perhaps seek in good faith to negotiate an arrangement capable of avoiding or minimizing the harm or threat. We will look at these developments in more detail in the subsequent lectures. But let me briefly mention several of them at this time. Thus, the Stockholm Declaration as a whole, and particularly Principles 21 and 22, may be broadly read to imply a responsibility to avoid or minimize environmental damage through the use of such anticipatory mechanisms. Again, recent actions by the General Assembly lend support to at least some of these principles. Thus, in Resolution 2995[13] the General Assembly has recognized that environmental cooperation "will be effectively achieved if official and public knowledge is provided of the technical data relating to the work to be carried out by states within their national jurisdiction with a view to avoiding significant harm that may occur in the environment of the adjacent area."[14] And in Resolution 3129, the General Assembly expressed the view that cooperation between countries sharing natural resources and interested in their exploitation "must be developed on the basis of a system of information and prior consultation within the framework of the normal relations existing between them."[15]

Other evidence of growing recognition of such obligations is accumulating. We will see that specific provisions to this effect are found in a great number of agreements relating to international drainage basins,[16] the Outer Space Treaty,[17] the 1974 Nordic Pollution Convention,[18] and the 1975 U.S.-Canadian Weather Modification Agreement.[19]

The OECD's 1974 Principles Concerning Transfrontier Pollution[20] emphasize the desirability of mechanisms for timely notice, exchange of information, consultation and negotiation. The Executive Director of UNEP has recommended that the draft code of conduct to be prepared pursuant to Resolution 3129 concerning cooperation with respect to shared resources might, inter alia, include provisions respecting notification, exchange of information and consultation, as well as the peaceful settlement of disputes.[21] The tentative conclusions of the American Society of International Law's 1974 Bellagio Conference on the Avoidance and Adjustment of International Environmental Disputes have similarly stressed the principal importance of dispute-avoidance mechanisms.[22] The recent decision of the International Court in the Fisheries Jurisdiction cases[23] is of interest in this respect, at least by analogy. After noting the existence of a duty by states to have due regard to the rights of other states as regards the treatment of the living resources of the sea in the high seas, and the need for conservation for the benefit of all, the Court went on to say:

> Consequently, both parties have the obligation to keep under review the fishery resources in the disputed waters and to examine together, in the light of scientific and other available information, the measures required for the conservation and development, and equitable exploitation, of those resources.....[24]

C. Methods of Dispute Avoidance and Settlement

Next, I want briefly to call attention to some of the dispute management options available to us. Obviously, there are a wide range of possible techniques for avoiding or adjusting international environmental disputes.[25] Each of these has its own uses, advantages and limitations. One of our tasks will be to explore and evaluate them.

1. Techniques for Avoiding Disputes

What techniques might we use to avoid environmental disputes? The possible methods we might consider employing include the following:

(i) The establishment of domestic regulations and procedures such as environmental assessment procedures and impact statements, which are intended to take account of and avoid possibly adverse international environmental consequences of domestic programs.

(ii) The reaching of prior international agreement on relevant environmental rules, regulations and standards, or on the permissible breadth of national regulatory jurisdiction concerning the environment.

(iii) The establishment, by formal agreement or informal means, of procedures for international notice, exchange of information and consultation in advance of, or in conjunction with, national actions which may give rise to international environmental problems.

(iv) The establishment of arrangements, institutions or procedures for environmental monitoring, the identification and assessment of environmental risks before they eventuate, and the public spotlighting of environmental problems.

(v) The establishment of ongoing informal or formal arrangements, or of specialized international regulatory and administrative agencies, capable of avoiding and adjusting problems on a continuing basis.

We will see that it is possible to establish institutions, such as joint commissions, which are capable of combining a number of these techniques. It should be noted that dispute settlement techniques may also serve dispute avoidance functions, at least as to future disputes. For example, international tribunals may in some cases have authority to exercise equitable powers to restrain conduct which might exacerbate a dispute, or to indicate a regime or course of conduct directed at future avoidance. Even ex post facto remedies, based on concepts of legal responsibility and award of money damages, can contribute to dispute avoidance by clarifying relevant rules and deterring rule-violating behavior.

2. Techniques for Settling Disputes

What about techniques for adjusting or settling disputes which have already arisen? The possible methods which we might consider using include the following:

(i) Settlement by national tribunals or administrative agencies.

(ii) Settlement by negotiation between or among the parties.

(iii) Settlement by negotiation between or among the parties, with the help of third parties through such techniques as enquiry, mediation, conciliation or advisory arbitration.

(iv) Resort to settlement prodecures employing specialized agencies such as joint commissions.

(v) Resort to settlement procedures provided by regional agencies such as the Organization of American States (OAS), Organization of African Unity (OAU), or the Council of Europe.

(vi) Resort to settlement through the political organs of the United Nations, under Chapter VI of the Charter.

(vii) Resort to traditional means of binding judicial settlement through the agency of ad hoc arbitration or an international court, such as the International Court of Justice.

(viii) Resort to possible new institutions, such as UNEP or other specialized environmental agencies or courts.

The principal differences among these techniques relate to the extent to which the parties give up their flexibility and right to

control outcomes. Other differences may relate to such matters as: (1) whether the relevant technique or mechanism is compulsory or non-compulsory; (2) whether it is ad hoc or in existence; (3) whether it is bilateral, regional or global; (4) whether it is specialized with respect to specific environmental problems or general; (5) whether the third parties are primarily lawyers, technical experts or political officials; and (6) how and by whom the technique is called into operation.[26]

3. Existing Institutions

Of course, many institutions capable of being used for international environmental dispute avoidance and settlement already exist. In a number of countries, it is possible to raise such issues before national courts or agencies. There are also already many treaties establishing general or specialized bilateral commissions or other bilateral arrangements for dealing with disputes. Regional and other specialized organizations such as the OAS, OAU, Council of Europe, European Communities, Arab League, North Atlantic Treaty Organization (NATO) and OECD provide forums and procedures for dispute settlement. At the global level, the United Nations, UNEP, and the various U.N. Specialized Agencies, such as IMCO, WMO, WHO and FAO, provide forums, facilities and procedures which can assist in dispute avoidance and settlement. Finally, states may submit their disputes to the International Court of Justice.

D. Dispute Management Objectives

Finally, let me raise the question of dispute management objectives.[27] If we are to have some basis for evaluating international experience in avoiding and adjusting environmental disputes, we should ask what we want to accomplish.

It is probably beyond our powers to avoid all international environmental differences. Disputes are a normal part of the workings of any active and developing social system. They reflect the emergence of real problems, continuing processes of social change and the inevitable readjustment of differing claims and interests. Our aim should be not to repress this turbulence, but to provide approaches, procedures and facilities which will help the parties to deal with and resolve these underlying problems in effective and sensible ways. In particular, we should try to ensure that these differences do not become socially disruptive—distracting energies, impeding useful interactions, escalating into violence or threatening international peace and stability.

More specifically, I suggest that a dispute management technique ought to meet the following criteria:

(i) It should be effective, in the sense of leaving the parties believing they have no significant differences. A dispute has been avoided or settled only when the parties think it has.

(ii) The parties, and other persons concerned, should feel that the procedures employed are fair, and that the outcome, even if not to their liking, is reasonable.

(iii) It should be relatively simple, efficient and inexpensive.

(iv) It should, by its availability, acceptability and credibility, reenforce generally desirable patterns of behavior, and thus deter the emergence of future differences or disputes.

(v) It should be capable of protecting broader international interests in the environment and international order.

This last point deserves some emphasis. International dispute management implies more than simply avoiding or adjusting differences between particular states. It should also mean promoting outcomes which protect the interests of the international community and human enterprise as a whole. Thus, if two states amicably resolve their differences over transfrontier pollution by mutually agreeing to dump their wastes in the ocean, the dispute may be settled, but hardly in a way which other states would consider desirable. Indeed, as we will see, there may be cases where activities affect important community environmental interests but where, in the absence of specific substantial damage to any particular country or special political considerations, no country has any incentive to raise the matter. Dispute management should furnish techniques and institutions capable of meeting these problems, seeing that problems which should be raised are raised, and ensuring that dispute avoidance and adjustment arrangements reflect the interests of the broader community as well as that of the individual states immediately concerned.

II. DISPUTES CONCERNING INTERNATIONAL RIVERS AND LAKES

Let us now look at some environmental problems as they have arisen in particular contexts. I will discuss, first, the management of environmental disputes concerning international rivers and lakes.[1] These are rivers and lakes which either form a common boundary between several countries or which flow successively through, or lie within, more than one country. The term international drainage basin is often used to describe these situations, and may better suggest that we are dealing with a complex and integrated hydrologic system, artificially divided by national boundaries.

There is an inherent possibility of international disputes between coriparian states due to the fact that these shared water resources can be used for a variety of different purposes—for example, domestic and sanitary uses; navigation; irrigation; the generation of electrical power; diverse industrial uses; fishing; recreation; and as a medium for the disposal of sewage, industrial or other wastes. These various uses may involve diversion or pollution of the shared waters, and, at least at some levels of utilization, may be conflicting and give rise to competing claims. For example, use of the water by one coriparian for sewage disposal may interfere with its use by another as a source of drinking water. We are here concerned primarily with issues involving the non-navigational uses of these waters; navigational uses involve essentially different questions.

There are several reasons why it is useful to begin our survey by examining problems concerning international rivers and lakes. First, they constitute our earliest and most extensive experience in attempting to deal with international environmental issues. Second, they continue to pose the most significant and pervasive types of environmental problems. Current examples include differences relating to Euphrates, the Ganges, the Rhine, and the Garrison River (which is between the United States and Canada). Since water resources are usually of vital importance to the coriparian states, disputes in this area can be very serious. As population and economic growth place ever-increasing pressure on limited freshwater supplies, these differences are likely to become even more intense and difficult to resolve. Third, international water problems are a good illustration of relatively localized international environmental issues. Typically they affect only areas and activities within the jurisdiction of the states particularly concerned, rather than international areas and interests of the entire international community. Finally, this experience suggests, in a relatively simple context, a number of questions, principles and approaches relevant to environmental dispute management more generally.

A. Relevant Law: An Overview

First, let us take a look at the relevant law in this area. Despite long and extensive experience with problems concerning international rivers and lakes, there is still very little general international law on this subject. There are no widely applicable international conventions and few significant international arbitral or

judicial decisions. Instead, international behavior has been governed principally by a large number of specific bilateral or regional agreements between or among the states sharing particular water systems, tailored to their unique problems and characteristics. These agreements differ considerably as to their provisions, and it is difficult to draw conclusions from them as to broadly applicable rules. However, there have recently been several efforts to codify this law, first by nongovernmental international legal associations such as the Institute of International Law and the International Law Association, and currently, by the International Law Commission and the U.N. Environment Program.

At the moment, perhaps the closest we have come to general law is in a wide recognition and apparent acceptance of the so-called principle of equitable utilization. The thrust of this principle is that all states which share an international drainage basin have a right to an equitable and reasonable share in the beneficial uses of the waters of the basin. Conversely, one state should not use or allow the use of these waters in such a way as to unreasonably interfere with the legitimate interests of the other co-basin states. The principle implies a need for cooperative approaches in the management and development of those shared resources. But it embodies only a broad standard, rather than any specific rule; its application in any given situation will depend on the particular circumstances. There also appears to be a growing consensus to the effect that pollution of the waters of a drainage basin may, at least in certain circumstances, constitute an unreasonable interference with use of the waters by other coriparians, and consequently be unlawful. However, more precise rules in this respect have yet to develop.

Let me comment on several aspects of these legal developments in more detail:

1. Specific Agreements

There are now some 300 international agreements dealing with particular rivers, lakes or drainage basins, which together cover something less than half of the world's international drainage basins.[2] As indicated, these agreements are quite diverse. However, scholars, such as Professor Bourne of Canada,[3] have collated these provisions and suggested certain broad features. Almost all of these agreements reflect acceptance in some form of the principle of equitable utilization. Over 60 of the agreements refer to water pollution, but they do so in differing terms; consequently, it is difficult to adduce any common principle from them, other than a general tendency to condemn pollution, a term which is, however, frequently undefined. Many of these agreements, including almost all those entered into recently, establish joint commissions or similar bilateral or regional institutions or arrangements. There are presently over 100 of these arrangements, ranging from occasional meetings of technical bodies to full-scale commissions with their own professional and technical staffs. The functions and authority of these bodies vary, but they typically have significant responsibilities with respect to the management and development of shared water resources and the avoidance and adjustment of disputes. However, only rarely do they have any far-reaching regulatory or decision making powers.

A number of these agreements contain provisions regarding dispute avoidance or settlement, though obligations are often stated in fairly general terms. Where the agreements establish a joint commission or similar arrangement, it is frequently either expressly or implicitly given a dispute management role. Over 40 of the agreements contain provisions for final settlement of disputes by third parties. However, almost all of these provide for resort to ad hoc arbitral tribunals or regional arrangements, rather than to the International Court of Justice, and, in any case, these provisions have rarely been invoked. Many agreements also provide dispute avoidance mechanisms, but, again, there is little uniformity. In a survey by Professor Bourne of some 253 agreements entered into before 1961,[4] he found that at least 16 agreements contained an explicit provision obliging the states' parties to negotiate with each other when they disagreed about plans for the development of the river basin; that in 18 other agreements the parties undertook to solve their water disputes by agreement; and that in some 80 other agreements the parties undertook not to make any change in the regime of the basin without the consent of the other party, thus implicitly providing obligations for consultation, negotiation and perhaps the reaching of agreement. That is, something under half of these agreements have some sort of relatively express dispute avoidance provisions.

2. The Institute of International Law's Salzburg Resolution

In 1961, the Institute of International Law, at its meeting in Salzburg, adopted its important Resolution on the Utilization of of Non-Maritime International Waters.[5] The Resolution is of particular interest for our purposes because it stresses dispute avoidance techniques. The Resolution recognizes the governing significance of the principle of equitable utilization and provides for the settlement of differences in accordance with this principle. No state should undertake works or utilizations which seriously affect the possibility of utilization by other states unless equitable settlement and adequate compensation for loss or damage are provided for. Such works or utilizations should not be undertaken without prior notice. If objection is raised, the states affected should enter into negotiations with a view to reaching an agreement in a reasonable time; recourse to technical commissions is recommended. During any such negotiations, the states must, in conformity with the principle of good faith, refrain from proceeding with the works or utilizations, or from taking other measures which might aggravate the dispute or render agreement more difficult. If the states fail to reach agreement in a reasonable time, judicial settlement or arbitration is recommended; refusal by an objecting state to submit to such settlement frees the other state to proceed with the project. Finally, the resolution recommends the desirability of common organs for planning and for the prevention and settlement of disputes.

3. The International Law Association's Helsinki Rules

In 1966, the International Law Association, at its Helsinki meeting, adopted Rules on the Uses of Waters of International Rivers.[6] These Rules, together with their extremely useful commentary, are the most comprehensive and detailed attempt at codification to date, and have been influential and widely cited. The Rules contain provisions

on the equitable utilization of the waters of an international drainage basin, on the abatement of pollution, on navigation and on the settlement of disputes. The provisions on pollution and on dispute settlement are of particular interest for our purposes.

The Rules define "water pollution" as "any detrimental change resulting from human conduct in the composition, content or quality of the waters of an international drainage basin." The Rules distinguish between state obligations respecting, on the one hand, new pollution, and, on the other hand, existing pollution. Under the Rules a state must prevent any new form of water pollution in the basin which would cause substantial injury in the territory of a co-basin state. If it violates this obligation, the responsible state shall be required to cease the wrongful conduct and compensate the injured state for the injury. However, a lesser obligation is imposed in the case of existing pollution. The Rules provide that a state shall take all reasonable measures to abate existing water pollution in a basin to such an extent that no substantial damage is caused in the territory of a co-basin state. If this obligation is violated, the responsible state shall be required promptly to enter into negotiations with the injured state with a view to reaching a settlement equitable under the circumstances.

The Rules recognize that states are under an obligation to settle disputes by peaceful means, and recommend that they resort progressively to particular techniques. First, with a view to preventing disputes, basin states should furnish each other relevant and reasonably available information concerning the waters of the basin and their uses of and activities with respect to it. Specifically each state should furnish the others notice of any construction or installation which would alter the basin regime in a way which might substantially affect the other's interest and give rise to a dispute. The notice should include facts sufficient to permit the recipient to make an assessment and communicate its views. In case a dispute arises, the states should seek a solution, in this order: by negotiation; by reference to a joint agency; through good offices or mediation by a third state, a qualified international organization, or a qualified person; through a commission of inquiry or ad hoc conciliation commission; or finally by resort to an ad hoc arbitral tribunal, or the International Court of Justice.

4. The Proposed International Law Commission Study and Other Recent Developments and Activities

Finally, let me note several recent developments in this area. In 1970, the General Assembly, in Resolution 2669,[7] called for the development and codification of the rules of international law relating to international waterways, and urged early consideration of this topic by the International Law Commission (ILC). In 1974, the ILC established a subcommittee on the Law of the Non-Navigational Uses of International Watercourses, and this subcommittee has begun its work.[8] While it is not yet clear whether the ILC's final product will take the form of a proposal for a broad agreement or recommended draft principles, its considerations are likely to influence considerably the further development of the law in this area. Other regional and U.N. organs are also involved in activities bearing on environmental problems concerning international rivers and lakes. The Council of Europe

has prepared a draft Convention on the Protection of International European Fresh Waters Against Pollution.[9] UNEP's proposed draft code of conduct regarding cooperation concerning shared resources will almost certainly produce a body of doctrine relevant either directly or by analogy to this area.[10] The United Nations Economic and Social Council has called for the convening of a U.N. Water Conference in 1977 to deal with water problems,[11] and the U.N. Department of Economic and Social Affairs has recently issued a major study dealing with institutional and legal aspects of the management of international water resources.[12] As these developments proceed, the law in this field may coalesce rapidly.

B. Particular Situations

I would like now to describe several actual situations involving differences over the utilization or pollution of international rivers and lakes in order to suggest the sorts of problems which have arisen and the kinds of techniques which have been employed in dealing with them.

1. The Colorado River Salinity Dispute

My first example is the dispute between the United States and Mexico over the salinity of the Colorado River.[13] This dispute, which plagued their relations for 12 years, illustrates the problems which can arise from an upper riparian's diversion or pollution of the waters of an international river flowing successively through several countries. It also suggests the role of negotiation in resolving these difficulties.

The problem in this case was as follows. The Colorado River arises in and drains a vast area in the southwest United States, flows across the Mexican border into the Mexicali Valley in Northwest Mexico, and then empties into the Gulf of California. The waters of the river are vital to the economies of both countries. In 1944 the two countries entered into a treaty concerning the uses of the Colorado River under which the U.S. agreed to deliver a certain quantity of water to Mexico each year. However, nothing was expressly said in the agreement about the quality of the water. Increasing development in the southwest United States in the post-war years resulted in intense and rapidly growing demands for the domestic use of these waters. In 1961, the U.S. completed a new dam, which resulted in the quantity of water reaching Mexico no longer being in excess of the Treaty requirement. Moreover, in 1957, the U.S. had begun to divert a significant amount of water from the Colorado in order to open up new areas to irrigation; the most important of these projects was called the Wellton-Mohawk diversion. These diverted waters eventually returned to the river before it reached Mexico, thus fulfilling the treaty's requirements of water quantity. However, during the use for irrigation, the waters picked up great quantities of minerals, and this highly saline return flow almost doubled the salinity of the waters eventually reaching Mexico. Reportedly, when U.S. agencies were planning the Wellton-Mohawk diversion, they gave little formal consideration to the potential effects on Mexico or the probable Mexican reaction.

In 1961, Mexico complained to the U.S. It claimed that the waters it was receiving were too saline to irrigate crops in the Mexicali Valley, that the livelihood of Mexican farmers was being severely affected, and that this was in violation of the 1944 treaty. The U.S. took the position that the treaty was not being violated. However, the matter was referred to the U.S.-Mexican International Boundary Waters Commission, which undertook scientific studies and provided a forum for negotiations. In 1965, the two countries within the framework of the Commission, reached a five-year agreement, providing for measures to ameliorate the salinity problem. This agreement was subsequently extended for two more years.

In 1972, President Echeverria of Mexico, during an official visit to the U.S., addressed the U.S. Congress, emphasizing the importance to Mexico of the Colorado River problem. Soon afterwards, President Nixon appointed former U.S. Attorney General Brownell as his special representative to find a solution. Mr. Brownell established a task force to study the problem and reported back to President Nixon in December 1972, with his recommendations. The two countries resumed negotiations on the basis of these recommendations, and in August 1973, reached an agreement which was embodied in the International Boundary Water Commission's Minute 242. This agreement is expressly stated to be a "permanent and definitive solution" to the salinity problem. Under the agreement, the U.S. promises to provide Mexico with the continued annual delivery of stated quantities of water which meet certain standards of average quality. To accomplish this, the U.S. will build the world's largest desalinization plant in Arizona to process the water from the Wellton-Mohawk diversion, decreasing its mineral content before it is returned to the Colorado and crosses into Mexico. The U.S. will also construct, at its expense, a lined bypass drain to carry the wastes produced by the treatment of Wellton-Mohawk drainage directly to the Gulf of California, bypassing the river entirely. The U.S. will also support Mexican efforts to obtain appropriate financing for improvements and rehabilitation in the Mexicali Valley, and will itself provide certain assistance. The total cost of the agreement to the U.S. is estimated at $115 million.

This experience illustrates the way in which negotiation can provide compromise solutions to highly individualized water basin problems. It also has other lessons. First, while the 1944 treaty formed the backdrop against which the dispute unfolded, the parties relied relatively little on legal arguments, and went to some lengths to avoid resort to judicial techniques or a liability-based settlement. While at one point there was apparently a threat of resort to international adjudication, this was never pursued. Concern over uncertainty of the law, delay, a possible heightening of tensions, and the enforceability of any judgement might have been factors; a high Mexican official has been quoted as saying that "friendly neighbors do not take each other to court."[14] While at one point Mexico claimed damages of up to $150 million, it ultimately dropped this issue. The U.S. took the position that it was not prepared to pay legal damages since no damages were demonstrable or quantifiable; moreover, such payment would certainly have raised both political problems and problems of legal precedent for the U.S. Mr. Brownell commented that the "whole settlement is in lieu of an acrimonious dispute over damages

[and] . . . in substitution for fighting it out;" and that the agreement "[d]emonstrates . . . the U.S. policy of endeavoring to settle disputes with its . . . neighbors on a friendly basis and not resort to courts or to other methods of settling the disputes . . ."[15]

Second, this experience illustrates the importance of financial and technical resources in the solution of these problems. Frequently, the real issue in dispute is who is to pay for the costs of controlling pollution. In this case the issue could be resolved to the satisfaction of both parties because technical solutions were available and the U.S. was prepared to pay their substantial cost. This was also the case with respect to solution of the India-Pakistan Indus River problem, which was made possible largely through the mediatory efforts and financial assistance for necessary works provided by the International Bank for Reconstruction and Development.[16]

Finally, the experience suggests how political factors may be important both in creating and resolving such problems. The Wellton-Mohawk diversion, which in part created the problem, was reportedly for the benefit of only several hundred farmers; nevertheless, the U.S. could not politically sacrifice their interests. On the other hand, the political impetus and financial resources for settlement were achieved only when the problem was raised at the highest governmental levels.

2. The Lake Lanoux Arbitration

My second example is the Lake Lanoux Arbitration, between France and Spain.[17] This experience suggests the possible role of judicial techniques in resolving problems of shared water resources. The problem in this case involved a water system shared by France and Spain and centering on Lake Lanoux. Lake Lanoux is located wholly within France and fed by French streams, but it drains into a series of rivers which eventually flow into Spain. The common water system between the two countries has since 1866 been governed by the Treaty of Bayonne and an Additional Act to that treaty. The Act provided, inter alia: that the interests of both parties should be safeguarded; for notice of works which might change the regime or volume of a watercourse; that there should be no interference with the natural flow of watercourses capable of harming the lower riparian; and that the authorities of the two countries should act in concert to set up regulations for the general interest.

For over 30 years, France had put forward various schemes for the utilization of the waters of Lake Lanoux. During the 1950s Electricite de France advanced a scheme for diverting certain waters of the lake for electrical purposes, with the waters to be returned to rivers lower in the basin before they reached Spain. Spain objected, and the question was long a subject of study by commissions and negotiation. Finally, in 1955, France said it would proceed with the scheme unless agreement was reached within a given period. Spain took the position that any such alteration in the natural conditions of the watercourse would violate the 1866 Treaty and that, under the Treaty and international law, France could not in any event undertake the project without prior agreement of Spain. Pursuant to a preexisting agreement

covering the settlement of disputes, the two countries agreed to submit the issue to arbitration.

The arbitral tribunal issued its decision in 1957. It first examined the question whether the French project in itself constituted a violation of the Treaty of Bayonne and Additional Act. It found that the project would cause no change in either the quantity or quality of water ultimately reaching Spain, and that, since Spanish interests would not be adversely affected, the project would not violate the Treaty. The tribunal then examined the question whether, even if the project itself did not violate the Treaty, France was nevertheless barred from undertaking it without the prior agreement of Spain. The tribunal found that neither the Treaty nor general international law required such prior agreement. The Treaty only obliged France to give notice, to consult, and to set up a system to safeguard Spain's interests—obligations which France had met.

The tribunal's decision is of interest in several respects. First, it is a precedent for the proposition that international law does not prohibit one riparian country from engaging in activities with respect to a shared water system which will not adversely affect other countries sharing the system. Second, the tribunal, in an obiter dictum, suggested that its decision might have been otherwise if the water returned to the lake by France after its use had been of such chemical composition, temperature or other condition as to damage Spanish interests.[18] This language has been cited in support of arguments for the existence of an international duty to avoid water pollution. Finally, while the decision turns on the provisions of the Treaty of Bayonne and its Additional Act, the opinion contains some language suggesting that the general obligation of coriparians to take each others interests into account may also involve certain broad subsidiary obligations, such as a duty to give notice of proposed works or utilizations, consult, and possibly even to negotiate in good faith concerning them. On the other hand, the tribunal made it clear that it did not regard international law as requiring that an agreement be actually reached before works or utilizations are undertaken, since this would give one coriparian a veto over the actions of another.

The Lake Lanoux arbitration was useful in resolving differences which had continued for much too long and proved impossible to settle by other types of dispute settlement techniques. The tribunal was able, in particular, to resolve differences concerning assessment of the likelihood that the diversion would have adverse effects on Spain. These differences may well have been at the root of the difficulty in adjusting this problem. More generally, the decision adds to the corpus of accessible doctrine, thinking and experience on international water disputes, and thus contributes to the development of principles and rules for solving like or analogous problems.

3. U.S.-Canadian Boundary Waters Problems: The U.S.-Canadian International Joint Commission

My final example relates to the long U.S.-Canadian experience in dealing with boundary waters pollution and other problems.[19] This experience suggests the use of ongoing institutions and mechanisms for

avoiding and adjusting such issues and, in particular, the device of the joint commission. Much of the long border between the two countries is water, including the Great Lakes, which are the world's largest freshwater system. Over the years, a number of differences have arisen concerning these shared water resources, including problems of pollution, diversion, Great Lakes water levels, and the utilization of boundary waters more generally. Recently, due to the heavy concentrations of population and industry along these boundary waters, problems of pollution—such as the eutrophication of Lake Erie—have become particularly significant.

The basic framework of U.S.-Canadian cooperation in this respect is the Boundary Waters Treaty of 1909.[20] The treaty was designed primarily to protect the levels and navigability of the Great Lakes and other boundary waters, but it has provided a basis for international cooperation respecting pollution and other problems as well. The Treaty establishes a permanent binational commission—the International Joint Commission (IJC)—composed of six commissioners, three appointed by each country. The Commission is intended to act as a single impartial body, rather than as two instructed national delegations, and it has taken this obligation very seriously. The Commission has several roles under the Treaty. First, it performs quasi-judicial functions. It must approve applications by the governments, public agencies, or private corporations or individuals to construct or operate dams or works that may affect the natural levels or flows of the boundary and other waters covered by the Treaty. Second, the Commission performs investigative and recommendatory functions. Under Article IX of the Treaty, the two governments may refer to the Commission for examination, report and recommendation any question involving the rights or interests of either country along the common frontier. These reports are only advisory and are subject to acceptance and implementation by the two countries. The two governments have used this device extensively. Third, the Commission performs certain surveillance and coordination functions. Thus, it may monitor compliance with orders of approval it has issued, or, at the request of the two governments, it may monitor and coordinate actions or programs that result from governmental acceptance of specific recommendations made by the Commission pursuant to Article IX references. Typically, the Commission has carried out its investigative and its monitoring and surveillance responsibilities through the appointment of binational technical boards, composed of technical experts drawn, on a part-time basis, from official agencies and other institutions in both countries. Finally, the Treaty contains detailed provisions for the use of the Commission as a judicial agency to which the parties may refer disputes for binding decision. However, these formal dispute settlement provisions have never been used.

During its almost 70-year existence, the Commission has dealt with a great many problems. These include: questions of hydroelectric and other water use developments; an intensive investigation of the potential beneficial uses of the Columbia River, which led ultimately to the conclusion of the 1961 Columbia River Treaty; and a comprehensive study of the desirability and feasibility of further controlling the water levels of the Great Lakes, which is probably the most extensive hydrologic study ever untertaken. In recent years, however, the two governments have, under Article IX of the Treaty, referred a number of

pollution problems to the Commission and, as a result, pollution responsibilities have become one of its chief concerns. The latest and most important of these references — that concerning the pollution of Lake Erie, Lake Ontario and the International Section of the St. Lawrence River — resulted in a six-year comprehensive study and the publication of an extensive report,[21] which includes: detailed findings concerning the trans-boundary movement, sources and extent of pollution; recommendation of proposed water quality objectives; and recommendations for programs and measures to achieve these objectives. This exhaustive report led to negotiations between the two countries concerning Great Lakes problems, which in turn resulted in conclusion of the U.S.-Canadian Great Lakes Water Quality Agreement of 1972.[22]

The Agreement, which is intended to clean up the Great Lakes, represents an important initiative in international pollution control. The Agreement establishes broad general objectives for water quality throughout the Great Lakes system, specific common water quality objectives, and a commitment on the part of both countries to carry out a variety of pollution control programs. Under the Agreement, the International Joint Commission is given wide responsibilities which include collecting, analyzing and disseminating relevant data and information; surveillance of water quality; monitoring the effectiveness of governmental programs; coordinating the two countries' activities; tendering advice and assistance; reporting to the governments and the public; and recommending legislation and further programs to meet the water quality objectives. The Agreement establishes a Great Lakes Water Quality Board under the Commission to assist it in carrying out these responsibilities. The Agreement also contains numerous provisions for international notification, extensive exchange of information, joint consultation and review.

There are several aspects of this U.S.-Canadian experience worth noting. The first is the general reluctance of the two states to use traditional legal procedures and remedies in dealing with pollution and other problems despite the fact that the 1909 Treaty expressly prohibits pollution. Thus, Article IV provides that "boundary waters and waters flowing across the boundary shall not be polluted on either side to the injury of health or property of the other." However, neither the term "pollution" nor the term "injury" is defined in the Treaty. Given their differences over pollution and other water resource problems, one or the other of these states could have resorted to usual processes of international claim and adjudication, through either the dispute settlement provisions of the 1909 Treaty, reference to some ad hoc tribunal, or resort to the International Court. However, neither of these states has ever invoked Article IV for this purpose and the two states have rarely resorted to liability-based approaches or formal agencies of dispute settlement.[23] Instead, almost all of these problems have been dealt with through the technique of advisory references to the Commission for study and recommendations under Article IX of the Treaty. This reflects the judgement of the two countries that the most sensible way of dealing with such technically complex and politically sensitive problems is through flexible and ongoing programs and institutions. Their value is that they take account of a multiplicity of factors, are founded on the necessity for compromise and a balancing of interests, and permit the governments to retain control over the most significant decisions and policy.

This experience is also suggestive as to the potential role of relatively apolitical expert bodies in managing the problems of shared water resources. Such institutions can be extremely useful in performing many of the functions involved in environmental dispute management, such as monitoring, surveillance, and the presentation of technical assessments, objectives and options. The International Joint Commission's reputation as an expert impartial body has enhanced its credibility and its usefulness in advancing international cooperation in this area. Moreover, the Commission's practice of using joint technical boards, composed of government technical experts serving in an expert rather than representative capacity, suggests techniques through which countries involved in such problems can deploy substantial expertise without incurring the problems of large permanent staffs or budgets. Moreover, the work of these expert boards results in continuing contacts and interactions between concerned officials in the different countries, and helps to establish important informal channels of communication, coordination, and influence which can themselves play a significant role in dispute avoidance and resolution.

Finally, this experience illustrates the inherent difficulty in resolving many environmental problems. Despite the Commission's long existence, the close relations between the countries, the achievement of a high level of cooperation between them and the current and proposed expenditure of up to several billion dollars by both governments, the problems of the Great Lakes pollution continue. This suggests that even the most effective dispute management techniques may not serve to remove underlying differences deeply rooted in growing and competing demands for the use of limited resources. Such techniques can only help the countries involved to deal with these problems in a more effective, more rational and less disruptive way.

C. Observations

This examination of international river and lake problems suggests several generalizations. First, there is broad recognition that the best way for coriparians to deal with these matters is through the negotiation of specific agreements, establishing special regimes tailored to that particular drainage basin's unique problems and characteristics. Since these situations tend to be individualized, there may be only a limited basis for the development of general substantive international law or conventions. Moreover, rules are likely to be expressed primarily in the form of standards, or to establish cooperative procedures rather than firm substantive rules.

Second, there is a growing consensus that coriparian states, pursuant to the principle of equitable utilization and their obligations as good neighbors, ought as a procedural matter to take cooperative measures to anticipate, avoid and resolve problems arising out of shared water resources. Such measures should include timely notice prior to undertaking activities that may affect a coriparian's interests; exchange of information necessary to assess the risks involved; and good faith entry into consultations and negotiations to attempt to avoid injury, resolve differences, and reach an accommodation. However, this does not imply that the proposing state need ultimately agree with the objecting state or that the objecting state can delay a project unreasonably or indefinitely.

Third, there is wide agreement that the tasks of managing and developing international rivers and lakes, and avoiding and adjusting disputes concerning them, can most easily and best be carried out by establishing continuing international institutions, such as joint commissions. These institutions can provide flexible cooperative mechanisms which can be tailored to meet diverse and changing situations, needs and problems. More specifically, such institutions can provide technical expertise for obtaining facts, monitoring changes in the water system, surveillance of developments, studying proposals and making recommendations; establish procedures for dispute avoidance and adjustment; and provide a framework for integreted and coordinated water basin planning.

Fourth, liability-based and judicial approaches appear to be of relatively limited usefulness in dealing with international river and lake problems. States tend to regard these problems as unsuited to these techniques and have rarely employed them. This attitude also applies to environmental dispute settlement more generally, and we will examine the reasons for it in more detail in the final lecture.

Fifth, effective resolution of these problems may often turn on the parties obtaining more knowledge, better technology and, in particular, substantial sums of money. In some cases, scientific findings may show that fears are groundless, or advances in technology may show that problems can be relatively easily resolved. And, as the Colorado River experience illustrates, some problems can be handled only if one or both countries are prepared to incur the necessary costs. When differences escalate to serious levels, the states concerned may come to the view that it is cheaper to pay these costs than to incur the possibly greater costs of continuing dispute and possible conflict.

Finally, since these problems are largely localized, the role of broader regional and global institutions is relatively limited. Agencies such as UNEP may be helpful in calling the parties' attention to problems, sharing relevant international experience, providing technical expertise, promoting collaboration and encouraging and providing facilities for dispute management. But the major burdens will necessarily fall on the parties directly involved.

III. DISPUTES CONCERNING THE MARINE ENVIRONMENT

Let me now turn to the management of environmental disputes concerning the seas and oceans.[1]

The question of marine pollution and the protection of the marine environment has been at the forefront of recent environmental concern. The oceans, which comprise two-thirds of the earth's surface, are of vital ecological significance. Much of the world's oxygen is produced by photosynthesis carried on by phytoplankton in the oceans. The seas produce much of our food supply. The earth's heat balance, weather and climate are heavily influenced by oceanic processes. Thus, any threats to the ocean environment pose serious dangers both to man and to all life on the planet.

Since the 1967 Torrey Canyon incident and 1968 Santa Barbara Channel oil well blowout, it has become clear that these threats exist and must be reckoned with. For example, it has been estimated that over two million tons of petroleum-based pollutants enter the oceans each year from direct sources of all kinds, including oil spills, and that many times this amount enters the oceans indirectly through the vaporization of fossil fuels, which pass first into the atmosphere but eventually end up in the ocean.[2] Heavy metals, chemicals such as DDT, and complex man-made compounds have also been found in significant quantities in the oceans.[3] Moreover, the problem appears to be increasing. Supertankers are growing in number and size, adding to the likelihood of serious accidents.[4] The energy crisis has spurred a sharp increase in efforts to exploit the oil and gas resources of the continental shelves, adding to the likelihood of leakages and blowouts. Finally, new technology has opened up the possibility of exploiting the manganese nodules and other resources of the deep seabed, posing new possibilities of pollution from dredging and processing.

This is an area in which scientific knowledge is particularly incomplete. We have only a general idea of where marine pollution comes from, of how it reaches the oceans, and of what effects it has when it gets there. A number of monitoring and other research projects are now under way to try to answer some of these questions, but it may be some time before we really understand the processes involved. The bulk of pollutants appear to come from land-based sources, either directly through outflows and rivers, or indirectly through the medium of the atmosphere. A second major source of pollution is from vessels, through either deliberate dumping, the intentional ballasting or cleaning of oil tanks, or maritime accidents. A third source of pollution is leakage, wastes or accidents related to offshore or deep ocean oil drilling and other exploitative activities.

There is continuing uncertainty as to the precise effects of marine pollution. It is clear that oil spills can have disastrous effects on estuaries and other areas of vital importance in the life cycle of various kinds of marine life.[5] It is also feared that pollution may have serious cumulative and long-run adverse impacts on

marine microorganisms which are basic to oxygen production and food chains. However, despite the great number of incidents, pollution appears thus far to have caused relatively limited financial loss. In practice, the impact has been primarily regional. The countries most immediately affected are those whose coasts lie along the great maritime routes and straits, or which border on relatively shallow enclosed or semi-enclosed seas such as the Baltic, Mediterranean or North Sea.

The management of marine environmental problems has certain distinct features and raises some special problems. First, some of the most difficult issues involve questions of jurisdiction. That is, the problem is not only whether polluting activities should or should not be permitted, but also which state has the power to establish regulations to control them. The oceans and seas have traditionally been regarded as a part of the international commons outside the territorial jurisdiction of any one country and, under the doctrine of the freedom of the seas, open to the use of all. In the view of many states, these traditional rules prohibit a coastal state from extending its regulatory authority to foreign vessels or activities on the high seas beyond narrow zones off its coasts; they believe that broader areas should be regulated only pursuant to international cooperative arrangements. Consequently, where one state attempts unilaterally to impose its own pollution prevention regulations over broader areas of the ocean, other nations may protest. Since such questions concerning the allocation of authority between nations involve national pride and sensitivities, they can be particularly difficult to resolve.

Second, states will have different attitudes towards the importance of protecting the marine environment and, more especially, towards jurisdictional questions, depending upon their particular interests. States whose coasts lie on important shipping routes are, as we have noted, most likely to be affected by pollution. These coastal states point out that ships may dump wastes or cause pollution far from the flag state's own coasts, and that the flag state may have little incentive to take costly measures to prevent harm to coastal state interests. Consequently, many coastal states believe that their interests can be protected only if they establish their own pollution control regulations, which might conceivably include ship construction and operating standards enforceable in broad areas off of their coasts. Nations with substantial interests in maritime shipping and commerce, on the other hand, strongly resist such unilateral coastal state assertions of jurisdiction. They point out that a worldwide industry cannot possibly hope to comply with a great number of varying and perhaps conflicting national standards which may differ with respect to each area of the sea sailed through or each port visited. Moreover, different standards may have the effect of imposing differential costs on different ship owners or operators, which in turn may distort competitive patterns. For these reasons, shipping countries generally support regulation only by the state of the flag of the ship, perhaps in accordance with uniform minimum international standards.

Third, marine environmental problems once again raise difficult issues of trade-offs. The oceans have traditionally been a place to put our wastes. If wastes are no longer to go into the ocean, where

will we put them? There is the risk that hazards and damage may simply be transferred from one environmental sector to another. Moreover, if costly measures to prevent marine pollution are to be undertaken, as through the establishment of high construction or operational standards, questions arise as to who is to pay for them and how the various benefits and costs are to be apportioned.

Finally, both the Law of the Sea, in general, and the law relating to marine pollution and dispute settlement, in particular, are currently in flux. Recent developments are already resulting in considerable expansions of coastal state authority, a consequent contraction of the international seas and profound changes in the concept of the freedom of the seas. The present focus of these developments is the U.N. Conference on the Law of the Sea, which is still in session. As we will see, predictions concerning the outcome of the Conference differ. But whatever the outcome, the negotiations are sure substantially to affect the way in which problems of marine pollution are managed and resolved.

A. Relevant Law, Conventions and Other Developments: An Overview

Before looking at several examples of particular disputes, let me give a brief sketch of the present law and recent developments in this area. While there are several older relevant conventions, the law concerning marine pollution has for the most part developed only during the past six years. Much of this law is in the form of international agreements. However, at least some principles of general international law concerning marine pollution seem to be emerging.

The most important of these emerging customary rules is the principle that states have a special obligation to protect and preserve the marine environment. While this principle is embraced within the more general principle of environmental responsibility expressed in Principle 21 of the Stockholm Declaration, it is most clearly stated in Principle 7 of the Stockholm Declaration, which provides that:

> States shall take all possible steps to prevent pollution of the seas by substances that are liable to create hazards to human health, to harm living resources and marine life, to damage amenities or to interfere with other legitimate uses of the sea.[6]

The Stockholm Conference's Action Program included a number of recommendations relating to the assessment and control of marine pollution and the protection of the marine environment.

Since Stockholm, this principle has been reflected in a number of General Assembly resolutions, international agreements, and other international actions. For example, Article I of the 1972 London Ocean Dumping Convention provides that the parties "shall individually and collectively promote the effective control of all sources of pollution of the marine environment."[7] The Informal Single Negotiating Text resulting from the recent Geneva session of the Law of the Sea Conference also embodies this principle.

In addition to the development of general law in this area, there are now a large number of international agreements relating to marine

pollution. Only some of these are presently in force, and they vary as to the states which are actually now parties and bound by their provisions. But their cumulative scope is impressive. The most important global agreements are the following:

(i) The 1954 International Convention for the Prevention of Pollution of the Sea by Oil,[8] as amended in 1962,[9] 1969[10] and 1971.[11]

(ii) The 1958 Geneva Conventions on the Law of the Sea. Article 2 of the High Seas Convention[12] generally calls upon states to exercise freedom of the seas "with reasonable regard to the interests of other states in the exercise of the freedom of the High Seas." Articles 24 and 25 of the Convention require states to establish regulations to prevent oil pollution and to take measures to prevent pollution from radioactive wastes. Article 5 Paragraph 7 of the Convention on the Continental Shelf[13] obliges the coastal state to undertake all appropriate measures for the protection of the living resources of the sea from harmful agents.

(iii) The 1963 (Moscow) Treaty Banning Nuclear Weapons Tests in the Atmosphere, in Outer Space and Under Water.[14]

(iv) The 1969 (Brussels) International Convention on Civil Liability for Oil Pollution Damage,[15] and the 1971 Convention on the Establishment of an International Fund for Compensation for Oil Pollution Damage.[16]

(v) The 1969 (Brussels) International Convention Relating to Intervention on the High Seas in Cases of Oil Pollution Casualties, [17] and the 1973 Protocol Relating to Intervention on the High Seas in Cases of Marine Pollution by Substances Other Than Oil.[18]

(vi) The 1972 (London) Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter.[19]

(vii) The 1973 (London) International Convention for the Prevention of Pollution from Ships,[20] which will essentially replace the 1954 Oil Pollution Convention.

There are also a growing number of regional conventions dealing with protection of the marine environment. These include:

(i) The 1969 (Bonn) Agreement Concerning Pollution of the North Sea by Oil.[21]

(ii) The 1972 (Oslo) Convention for the Prevention of Marine Pollution by Dumping from Ships and Aircraft.[22]

(iii) The 1974 (Paris) Convention for the Prevention of Marine Pollution from Land Based Sources.[23]

(iv) The 1974 Convention on the Protection of the Marine Environment of the Baltic Sea Area.[24]

(v) The 1974 (Nordic) Convention on Environmental Protection.[25]

These agreements differ widely with respect to their dispute avoidance or settlement provisions. Some of them provide for compulsory dispute settlement, but they vary as to the techniques prescribed. Let me give some examples to suggest this diversity.[26] Article XIII of the 1954 Oil Pollution Convention provides for compulsory settlement by the International Court. However, most of the other treaties containing provisions for compulsory dispute settlement provide solely for reference to an arbitral tribunal, without mention of the International Court. This is the case, for example, under Article 12 of the 1974 Nordic Pollution Convention, Article VIII of the 1969 Brussels Intervention Convention, Article 10 of the 1973 IMCO Pollution Convention, and Article 21 of the 1974 Paris Convention on Pollution from Land-Based Sources. Several of these agreements have annexes setting forth detailed arbitral procedures. The arbitral tribunal is typically composed of three persons, one nominated by each of the parties and the third elected by agreement between the other two. Other agreements contain provisions only for non-compulsory dispute settlement. The 1974 Baltic Convention, for example, calls for submission of disputes by "common agreement" to an ad hoc arbitral tribunal, to a permanent arbitral tribunal, or to the International Court. The London Convention on the Prevention of Marine Pollution by Dumping contains no express provisions for dispute settlement; under Articles X and XI the parties undertake only to develop procedures for the assessment of liability and the settlement of disputes and to consider this matter at their first consultative meeting. Several of these agreements contain provisions directed at the avoidance of disputes. For example, Article V of the Ocean Dumping Convention requires consultation in the case of emergency dumping. The Nordic Convention on the Environment also provides notification and consultation procedures.

Several other recent developments deserve mention. In 1974 the Intergovernmental Maritime Consultative Committee (IMCO) established a Marine Environment Protection Committee.[27] UNEP has given marine pollution problems an important place in its work program and is engaging in various relevant activities. For example, early in 1975, UNEP, in cooperation with FAO and other international organizations, convened an Intergovernmental Meeting on the Protection of the Mediterranean at Barcelona, Spain. The 16 Mediterranean states which participated in the meeting adopted a common Plan of Action for Protection of the Mediterranean against Pollution and requested UNEP to prepare a draft convention on this subject, which will be considered at a conference to be held in Barcelona in 1976.[28] Perhaps the most significant recent development in this area is the Law of the Sea Conference, which we will look at in some detail shortly. Finally, recent decisions of the International Court may have a bearing in this area. Thus, the North Sea Continental Shelf cases and Fisheries Jurisdiction cases may be broadly read as suggesting that states have special obligations to consult and negotiate in order to avoid and resolve problems regarding shared ocean areas and resources, and perhaps, implicitly, problems of maritime pollution.

B. Particular Situations

I would like now to describe several specific controversies relating to marine pollution in order to indicate the types of problems which may arise.

1. The Finnish Arsenic Dumping Incident

My first example is the recent incident concerning the proposed dumping of arsenic wastes in the South Atlantic by a Finnish ship.[29] This incident illustrates a typical controversy between a state engaging or proposing to engage in conduct which threatens to pollute a particular area of the oceans, and other states in that region which may be affected by such pollution. In March 1975, it was reported, particularly in the Brazilian press, that the Finnish tanker Enskeri was planning to dump several hundred barrels of industrial waste with substantial arsenic content into international waters in the South Atlantic. The ship belonged to Neste Oy, the Finnish state-owned oil importing and refining operation. The company had apparently loaded the waste without first seeking the Finnish government's approval.

Following these reports, the Brazilian, Uruguayan and Argentinian governments made joint protests to the Finnish Foreign Ministry. The Brazilian press gave extensive coverage to statements by the head of Brazil's Special Secretariat for the Environment that "Brazil is not the garbage pail of the world . . . we still do not know exactly what the Finnish ship is carrying, but we can guarantee that if it were something good, they would not come here to the South Atlantic to throw it away... ." However, these initial protests to the Finnish Foreign Ministry produced no immediate results; the Finnish government reportedly initially took the position that the dumping plans were neither illegal nor contrary to international agreements. At this point, Brazil, apparently supported by several other Latin American states, requested the Permanent Council of the Organization of American States to call upon Finland to prevent the dumping, noting their concern that Gulf Stream currents might spread this waste throughout the South Atlantic region. A meeting of the Permanent Council was set for March 24. At the same time, Brazil and several other Latin American countries asked U.N. Secretary-General Waldheim to urge the Finnish Government not to proceed with the dumping, and he agreed to do so.

On March 23, an extraordinary Sunday meeting of the Finnish Council of State was held to discuss the problem. Late that same day, the Finnish government announced that Neste Oy had been denied permission to dump these wastes at sea. On the basis of its further investigations, the Finnish government had decided that the dumping might be contrary both to the 1972 London Ocean Dumping Convention and to other environmental agreements which Finland supported. Upon hearing of the Finnish government's decision, the Brazilian government issued an announcement praising Finland's understanding of the concern of nations subject to potential damage and indicating that it had informed the appropriate international organizations of Finland's decision. Therefore, no action was taken either in the OAS or in the U.N.

The international furor about the proposed dumping was reportedly of great concern to the Finnish government, which has vigorously supported international environmental protection efforts. There was considerable domestic criticism of the proposed dumping. Further, the Brazilian press subsequently reported that the Brazilian government might have withheld its acceptance of the recently-appointed Finnish Ambassador to Brazil if Finland had not prevented the dumping, and that the nomination was accepted only after the government was informed of the Finnish decision. The arsenic wastes were removed from the ship and will be stored on land in Finland while a program for safe disposal is developed and approved.

The incident has a number of interesting aspects. The most obvious is that, as a result of diplomatic and public pressure, the Finnish government called off the dumping. Moreover, it acknowledged that international environmental norms were both relevant and opposed to the proposed conduct. This is in marked contrast with similar earlier international incidents in which diplomatic and public protests proved less successful—in particular, the 1970 incident involving the United States' dumping of nerve gas in the Atlantic Ocean off of the southeast United States. The success of protests in the Finnish case may reflect the rapid development of environmental law in the interim, the special sensitivity of the Finnish government to environmental issues, or perhaps the relative unimportance to that government of proceeding with the proposed dumping, when weighed against the diplomatic and other difficulties the action would entail.

Another aspect of this experience is the possibility, implicit in reports of the incident, that, until protests were made, the Finnish government may simply not have been aware of the proposed dumping, or at least of its possible significance and repercussions. Once the problem was fully brought to the government's attention and considered by appropriate authorities, preventative action was promptly taken. This suggests how alerting mechanisms—brought into play by either domestic procedures, action by other states, or by international organizations—may be particularly important in avoiding disputes.

Finally, the incident suggests the importance of international law and institutions in avoiding and adjusting ocean pollution disputes. In this case, emerging norms prohibiting dumping, reinforced by public opinion, apparently influenced the Finnish government's behavior. Moreover, in this case the countries affected had available established regional and global forums and procedures, such as the Permanent Council of the OAS and the U.N. Secretary General, through which normative pressures could be quickly mobilized and brought to bear in order to deal with urgent problems.

2. The Canadian Arctic Waters Pollution Prevention Act

My second example is the controversy between the United States and Canada over enactment of Canada's Arctic Waters Pollution Prevention Act.[30] This experience illustrates how unilateral claims by one state to jurisdiction to protect its marine environment may give rise to international difficulties.

The background of the problem is as follows: In the summer of 1969, the United States Tanker S.S. Manhattan made an historic voyage from the east coast of the United States to the arctic coast of Alaska through the waters and ice of the Northwest Passage, north of the Canadian mainland. The voyage was designed to demonstrate the feasibility of utilizing ice-breaking supertankers on this route for the large-scale transportation of oil from the developing Alaskan oil fields to U.S. east coast markets. The Torrey Canyon incident and a succession of similar occurrences had previously dramatically highlighted the environmental hazards posed by the possibility of maritime-tanker and oil-drilling accidents. Consequently, the Manhattan's feat was taken as giving warning that Canada's arctic environment might soon be subjected to similar threats. Canada's concern and sense of particular responsibility in this respect was heightened by a number of factors: Canada's special pride in its Canadian arctic heritage; its hopes for the economic exploitation of this region; the hazards of Arctic navigation; and the acute dangers which oil spills pose to the unique and fragile ecology of the Arctic region.

Canada responded to this threat by enacting, in June 1970, the Arctic Waters Pollution Prevention Act, which asserts Canada's jurisdiction to regulate all shipping and other pollution threatening activities in zones up to 100 nautical miles off its arctic coasts in order to guard against pollution of the region's coastal and marine resources. The Act's provisions are far-reaching. It applies to all deposits or threats of deposit of "waste" in "Arctic Waters," and both terms are very broadly defined. The government may prescribe "shipping safety control zones" in these waters, which may extend up to 100 miles from Canada's northern coasts, and may prohibit any ship from entering such a zone unless it meets prescribed regulations. These regulations may relate to such matters as hull and fuel tank construction, navigational aids, safety equipment, qualification of personnel, time and route of passage, icebreaker escort and so forth. In certain circumstances, ships may be barred completely from such zones. The Act further provides for the appointment of "pollution prevention officers" having broad powers, including authority both to board ships within a safety control zone for inspection purposes and to order a ship in or near a zone to remain outside if the officers suspect that it may not comply with applicable standards. The Act contains broad enforcement and remedial provisions, including heavy fines for violations of the regulations, seizure and forfeiture of an offending ship and its cargo, and strict civil liability for clean-up cost and damages.

At the same time that the Canadian government introduced this legislation, it also amended its long-standing acceptance of the compulsory jurisdiction of International Court by adding a reservation that Canada retains jurisdiction over "disputes arising out of or concerning jurisdiction or rights claimed or exercised by Canada... in respect of the prevention or control of pollution or contamination of the marine environment in marine areas adjacent to the coast of Canada." The purpose of this reservation was clearly to remove the possibility of any challenge to the Act in the International Court.

The United States government had long indicated to Canada its concern over proposed passage of this legislation and made formal protests

as enactment became imminent. Thus, in a diplomatic note of April 15, 1970, the U.S. Department of State stated that: "International law provides no basis for these proposed unilateral extensions of jurisdiction on the high seas, and the United States can neither accept nor acquiesce in the assertion of such jurisdiction." The State Department asked Canada to defer making its proposed legislation effective until an international agreement was reached; in the event Canada was not willing to do so, the U.S. urged that the issue be voluntarily submitted to the International Court. However, the Canadian government promptly rejected the American position and suggestions. In a note in reply, it stated: that the Act was justified since it was based on the overriding right of self-defense of coastal states to protect themselves against grave threats to their environment; that such extensions of jurisdiction for limited protective purposes outside territorial seas had ample precedent; that the Canadian government was prepared to participate in international efforts to deal with the problem, but was not prepared to await the development of international rules as the solution; and that it would not agree to submit the dispute to the International Court.

This dispute has now been largely overtaken by events. The idea of using tankers to carry oil through these arctic waters has been abandoned, and the issue of extensive pollution control zones has become part of the broader Law of the Sea negotiations. However, there are several aspects of this experience worth noting.

First, Canada chose to act unilaterally rather than await multilateral action and, indeed, took the position that unilateral action was both useful and legally appropriate under these circumstances. Canada's attitude seems based in part on its increasing frustration and disillusionment with international attempts to control marine pollution. The government had come to feel that international approaches would produce only delay, ineffective programs and a sacrifice of coastal state interests. This suggests that multilateral approaches to pollution problems can successfully avoid unilateral action only if they are perceived by the states concerned as serious, as capable of reaching fair arrangements, and as likely to produce timely solutions.

Second, Canada's refusal to permit the International Court to rule upon the dispute serves to suggest some limitations of international adjudicative processes and some reasons for these limitations. Canada was apparently not prepared to risk losing a case in which they considered their vital interests to be involved. Canada's position was at least questionable under existing international law. Moreover, Canada apparently viewed the Court as having an inherently conservative and legalistic bias and as unlikely to approach the matter creatively or with sufficient flexibility to take into account relatively new and emerging national interests such as concern over pollution. Drawing a distinction between Canada's willingness to submit extension of the territorial sea to international adjudication and its unwillingness to submit its pollution control legislation to such adjudication, Canada's Prime Minister Trudeau commented:

> There is no novelty in 12 miles; there is no new legal concept involved. There are differences of opinion but Canada is nevertheless prepared to have the territorial sea legislation adjudicated upon by

international tribunals. We are content to do so in this instance because there is a body of law and practice upon which a court can base its decision. Such is not the case, however, with the concept of pollution control. There is as yet little law and virtually no practice in this area.

It is for that reason that we are not prepared in this matter of vital importance to risk a setback. Make no mistake. Involved here is not simply a matter of Canada losing a case in the World Court—that is one of the prices that we have long willingly paid as part of our adherence to an internatinnal rule of law. What is involved, rather, is the very grave risk that the World Court would find itself obliged to find that coastal states cannot take steps to prevent pollution. Such a legalistic decision would set back immeasurably the development of law in this critical area.

In short, where we have extended our sovereignty, we are prepared to go to court. On the other hand, where we are only attempting to control pollution, we will not go to court until such times as the law catches up with technology.[31]

Finally, Canada defended its unilateral action in part by claiming that it was necessary to protect not only its own environmental interests but also those of the broader international community. Thus, in discussing the proposed legislation to prevent pollution of the Arctic waters, the Canadian Prime Minister commented "[w]e owe it to the world to do something..."[32] and that "[w]e do not doubt for a moment that the rest of the world would find us at fault, and hold us liable, should we fail to ensure adequate protection of that [Arctic] environment from pollution or artificial deterioration."[33]

C. The Law of the Sea Conference

I would like now to turn to the work of the U.N. Conference on the Law of the Sea.[34] This conference will have an important effect on the way in which marine environmental problems are managed, and deserves special discussion. The Conference has as its purpose a wide-ranging revision of the Law of the Sea, and, in particular, the establishment of a regime to govern the exploitation of the resources of the deep seabeds beyond the limits of national jurisdiction. Some 150 delegations are participating in the negotiations, which involve consideration of an agenda of some 75 separate items. After four years of preparations, the Conference convened in December 1973. Extensive formal negotiating sessions have thus far been held in Caracas in June-August 1974 and in Geneva in March-May 1975. The next session is scheduled to be held in New York in March-May 1976.

The task undertaken by the Conference is immense, and it faces many difficulties. While the Geneva session indicates some prospect for success, there is still question whether a broadly acceptable agreement can be reached and, if so, what its provisions will be. However, a review of the situation as of the end of the Geneva session may suggest the present status of the negotiations, particularly with respect to the issues of the protection of the marine environment and the settlement of disputes, and some of the problems which remain.

The principal result of the recent Geneva session is the preparation by the chairmen of the main committees of a massive Informal Single Negotiating Text of 304 articles, in three parts,[35] accompanied by a Working Paper on the Settlement of Disputes containing 77 additional articles.[36] While these are not agreed articles, they reflect a considerable measure of consensus, and are expected to serve as the basis of discussion at the next negotiating session in 1976. The text embodies, among other things, provisions for: a 12-mile maximum territorial sea; unimpeded passage through international straits; a 200-mile economic zone, in which coastal states will have control of all living and nonliving resources, subject to rights of innocent passage; the establishment of an International Seabed Authority to regulate exploration and exploitation of the resources of the seabed in the international area beyond the limits of national jurisdiction; access by landlocked states to the international sea; revisions of other provisions of the 1958 Law of the Sea Conventions; and alternative approaches to dispute settlement. A number of important issues are still outstanding, including the powers and structures of the proposed International Seabed Authority and the legal status of the economic zone. However, it is already clear from the negotiations and Text thus far that one effect of the Conference, whether agreement is reached or not, will be a considerable expansion of coastal state jurisdiction over adjacent oceans, with a consequent contraction of the internationally-shared seas.

The subject of marine pollution has been handled by a working group of Committee III of the Conference. Thus far it has achieved widely agreed texts on monitoring, environmental assessment and landbased pollution, and it has moved close to completed texts on ocean dumping and continental shelf pollution.[37] It is likely that the new convention will include some broad recognition of the principle of state responsibility to protect the marine environment; that the International Seabed Authority will have authority to establish and enforce regulations to protect the marine environment from dangers arising from exploration and exploitation of the deep seabed; and that coastal states will have fairly broad general pollution control authority within economic zones. But there is as yet no agreement as to whether international standards or coastal state standards will be controlling with respect to vessel-source pollution in the economic zone. Many states are concerned that coastal states might misuse pollution control regulations to unreasonably interfere with rights of navigation in this area, and there appears to be some trend in favor of primarily international standards.

The present Text includes several articles relating to notice, monitoring and assessment of marine pollution. A state which becomes aware of damage or imminent threats of damage to the marine environment must immediately notify other states which might be affected and competent international organizations.[38] States are to keep under surveillance activities which might pollute the marine environment, monitor the risks and effects of pollution, and report results to UNEP and other competent agencies.[39] When states have reasonable grounds for expecting that planned activities may cause substantial pollution, they shall, as far as practicable, assess in advance the environmental effects of these activities and report the results to competent international organizations.[40]

Of particular interest for our purposes is the Working Paper on the Settlement of Disputes.[41] This is the work of an informal group, in which more than 60 countries participated. There is apparently broad support among the governments participating in the working group for the concept of binding dispute settlement, though some delegations wish to confine it to particular areas or to exempt from binding dispute settlement procedures those disputes which relate to the economic zone or other areas of national jurisdiction. A consensus has thus far been reached on four general articles.[42] These provide that the parties shall settle convention-related disputes by the peaceful means provided in Article 33 of the U.N. Charter; that they may choose the means to settle their disputes; that they may resort to particular means of settlement provided in other instruments to which they are parties; and that they shall exchange views whenever a dispute arises or a procedure is terminated without settlement of the dispute. There is also general agreement that there should be special dispute settlement machinery, and possibly a special seabed tribunal, for the deep seabeds, administered by the International Seabed Authority.

However, with respect to the use of specific dispute settlement procedures, views differed considerably, and the Working Paper presents several alternatives. The first alternative, for which there is wide support, is a compromise proposal.[43] It would permit a state, at the time of acceptance of the convention, to choose among one or more of three procedures for binding dispute settlement—arbitration, reference to the International Court, or reference to a special Law of the Sea Tribunal. A state invoking dispute settlement procedures would have to resort to the procedure, or one of the procedures, chosen by the defendant state. A second alternative presents a functional approach under which different dispute settlement procedures would apply to disputes in special areas; under these articles, as presently drafted, pollution disputes would be referred to a special committee selected from a panel of experts on pollution problems established by IMCO.[44] The draft articles also include annexes containing provisions for special conciliation procedures;[45] arbitration procedures providing for establishment of a five-member panel, one chosen by each party and the three others chosen by agreement of the two nationally-selected arbitrators;[46] and a proposed Statute of the Law of the Sea Tribunal, which would consist of nine members.[47] The various tribunals would have power to prescribe provisional measures.[48] Scientific or technical matters could be referred to a committee of experts, or alternatively, four technical assessors may be asked to assist the tribunal with its deliberations.[49] The draft articles on dispute settlement also provide in a separate annex for dispute avoidance procedures, exchanges of information and consultation.[50] Under these provisions the parties shall communicate to the U.N. Secretariat or other concerned international organizations, as promptly as possible, information regarding the adoption or application of measures falling within the scope of the Convention, and this information shall be published. Moreover, a party shall respond promptly to a request by any other party for consultation with respect to the adoption of such measures.

It is still too early to predict whether the Conference will provide an agreement which will be helpful in managing marine environmental problems and disputes. The major issues of the Conference are clearly jurisdictional—what some commentators have referred to as the

"carving up of the oceans"—and environmental interests could possibly be lost or sacrificed in this complex negotiation. In any event, it is particularly difficult to predict whether the Conference will result in less or in more disputes with respect to the marine environment. A new Law of the Sea Convention may, of course, help to avoid such disputes by clarifying relevant jurisdictional and other rules. But, on the other hand, unreasonable rules, or ones which are misused, may also give rise to disputes. Moreover, a new convention will inevitably produce some differences as states adjust to the new regime and work out unresolved problems. An even more difficult question is what the situation will be if a new agreement is not reached promptly, or is achieved but not widely accepted, or is not reached at all. In this case, possibilities for controversy may increase as states gradually and on an ad hoc basis attempt to work out solutions to these issues.

D. Observations

This examination of marine pollution disputes suggests several general comments.

First, experience with marine environmental problems indicates that it is possible to move the international community to a position of concern with environmental issues even when damage is relatively limited, indirect and long-term. Marine pollution has caused some harm to coastlines and particularly to marine esthetic and recreational interests. But, as yet, few nations or individuals seem to have suffered really serious damage, either economically or in terms of health concerns. Nevertheless, states have, with remarkable speed, concluded a number of significant agreements in this area and are taking a variety of cooperative measures to meet these threats.

Second, while the various agreements and the other measures thus far taken to deal with marine pollution are collectively impressive, they represent an essentially partial and fragmented attack on these problems. There is broad recognition that different facets of marine pollution—from sources on land, in the sea, on vessels and in the atmosphere—are part of a total ocean problem, and indeed, a total global environmental problem. Thus, attempts to manage the marine environment raise recurrent questions as to whether we can successfully deal with these issues through rules or institutional responses geared to one type of problem or one environmental sector alone.

Finally, existing arrangements to deal with marine pollution issues inevitably reflect primarily governmental interests. These may or may not reflect the broader, collective and long-term interests of mankind. As we have noted, it may be that effective management of the environment, including the marine environment, will ultimately require the development of international procedures and institutions capable of ensuring that these broader problems will be raised, adequately considered and dealt with. We will look at this question again in more detail in the last lecture.

IV. DISPUTES CONCERNING AIR POLLUTION AND OTHER ENVIRONMENTAL CONTEXTS, AND SOME GENERAL DEVELOPMENTS

To complete our survey, I want to discuss some problems which have arisen concerning air pollution and certain other environmental contexts, and to note some other developments. In general, international experience in these areas tends to reenforce points we have already noted—our frequent lack of necessary knowledge, the limited usefulness of judicial and liability-based dispute management approaches, and the broad usefulness of ongoing and flexible dispute avoidance techniques as ways of dealing with these problems.

A. Disputes Concerning Air Pollution

First, let us look at air pollution problems.[1] With increasing industrialization and energy use, transnational air pollution is likely to prove a growing source of international environmental differences. Air pollution may take various forms and be produced in many ways—for example, the emission of various gases or particulates as the byproduct of the consumption of fossil fuels in factories, generating plants, automobiles, ships or aircraft; the dispersion into the air of chemicals such as DDT from industrial use or spraying, or of dust from various land activities; and the production of heat from nuclear generators. Nuclear tests in the atmosphere produce radioactive air pollution but raise special problems and will be considered separately. Since pollutants in the air eventually come to ground, air pollution may form an important pathway for the eventual pollution of land areas, lakes and rivers, and the oceans. Air pollution may also have important indirect effects, for example on weather, climate and the level of ozone in the upper layers of the atmosphere.

We know little about the atmosphere in general or problems of air pollution in particular. For example, scientific knowledge remains sketchy concerning the nature and dynamics of air currents and regional and global circulation patterns; how long different pollutants remain in the air; and how far they travel. As a result, air pollution problems are characterized by particular difficulties in establishing causal connections between particular sources of pollutants and particular effects, in developing meaningful pollution criteria and standards, and in devising effective management or abatement techniques.

1. Relevant Law

It is not surprising that international law in this area remains rudimentary and that there are few agreements dealing specifically with air pollution problems. However, some progress is being made in efforts to produce air pollution principles, program, and standards, especially in Europe where heavy industrialization raises particularly serious air pollution problems. Recent instruments concerned with aspects of these problems include the Council of Europe's 1968 Declaration of Principles on the Struggle Against Air Pollution,[2] and the OECD Environmental Committee's 1974 Action Proposals on Measures Required for Further Air Pollution Control[3] and on Noise Prevention and Abatement.[4]

2. Particular Situations

A few examples of specific air pollution problems may suggest their character and some possible techniques for dealing with them.

(a) The Trail Smelter Arbitration

The Trail Smelter arbitration between the United States and Canada, a landmark in the development of international environmental law, illustrates a relatively simple dispute involving transboundary air pollution and the use of arbitration as a settlement technique.[5] The facts were as follows: Over a period of years, trees, crops and other property in the state of Washington had been damaged by fumes from a zinc smelter at Trail, British Columbia, just across the international border. The American citizens who were affected complained and sought compensation. In 1928, the two governments referred the matter to the U.S.-Canadian International Joint Commission (IJC), which, after investigation, recommended that Canada pay $350,000 to cover damage caused by the smelter through 1931. In 1935, the governments agreed to entrust certain remaining questions to an ad hoc arbitral tribunal. The tribunal was asked to determine: (1) whether further damage had been caused by the smelter since 1931; (2) the amount of any such damage; (3) whether the smelter should be required to refrain from causing damage in the future; and (4) if so, to what extent.

In the interim decision in 1938, the tribunal concluded that: additional damage had been caused up to that date; a further indemnity of $78,000 plus interest should be paid; and a temporary regime to reduce further damage should be instituted. In its final decision issued in 1941, the tribunal concluded that no further damage had occurred since 1937. However, it recommended that a special regime, which would include specific regulatory measures and surveillance procedures, be established to avoid further damage. In the course of its opinion, the tribunal made a statement which has been frequently quoted since that time:

> . . . under principles of international law, as well as of the law of the United States, no State has the right to use or permit the use of its territory in such a manner as to cause injury by fumes in or to the territory of another or the property of persons thereon, when the case is of serious consequences and the injury is established by clear and convincing evidence.[6]

The decision and special regime were complied with, reportedly at considerable expense to the owners of the smelter.

It has been pointed out that the compromis (the arbitral agreement submitting the dispute to arbitration) assumed Canadian liability for any damage and expressly granted the tribunal equitable powers. Thus, the well-known language in the opinion is technically obiter dictum. Moreover, the principle stated is relatively narrow, since it suggests that there is no international responsibility or liability for transnational pollution where serious and actual damage is not clearly

established. However, the decision is an important precedent with respect to both environmental law and the role of equity in international adjudication.

(b) The U.S.-Canadian Detroit-St. Clair River Problem

More recent U.S.-Canadian experience regarding transboundary air pollution in the Detroit-Windsor area suggests the potential role of joint commissions and other expert bodies in handling more complex problems of transnational air pollution.[7] This area of the U.S.-Canadian border is heavily industrialized and air pollution has been a persistent problem. In 1949 the two governments asked the U.S.-Canadian International Joint Commission to investigate the contribution made by vessels on the Detroit River to air pollution in the Detroit-Windsor area. The Commission established a binational board for this purpose, which issued a report in 1960.[8]

In 1966 the two governments greatly expanded this previous reference by requesting the IJC to investigate air pollution in the entire Detroit and St. Clair River areas. This new reference asked the Commission to ascertain whether detrimental transboundary air pollution was occurring and, if so, the sources and extent of such pollution, and to recommend the most practical preventative or remedial measures. More broadly, the IJC was also authorized to call the attention of the two governments to any air pollution problems along the entire boundary. The Commission assigned the study to its existing binational board and also established an International Air Pollution Board, which is still functioning, to establish surveillance over the entire border.

In its comprehensive 1972 report on the Detroit-St. Clair River reference[9] the Commission found that very substantial transnational air pollution existed, arising from industries and power plants on both sides of the boundary, and that a variety of practical preventative or remedial measures were feasible, at an annual cost of about $150 million. The Commission recommended that the two federal governments, the State of Michigan and the Province of Ontario incorporate specific Air Quality Objectives developed by the Commission into their standards and regulations for these two areas; enter into agreements for preventative and remedial measures and contingency procedures; and confer appropriate surveillance, monitoring, reporting and recommendatory authority upon the Commission. Since the issuance of the Commission's Report the State of Michigan and Province of Ontario have: (1) adopted an Integrated Co-operative Air Pollution Control Program; (2) begun to implement compatible programs consistent with the IJC objectives; (3) asked the two federal governments to request the IJC to assume monitoring responsibilities; and (4) in November 1974 signed a Memorandum of Understanding pledging cooperation in implementing a series of pollution control programs.

(c) "Acid Rain" in Scandinavia

The problem of so-called "acid rain" in northern Europe suggests the potential role of cooperative research and

premanagement techniques in regional approaches to air pollution differences.[10] In certain atmospheric conditions, sulfur dioxide emitted into the air from industrial and generating plants may be converted into hydrosulphuric acid, carried considerable distances by air currents, and eventually deposited as "acid rain." Such acid rains have been observed throughout Northern Europe but have caused particular damage to forests and other resources in Norway and Sweden. Norway called a major conference of experts in 1974 to discuss this matter. At the initiative of Norway and other concerned countries, the problem is being dealt with within the framework of the Economic Commission for Europe (ECE). The ECE's Working Party on Problems of Air Pollution will first coordinate an inventory of sulfur dioxide emission sources in the European region, using two governmental rapporteurs, one from Norway and one from the Soviet Union. The Commission will then develop broader cooperative programs for monitoring and evaluating the transmission of air pollutants in this region, harmonizing methods of measurement, and studying the physical and chemical interaction of pollutants in the air.

(d) The Ozone Problem

My final example is the current debate concerning the effects of human activities on the ozone layer of the upper atmosphere.[11] This debate suggests both the continuing emergence of new problems and the difficulty of finding the facts and agreeing on the risks associated with them. The ozone layer is of vital importance since it shields the earth from the more intense ultra-violet rays of the sun. Some scientists believe that the ozone layer is in the process of being seriously depleted. They have suggested various causes, such as nuclear explosions, exhaust gases from supersonic transports, the large-scale use of nitrogen fertilizers, nitrogen produced by the combustion of fossil fuels, and the escape into the atmosphere of bromines and fluorocarbons, which are used as propellants in aerosol spray cans. If true, this could have very serious effects, such as a rise in the incidence of skin cancer, and long-run impacts on climate, food production and the earth's habitability. But other scientists disagree as to these facts and risks. Different government views on the questions may lead to different policies towards the activities involved, such as supersonic transports, and could give rise to disputes. This again calls attention to the need for reliable and broadly acceptable international monitoring, surveillance, research and assessment techniques. Certain programs, such as the World Meteorological Organization (WMO)-International Confederation of Scientific Unions (ICSU) Global Atmospheric Research Program, are beginning to provide this capability.

B. Disputes Arising in Other Environmental Contexts

International environmental differences may also arise in a number of other contexts. I would like briefly to call the more significant of these to your attention.

1. Outer Space

Activities in outer space pose unique environmental problems.[12] Scientific research may be threatened by the accumulation of debris

in space, by the pollution of celestial bodies by terrestrial organisms, or by high altitude nuclear tests or other experiments. Returning spacecraft may introduce extraterrestrial organisms into the biosphere with potentially catastrophic consequences for terrestrial life. Developing space technology, such as the proposed use of space mirrors to heat portions of the earth's surface, may directly or indirectly affect the earth's radiation levels, weather or climate. The risks involved are global, but are also typically long-term, speculative and subject to differing assessment by scientists.

There are several international agreements related to these problems. The 1967 Outer Space Treaty[13] recognizes that outer space and celestial bodies are "the province of all mankind" and provides that states must carry out their activities in outer space with due regard to the corresponding interests of other states and so as to avoid harmful contamination and adverse changes in the environment of the earth resulting from the introduction of extraterrestrial matter. It provides that states bear international responsibility for such activities. The 1963 Nuclear Test Ban Treaty[14] prohibits nuclear tests or explosions in outer space. The 1972 Convention on International Liability for Damage caused by Space Objects[15] makes a launching state absolutely liable for damage which its space object causes on the surface of the earth, which arguably could include environmental damage.

Neither the Outer Space Treaty nor the Nuclear Test Ban Treaty contains specific dispute settlement provisions. However, in Article IX of the Outer Space Treaty, the parties agree to inform the U.N. Secretary General, as well as the public and the international scientific community, of the nature, conduct, location and results of their outer space activities. When a state has reason to believe that an outer space activity or experiment planned by it or its nationals would cause potentially harmful interference with activities of other states, it must undertake appropriate international consultations before proceeding. A state which has reason to believe that another state's activities would cause such potentially harmful interference may request such consultations. The Space Liability Convention provides specific procedures for compensation for damage, first, through diplomatic channels, without the requirement of prior exhaustion of remedies, and then, if no negotiated settlement is reached in one year, by a claims commission which may be established at the request of either party.

While space activities have thus far not occasioned significant disputes, international reaction to the United States' 1963 Project West Ford experiment suggests the type of controversies which might arise.[16] This experiment involved placing some 350 million tiny copper needles in orbit about the earth to study their usefulness in facilitating communication. The experiment produced widespread protest by the international scientific community, a letter of protest from the Soviet Union to the U.N. Secretary General, and a U.S. announcement that it would henceforth enter into appropriate international consultations before proceeding with space activities that it believed raised significant international risks. Article IX of the Outer Space Treaty reflects this experience.

2. Antarctica

The Antarctic continent is of great environmental importance in view of its unique ecology and significance for scientific research, its role in the earth's heat balance, weather and climate, and the rich supply of nutrients in its offshore waters. Activities on the continent are presently governed by the Antarctic Treaty of 1959,[17] to which 19 countries are now parties. The Treaty demilitarizes the continent, reserves it for peaceful and scientific purposes, and prohibits nuclear explosions or the disposal of radioactive wastes. Conflicting national claims to territory are essentially "frozen" for the 30-year life of the Treaty; scientists may pursue their work anywhere in the continent without restriction. The Treaty provides for the promotion of scientific cooperation and that the parties shall keep one another informed of their plans for scientific programs and shall exchange scientific observations and make them freely available. The Treaty provides broad rights of inspection by the parties to verify compliance.

The Treaty contains no specific dispute settlement provisions. However, under Article IX, the parties meet biennially to exchange information, to consult on matters of common interest, and to formulate, consider and recommend to their governments measures in furtherance of the principles and objectives of the Treaty. These include measures concerning the preservation and conservation of living resources. A number of such measures have been agreed upon by the parties, including measures recommended in 1964 for the Conservation of Antarctic Fauna and Flora.

Recent indications that the continent and continental shelf may contain minerals and large reserves of oil and gas are currently producing new stresses on the Treaty, which is silent as to economic questions or the exploration and exploitation of the continent's resources. There is considerable concern that states, driven by growing energy and resource requirements, might seek to reassert national claims in order to obtain exclusive access to any discoveries. Any large-scale exploration and exploitation of resources would threaten the fragile Antarctic ecosystem. International community interests clearly call for some collaborative solution, perhaps through a consortium arrangement, capable of preserving the Treaty and the Antarctic environment from competitive national actions.

This subject was discussed at the recent Eighth Consultative Meeting of the Parties held in Oslo in June 1975. The meeting concluded that governments should: (1) undertake individual and joint studies of the environmental implications of mineral resource activities in the Treaty area and exchange the result of such studies; (2) request the Scientific Committee for Antarctic Research (SCAR) to invite national scientific committees to coordinate relevant research and assess the possible impact of potential mineral exploration and exploitation on the Antarctic environment and ecosystems; and (3) study these issues generally with a view to convening a special preparatory meeting on this subject in 1976 to report to the Ninth Consultative Meeting.[18] These recommendations have not yet been acted upon by the governments.

3. Nuclear Testing and Other Radiation Hazards

Nuclear testing has provided a persistent source of international differences and occasioned the only environmental litigation which has reached the International Court. The hazards created by such activities, both regionally and globally, have been widely recognized and have produced a number of attempts at international regulation. However, while there is broad international sentiment opposed to international testing in the atmosphere, the issue of the legality of such atmospheric tests is still unsettled.[19] Nuclear testing underground is apparently lawful, at least so long as radiation does not escape into the atmosphere or the test does not produce other harmful transnational effects.

The principal international agreement in this area is the 1963 Moscow Treaty Banning Nuclear Weapons Tests in the Atmosphere, in Outer Space and Under Water.[20] The Treaty, which contains no express dispute settlement provisions, has been ratified by over 100 states; however, neither France nor the Peoples Republic of China are parties. The U.N. General Assembly has condemned atmospheric nuclear tests in several resolutions and called urgently for their suspension.

With respect to damage caused by other peaceful uses of atomic energy, there is a broad consensus favoring international responsibility and strict liability. This is reflected in such instruments as the 1962 Brussels Convention on the Liability of Operators of Nuclear Ships[21] and the 1963 Vienna Convention on Civil Liability for Nuclear Damage,[22] which includes an optional protocol concerning compulsory settlement of disputes providing for resort to the International Court. Other relevant instruments include the Statute of the International Atomic Energy Agency (IAEA) and the EURATOM Treaty, both of which contain provisions for compulsory dispute settlement. Both the IAEA and EURATOM have been active in establishing internationally recognized safety standards concerning radiation.

The most important recent dispute in this area is reflected in the Nuclear Tests cases brought by Australia and New Zealand against France in the International Court in 1973. The cases concerned French nuclear tests in the atmosphere carried out at Murotoa, a French possession in the Pacific. The two countries asked the Court: (1) to declare that France's atmospheric tests in the South Pacific Ocean were not consistent with international law; (2) to order that France not carry out any further tests; and (3) to indicate interim measures of protection. Neither country sought damages. Australia, whose claims may be used to illustrate those of both applicant states, based its case on several arguments: the illegality per se of nuclear testing in the atmosphere; the illegal infringement by France through such tests of the freedom of the high seas; and the violation of Australian territorial sovereignty as the result of radioactive fallout from the tests. France refused to participate in the cases, contending that the Court lacked competence. However, the French government maintained that its nuclear tests did not violate any rules of international law, that it was not bound by any rule of international law to terminate them, that the radioactive fallout produced by the tests was so infinitesimal as to be negligible, and that such fallout

in Australian territory did not constitute a danger to the health of the Australian population.

In June 1973, the Court issued an order under Article 41 of its Statute indicating that France should avoid nuclear tests causing the deposit of radioactive fallout in Australian territory.[23] Nevertheless, France carried out two further series of atmospheric tests. However, French officials subsequently made several unilateral public statements indicating that France did not intend to conduct further atmospheric nuclear tests. In its Judgments of 20 December 1974,[24] the Court, by nine votes to six held, in effect, that the case was moot. The majority took the view that these unilateral French statements had legal effect; that France had therefore "undertaken the obligation to hold no further nuclear tests in the atmosphere in the South Pacific;" that the Australian claim consequently "no longer has any object;" and that the Court "is therefore not called upon to give a decision thereon." However there were vigorous dissenting opinions. Thus, in a joint dissenting opinion,[25] four judges argued: that the Australian application in effect called for a declaratory judgment that atmospheric nuclear tests are not consistent with international law; that Australia was entitled to pursue this claim; that the Court had jurisdiction to hear the claim; and that the Court should have proceeded to hearings on the merits.

In the Court's view its function had been performed. Suggesting that the suit may have led to the French declarations, the Court said, "[W]hile judicial settlement may provide a path to international harmony in circumstances of conflict, it is nonetheless true that the needless continuance of litigation is an obstacle to such harmony."[26] Nevertheless, the decision leaves the important question of the legality of atmospheric nuclear testing unresolved.

4. Weather and Climate Modification

The growing prospects for human intervention in weather and climatic processes create an acute potential for disputes.[27] Experiments have already been conducted in a number of countries aimed at the deliberate modification of local weather conditions through cloud seeding in order to affect precipitation, cloud cover and the intensity of hurricanes. The U.S. reportedly used such techniques for military purposes during the Southeast Asian conflict. Large-scale experiments designed to modify regional or global climatic patterns have been suggested—for example, the damming of Bering Straits, the diversion of major rivers, or the deliberate melting of polar ice caps. There is concern that pollution may be affecting levels of carbon dioxide, ozone and other substances in the atmosphere and thus inadvertently affecting the world's weather and climate. Finally, the possibility of deliberate climate modification as a weapon has been widely discussed.

Such activities raise local, regional and global problems. More or less rain for one country may mean less or more rain for another. Diversion of a hurricane from one country may mean steering it to another. Changes in climate may help some countries but hurt others. Moreover, since we have little understanding of complex atmospheric

processes, human intervention may produce unpredictable and serious consequences. Indeed, the mere existence of such technological capability may create disputes. Thus, a state conducting such activities may be blamed for natural weather or climatic changes it did not in fact cause, or it may be blamed for not having taken action to change conditions it ostensibly has the capability to affect.

At the present time, there appears to be virtually no international law on this subject. However, there is a growing consensus that weather and climate should be regarded as shared international resources and rapidly brought under international rules. UNEP is currently attempting to develop general principles and operative guidelines for man-induced weather modification.[28] Another important recent development in this area is the conclusion by the U.S. and Canada in 1975 of a bilateral agreement relating to Exchange of Information on Weather Modification Activities.[29] The agreement provides for exchanges of information, notification prior to commencement of such activities, and prompt consultation at the request of either party with respect to weather modification activities carried on within 200 miles of the international boundary or activities which may have significant effects on the atmosphere over the territory of the other party. However, no dispute settlement provisions are included, and it is expressly provided that nothing in the agreement "relates to or shall be construed to affect the question of responsibility or liability for weather modification activities, or to imply the existence of any generally applicable rule of international law."

5. International Trade and Investment

Disputes are already arising regarding the international trade and investment consequences of various measures designed to implement national environmental policies.[30] For example, states may impose barriers on the importation or exportation of products which they believe create environmental risks, such as automobiles which emit excessive pollution, high sulphur fuels, pesticides or food products containing chemical substances. They may also attempt to use tariffs, subsidies or other techniques to protect the competitive position of their own industries against competition by industries of other countries imposing less stringent and hence less costly environmental control regulations.

A number of international organizations are attempting to deal with these problems. The General Agreement on Tariffs and Trade (GATT) already provides a variety of formal and informal dispute avoidance and settlement techniques adaptable to this purpose. It has also recently completed a major study of non-tariff barriers and established a working group dealing with environmental and trade measures to which specific complaints may be submitted.[31] The Environment Committee of the OECD, in its 1974 Ministerial Meeting, stressed the importance of harmonizing environmental policies and avoiding the restrictive effects or distortions such policies might create in international trade and investment.[32] The 1972 Recommendation of the OECD Council on Guiding Principles Concerning the International Economic Aspects of Environment Policies[33] sets out basic principles in this respect and calls for consultations with respect to their implementation. Both

the OECD and the European Communities have adopted the "polluter pays" principle, under which the polluter should bear the expenses of carrying out pollution prevention and control measures, as the basis of efforts to harmonize their environmental policies and avoid economic distortions.[34]

6. Other Problem Areas

Some other areas of environmental problems may be briefly noted. Concern for the protection of endangered species has stimulated a growing number of international arrangements, such as the 1973 Convention on Trade in Endangered Species,[35] the 1973 Five Power Agreement on the Conservation of Polar Bears,[36] and various agreements to protect whales and other oceanic species. Wide public protests concerning the destruction of various species of whales has helped to produce some added restraints and quota reductions by the states participating in the International Whaling Commission.[37] The Endangered Species Convention contains rudimentary procedures for consultation and a provision for dispute settlement through negotiation or arbitration by mutual consent; however, there are no provisions for compulsory dispute settlement. The Agreement on Conservation of Polar Bears is silent on dispute settlement.

Large-scale experiments or activities which may affect the surface or subsurface of the earth may give rise to disputes. For example, the 1971 U.S. "Cannikin" nuclear test, which was carried out underground on the island of Amchitka off of Alaska, occasioned demonstrations by Canadian environmental groups and strong protests by the Canadian and Japanese governments.[38]

The developing possibilities of genetic engineering, with its capability for producing new forms of bacteria or other life, could pose severe threats to the human and other species. At a meeting in Pacific Grove, California in February 1975, scientists from 16 nations proposed the voluntary deferral of research and adoption of safeguards to prevent the escape of such potentially dangerous organisms from laboratories.[39]

Another area of problems involves the possibility of transboundary health hazards from long-term, low-level exposure to microwaves or "electronic smog" produced by defense or other installations established close to borders. WHO is currently studying this problem.[40]

Finally, there is increasing concern over the prospects for ecocidal weapons and environmental warfare. Developing technology is creating a variety of weapons capable of producing catastrophic alterations in the human environment. These include nuclear and bacteriological weapons and the use of herbicides and weather and climate modification for military purposes. New technology may permit triggering earthquakes, steering hurricanes, diverting rivers, releasing tidal waves and creating artificial electromagnetic or acoustical fields. In the words of U.N. Secretary General Waldheim, "Environmental warfare might soon pass from the realm of imagination to terrifying reality unless preventative action is taken promptly."[41]

The international community is beginning to attempt to deal with these problems. There are a number of instruments directed at limiting the proliferation of nuclear weapons or their emplacement in particular regions or environments such as outer space or the deep seabed.[42] There is also a growing consensus towards the prohibition of bacteriological warfare, reflected in the widely ratified 1925 Geneva Protocol[43] and the 1971 U.N. Resolution and Convention on Bacteriological Weapons.[44] Moreover, the General Assembly has recently declared itself to be in favor of a convention prohibiting "action to influence the environment and climate for military and other purposes."[45] The U.S. Senate has called upon the U.S. government to seek such a treaty banning environmental warfare;[46] and the Soviet Union has proposed an extremely broad draft convention to this effect which has been referred to the Disarmament Committee.[47] It has recently been reported that the U.S. and Soviet Union have reached virtual agreement on such a treaty.[48]

C. Some General Developments

Before concluding our survey, I want to mention several general developments relevant to environmental dispute management which do not fit into any precise narrower category. One of the most interesting is the 1974 Nordic Convention on the Protection of the Environment between Denmark, Finland, Norway and Sweden,[49] which applies generally to all environmentally-harmful activities. The Convention provides that the courts and administrative agencies in each Nordic country shall, when deciding on the permissibility of environmentally-harmful activities, assess the nuisance that such activities may cause in a neighboring Nordic country on the same terms as if the nuisance occurred in their own country. Citizens of all the Nordic states shall enjoy equal status in any of the states regarding the right to institute environmental proceedings and the right to receive compensation for environmental damage. Each state shall establish a special supervisory authority which shall have special rights to institute proceedings in another state or take other action to protect environmental interests. The Convention provides for consultations and opinions from specially constituted commissions. However, it does not contain any provision for compulsory dispute settlement.

There have been several attempts to develop broad principles concerning environmental cooperation. The Stockholm Declaration is, of course, the most important example. Another is the OECD Recommendation on Principles Concerning Transfrontier Pollution,[50] which is of particular interest for its emphasis on avoiding and adjusting disputes. The Recommendation sets out the following principles:

(i) International solidarity, which stresses the importance of defining long-term environmental policies reflecting an equitable balancing of rights and duties.

(ii) Nondiscrimination.

(iii) Equal rights of hearings.

(iv) Information and consultation, including prior notification, exchange of information, and consultation concerning environmentally threatening activities.

(v) Warning systems and assistance.

(vi) General exchange of scientific information, monitoring, and research.

(vii) Cooperation through institutions such as international commissions.

(viii) Dispute settlement, including opportunity to resort to a procedure providing prompt, effective and binding legal settlement.

(ix) Conclusion of international agreements, which should include provisions for practical procedures promoting prompt and equitable compensation of persons affected by transfrontier pollution, as well as procedures facilitating the provision of information and consultation.

As previously indicated, UNEP's Governing Council, in implementation of General Assembly Resolution 3129, has recently at its Third Session in April 1975 requested its Executive Director to establish an intergovernmental working group of experts to prepare draft principles of conduct for the guidance of states in the conservation and harmonious exploitation of natural resources shared by two or more states.[51] These principles will eventually be presented to the General Assembly. The Governing Council expressly provided that the principles should be prepared on the basis of the recommendations and proposals contained in the Executive Director's Report to the Council on this question. In this report, the Executive Director suggested that the Code might include the following principles and guidelines:

(i) The principle of environmental responsibility reflected in Principle 21 of the Stockholm Declaration.

(ii) Encouragement of international agreements, which should include, in particular, the establishment of joint institutional structures, such as joint commissions, for consultations as well as planning and rational management of shared natural resources.

(iii) Advance notification.

(iv) The exchange of information.

(v) Consultations.

(vi) The principle of good faith and neighborliness.

(vii) The establishment of an information register.

(viii) Procedures for emergency action.

(ix) Means for the settlement of disputes.

(x) Encouragement of the use of good offices of UNEP.

(xi) General guidelines relating to liability and compensation of foreign victims of environmental damage, including the availability of domestic procedures.[52]

Another significant instrument is the 1973 Programme of Action of the European Communities on the Environment,[53] which sets out a comprehensive statement of the objectives and principles of community environmental policy, and stresses, among other things, cooperative activities, harmonization of policies, prior assessment and consultation. Finally, the 1974 Bellagio Conference on the Avoidance and Adjustment of Environmental Disputes, sponsored by the American Society of International Law, presented a variety of useful conclusions and recommendations concerning the management of environmental disputes.[54]

V. CONCLUSION

In this concluding lecture I want to suggest some principles of environmental dispute management, to comment on the relative usefulness of various dispute management institutions and to raise some broader questions concerning our prospects for successfully coping with these problems.

A. Some Principles of Environmental Dispute Management

Any attempt to generalize from our still recent, limited and diverse experience in attempting to manage international environmental disputes must be undertaken with diffidence. However, I would like to suggest some principles which seem to me to be applicable to the effective handling of these problems.

1. The Principle of Environmental Responsibility

At the threshold, the international community must insist that states take seriously their responsibilities, as reflected in Principle 21 of the Stockholm Declaration, to protect the environment and to ensure that activities within their jurisdiction or control do not cause damage to the environment of other states or to areas beyond the limits of national jurisdiction. We cannot assume that, in the absence of effective international pressures, particular states will always choose to do so. As we have seen, environmental issues raise, in a particularly acute form, the continuing tension between sovereign rights and international responsibilities. On the one hand, the potential reach of international environmental concern is vast, extending to a variety of conduct by states within their own borders and of a nature traditionally considered solely of domestic concern. On the other hand, continued environmental deterioration can have immense consequences for the international community, potentially threatening man's future. It is clear that in these areas appropriate balances will be difficult to agree upon, and that compliance with international rules and standards may be difficult to achieve. But the stakes involved are high and worth the effort. We will be able to deal with environmental challenges only if governments prove generally willing to take the potential political risks of calling to account states violating environmental standards.

2. The Principle of Diverse Approaches

We have seen that, despite underlying similarities, there are many types of environmental problems and disputes. From the standpoint of dispute management, the problem of local transboundary pollution involved in the Trail Smelter arbitration and the problem of the depletion of the ozone layer in the upper atmosphere, even though they both involve air pollution, have little in common. These diverse problems will require diverse approaches, tailored to the unique issues and circumstances involved. We will have to provide not one procedure for the management of environmental problems, but rather a

large variety of procedures, utilizing different techniques, employing different institutions and operating at different levels.

3. The Principle of Factual Knowledge

We cannot deal effectively or responsibly with environmental problems or disputes without at least some knowledge of the relevant facts and some responsible assessment of the risks involved. Environmental disputes are often at basis disputes about the sources, channels or impact of environmental harm, or about the potential threats posed by various kinds of activities. We have seen a number of examples, such as disputes involving the French nuclear tests and the proposed diversion of Lake Lanoux. Consequently, successful management of environmental disputes will depend heavily upon our ability to strengthen our institutional capabilities for obtaining the necessary information and making the necessary assessments of risk.

This need has been widely recognized, and many programs aimed at problem identification, environmental monitoring, surveillance and research are underway.[1] However, even with increased efforts, certain problems will remain. First, the necessary facts and understanding of these processes will, at best, be acquired only slowly. Thus, for some time we will have to continue dealing with these problems on the basis of knowledge which is scanty and assessments which are uncertain. Second, there is need not only to acquire knowledge but to communicate it in effective and useful ways. Officials must receive information in a form which they can understand and use in making their decisions, and they must receive it in time to reach relevant decisions and take appropriate action. Finally, we need procedures for ensuring that the information received is credible and broadly acceptable. Experience shows that the opinions of scientists and experts may differ widely. In such cases, we will have to agree on ways for deciding which experts we should accept as authorities and rely on.[2]

4. The Principle of Dispute Avoidance

There is a very wide consensus that our environmental efforts should stress avoiding environmental disputes and preventing them from arising, rather than attempting to deal with these problems only after they emerge. As we have seen, this can be accomplished in a variety of ways—by prior international agreement on applicable rules and standards, through the establishment of ongoing cooperative institutions and through a variety of dispute avoidance procedures. These procedures include techniques for technology assessment and the advance identification of problems, for timely international notification of proposed activities which might have significant environmental or related consequences, for exchanges of information and consultation between states concerned, and for negotiation with a view to avoiding potential problems. It is important that notice and exchanges of information should be sufficient to permit reasonable assessment of risks, and that consultation and negotiation should involve good faith efforts to find ways of accommodating different interests. International obligations in at least some of these respects appear to be developing.

5. The Principle of Predictability

One of the most effective ways of avoiding disputes is to provide relatively clear prior understandings as to applicable rules of behavior—what each state expects that other states should or should not do. Consequently, it is desirable to reach agreement, wherever possible, providing relatively clear rules with respect to the protection of various environments and the conduct of various environmentally threatening activities. But this will not always be an easy task. Unique and varying circumstances, changing knowledge and the continuing emergence of new problems may sometimes make agreement on precise substantive rules impracticable. In these cases, we may have to be satisfied with agreements setting out only broad standards of what constitutes reasonable conduct by states. While necessarily imprecise, these can provide at least some measure of guidance. We can also usefully reach broad procedural understandings concerning the ways in which relevant decisions may be reached and the ways in which problems and disputes can be handled.

6. The Principle of Flexibility

There are many different ways of avoiding and resolving disputes. It makes little difference which means states employ, as long as these means are effective in dealing with the problems. This suggests that we might wish to provide states with a range of options and the flexibility to choose among the dispute management institutions and techniques they prefer, rather that seeking to force states into particular procedures they are reluctant to use. The dispute settlement options suggested in the Working Paper on the Settlement of Disputes developed at the Geneva Session of the Law of the Sea Conference are an example of this type of approach.

7. The Principle of Lowest-Level Solutions

There is an obvious advantage in attempting to deal with problems at the lowest possible level and with the least fuss. Lower-level solutions tend to be simpler, quicker and cheaper. Moreover, they may keep a problem from becoming enmeshed in larger political issues or engaging national sensitivities. This concept is reflected, for example, in traditional international claims principles concerning the exhaustion of local remedies.

One possible means of low-level dispute management is through the increased use of domestic procedures and remedies.[3] These can play a particularly useful role in dealing with essentially local problems of transfrontier pollution, which constitute a significant portion of current problems. The use of these techniques can be facilitated through agreements or uniform or reciprocal legislation providing for nondiscriminatory access to domestic agencies and remedies. We could also usefully take steps to ease some of the problems encountered by litigants in bringing proceedings involving transnational facts before national courts and agencies—problems of jurisdiction, standing, sovereign immunity, choice of law, the obtaining and use of evidence and the enforcement of judgements. The 1974 Nordic Convention is an important example of this approach.

At international levels, problems may frequently be resolved through informal or formal consultations by technical experts, either under nongovernmental or official auspices. There are now a great variety of institutions and forums available to facilitate such technical consultations—scientific groups, bilateral technical arrangements, joint commissions, regional institutions and global institutions. While there may be some situations where higher level political consideration becomes necessary—the Colorado River salinity problem may be an example—experience suggests that seeking to resolve issues at high formal diplomatic levels may often raise as many problems as it solves.

8. The Principle of Nonlegalistic Solutions

As our discussion has stressed, experience suggests that states strongly prefer to deal with environmental problems through negotiation, compromise and ongoing administrative arrangements, which emphasize the prevention of disputes and the prospective protection of interests, rather that through resort to international adjudication and liability-based approaches, which emphasize ex post facto adjustment and indemnity. A number of reasons for this attitude have been suggested.[4] Let me indicate some of them. First, states may be concerned that resort to legal proceeding will be considered an unfriendly act, may make negotiated settlement more difficult, may adversely affect general relations between the countries or may give rise to legal or political retaliation. Second, such proceedings tend to be complex, lengthy and expensive. Third, much of environmental law is still rudimentary and uncertain, and litigating risks and probable outcomes may be hard to predict. Fourth, environmental issues are likely to raise particularly difficult evidentiary problems. Thus, they frequently arise from accumulations of damage from many sources over long periods of time affecting many people. In these cases, proof of sources, victims, causation and injury may be complex or impossible. Fifth, with respect to many types of environmental problems, traditional legal remedies may be inadequate or come too late. Thus, environmental harms may be subtle, cumulative, manifest themselves only over long periods and affect very large numbers of people. In these cases, money damages may be impossible to calculate or ineffective. Only equitable and preventative remedies may be capable of providing an effective solution. But the equitable powers of international courts are limited, and injunctions appropriate to these problems may be difficult to fashion and administer. Sixth, many of these questions are highly technical, and officials may fear that judges, trained only in law, may have difficulty understanding them. Seventh, environmental disputes may frequently involve complex and essentially regulatory or legislative policy issues, such as questions of allocation and apportionment, which officials may believe will be difficult to analyze and fairly decide through judicial techniques. Eighth, there is concern that the use of judicial techniques may be ineffective, since a losing state may refuse to carry out a court judgment, and it may, as a practical matter, be impossible to obtain international enforcement. Ninth, officials may be concerned that a judicial decision may be too inflexible, freezing the status quo and making adjustments to changing needs, interests and problems more difficult. Finally, it

is broadly recognized that governments have traditionally been reluctant to sacrifice their control over events by entrusting significant national concerns to the unpredictable outcomes of international adjudication. Experience suggests that some issues are so important to the states involved that they are simply not prepared to take any chance of losing them.

This is not to suggest that international adjudication and concepts of liability may not have a role in environmental dispute settlement. A number of conventions reflect these techniques, and there are clearly many ways in which, if states are willing to employ judicial institutions, they can be very useful. Thus, where specific responsibility, causation and monetary injury to specific victims can be clearly established, it seems only fair that indemnity to these victims be provided. Even where victims are hard to identify, general or lump sum settlements can remove the problem from international controversy. Hopefully, the prospect of liability and payment of damages may deter activities likely to cause such injury. Moreover, judicial techniques always offer the parties at least a "last resort" impartial means of settlement when other techniques have failed. Indeed, in some cases, they can provide acceptable ways of dealing with problems which governments would like to settle but cannot, because internal political considerations impede the negotiation of compromises. Judicial techniques may stimulate settlement simply by being available; states may prefer negotiated compromises to even a small possibility of being pushed or dragged into international adjudication. Finally, judicial decisions can perform a broader useful function by clarifying and developing rules and principles and thus helping to guide future conduct and to avoid future disputes. However, these techniques have thus far been little used in managing environmental differences, and it seems unlikely that they will play a major role.

9. The Principle of Coordination

While I have emphasized the point that different environmental problems have different characteristics and may require different approaches, it is also true that, at a higher level, they are often interrelated and their solutions may be interdependent. For example, we have come to recognize that we cannot deal effectively with marine pollution without, at the same time, dealing with its principal source—land-based pollution. Moreover, as we have noted, measures controlling pollution in one area, such as the burning of wastes, may simply transfer pollution to another sector, such as the atmosphere. Consequently, there is a need for some type of coordinating procedures to ensure that we do not simply achieve a patchwork quilt of particular solutions, working at cross purposes. UNEP has established an Environment Coordination Board in an attempt to begin dealing with these problems and continued attention to the problem of coordination is essential.

B. Some Institutional Means

With these principles in mind, let us examine the usefulness of some particular types of institutions.

1. Joint Commissions

The most effective technique for managing international environmental problems, at least at the bilateral or regional level, has been the use of joint commissions, or similar arrangements for formal or informal technical cooperation. We have seen that these arrangements have a great many advantages. They are highly flexible and may be tailored to particular problems and circumstances. They can provide for the efficient organization of technical expertise to perform a variety of functions such as problem identification, fact-finding, monitoring, surveillance, environmental assessment and recommendation. They provide a continuing forum for exchanges of information, coordination, consultation, the harmonization of national policies and the formulation of integrated multinational responses. They facilitate problem solving by establishing valuable lines of communication between officials at working levels of different governments. Their responsibilities and authority can be quickly and easily varied to meet changing desires of the parties or emerging needs. In view of these advantages, it is not surprising that this technique has been widely adopted and its use broadly endorsed.

However, we should also recognize that such commissions may have certain limitations. As the number of countries participating in any such institution increases, advantages of flexibility and informality may be lost. Moreover, such commissions tend to be most effective when the countries concerned have at least some cooperative traditions and shared outlooks, as is the case with the U.S.-Canadian International Joint Commission. Finally, it is not clear that such commissions can effectively deal with more complex political issues, such as problems of resource allocation and cost apportionment. In most cases, states have thus far been reluctant to entrust such commissions with this type of decision-making authority.

2. International Judicial Agencies

In my opinion, it is unlikely that the International Court or other international judicial agencies will, in the near future, play an important role in environmental dispute management. We have seen that states, for a variety of reasons, have been reluctant to use such judicial techniques. This lack of enthusiasm for international adjudications was reflected more generally during the General Assembly's recent view of the role of the Court.[5] It is true that the Nuclear Tests cases show that states may occasionally use the Court for these purposes. However, it is not yet clear whether the results in those cases will have the effect of encouraging or discouraging the submission of other environmental disputes in the future.

Some commentators believe that the International Court could make a useful contribution in the environmental area, and that this reluctance of states to use the Court for these purposes is shortsighted. Former Judge Jessup, for example, has pointed out that the Court is an extremely flexible instrument and that at least some of the concerns expressed are exaggerated.[6] Thus, under the Court's rules, it can form chambers to hear particular categories of cases, appoint technical assessors to sit with it, and secure expert fact-finding

and opinions. The Court has recently shown itself more willing to grant interim orders of protection, as illustrated by its issuance of such orders in the Fisheries Jurisdiction[7] and Nuclear Test[8] cases. It has also shown itself more willing to deal with complex technical issues involving a balancing of various state interests, as illustrated by its decisions in the Fisheries Jurisdiction cases.[9] The Court could play an important role in resolving disputes involving the many new environmental agreements, and in helping to develop emerging customary law in this area. But for the time being, at least, I believe that these arguments are unlikely to prove persuasive to governments.

Suggestions have been made for the establishment of special environmental tribunals, similar to the special Law of the Sea Tribunal proposed by some nations in the current Law of the Sea negotiations. It is not entirely clear why there is a need for such special tribunals, how much they would be used, or why the International Court could not serve just as well. For example, I am skeptical that technical experts would be more likely than legally-trained judges to resolve these types of problems. Moreover, if states feel the need for a decision by experts or for special tribunals to deal with a particular matter, it is always open to them to establish an ad hoc arbitral tribunal by special agreement which can be tailored to their particular desires. However, despite these questions, if states believe such tribunals will be useful and are prepared to pay for them, there seems to be no reason not to furnish them with this additional institutional option.

3. International Organizations

We have seen that global and regional international organizations can play a variety of important roles in the avoidance and adjustment of environmental disputes. They can perform many of the functions of joint commissions, and others as well, but on a broader regional or global scale. These functions include: coordinating various national efforts concerning problem-identification, fact-finding, monitoring and surveillance; mobilizing or providing technical expertise and advice; serving as clearing houses for exchanges of information; educating states as to problems and publicizing dangers; facilitating and encouraging consultation and negotiation; organizing international efforts to develop rules and standards; and performing mediation and conciliation functions or otherwise acting as agencies of dispute settlement. Almost all of the lawmaking conventions and significant programs so far achieved have been reached under international organization auspices. Moreover, by virtue of their wide multinational representation and permanent international staffs, these organizations can provide the potential for bringing broadened perspectives and community pressures and interests to bear on the solution of particular problems or disputes.

But international organizations also have their limitations. Typically, they have only recommendatory authority; few have any regulatory powers. Ultimately, they are creatures of the states which comprise them; they cannot move further, faster or in different directions than dominant majorities or powerful minorities permit. Adequate funding is often lacking. Permanent secretariats may on occasion be conservative, bureaucratic or even incompetent. There is a

broad tendency for rhetoric and reports to substitute for innovative and well thought out programs and useful action. Moreover, it has often proven difficult to achieve effective coordination between different international organizations, and jurisdictional overlaps and conflicts may emerge. The fact that an international organization is given responsibilities concerning a problem does not mean something will necessarily be done about it.

The most important international institution concerned with environmental problems is, of course, the United Nations Environment Program, now barely three years old. As previously indicated, UNEP has been given broad coordinating and other responsibilities in this field, and is active in a number of areas. UNEP's governing resolution also authorizes it to provide advisory services and to bring significant problems to the attention of its Governing Board. It could conceivably exercise mediatory and conciliatory functions with respect to environmental differences and play other useful roles in managing disputes.

However, UNEP's powers are limited and the extent to which it will prove effective remains uncertain. It currently has an energetic Executive Director and is involved in a large variety of projects.[10] But some countries, such as the United States, have been somewhat critical of UNEP's efforts. They have suggested that it has been paying too little attention to strictly environmental problems, failing to develop specific programs demonstrating cohesive planning, improperly intruding into economic and political questions and spreading its efforts and limited resources too thin.[11] This suggests some of the problems UNEP will have to meet in the future. If UNEP is to perform effectively as a dispute management agency, it must maintain its credibility with both developing and industrialized countries. This may not prove to be an easy task.

C. Protecting the International Community Interest

A unique and important feature of the recent development of international environmental concern has been the concept that there is an international community interest in the protection of the environment, independent of the particular interest of any government. In the words of Principle 1 of the Stockholm Declaration, "Man...bears a solemn responsibility to protect and improve the environment for present and future generations." This idea has been applied in particular to issues of protection of the international commons—the seas, the atmosphere, outer space, and possibly Antarctica. There is a growing sentiment that, even where states exercise jurisdiction in such areas—as may prove the case, for example, with respect to the economic zone contemplated in the Law of the Sea negotiations—they have custodial responsibilities concerning the protection of these areas to the community at large.

This concept raises many problems. Who is to define this community interest and how? Who is to raise it and in what forms? How can this interest be effectively protected other than with the active cooperation of governments?

Several possibilities for enforcing this community interest have been suggested. First, perhaps states themselves, acting on behalf of the international community, may raise and pursue such issues, either by direct claim against other states or through international organizations. There is considerable support for the concept that states may have obligations not only to other states, but to the international community erga omnes—that is, as a whole. Suggestions to this effect are contained, for example, in the International Court's decision in the Barcelona Traction case.[12] However, it is not clear that international law as yet recognizes the concept that states have standing or that there is a so-called actio popularis to vindicate this right.[13] The Court has expressed doubts in this respect, particularly in the second phase of the South West Africa cases.[14] However, at least some dissenting judges in the Nuclear Tests cases seemed prepared to consider the existence of a right of any state to bring an action to vindicate such universal obligations.[15] There are possible analogies in other fields, such as in the concept of universal jurisdiction with respect to international crimes, and in the concept of the international protection of human rights. Clearly, an obligation erga omnes has little meaning if no state can enforce it. But, whatever may prove to be the law in this respect, experience suggests that governments may be reluctant to involve themselves in disputes where their immediate interests are not threatened or where they have nothing tangible to gain.

Second, perhaps international organizations, such as UNEP, acting as agents of the international community, may take measures to protect its interests. UNEP's responsibilities place it in a unique position to be aware of such dangers, to coordinate an assessment of their consequences and to call them to the attention of the international community. Thus, under its governing resolution, the Executive Director may bring to the attention of the Governing Council "any matter which he deems to require consideration by it."[16] UNEP can also initiate and sponsor international consultations with respect to such problems, as it did in the case of the Mediterranean. In many situations, UNEP may perform this function very effectively. However, as we have noted, UNEP, like other organizations, is not independent of the states which comprise it. It remains to be seen whether UNEP will be prepared to act as an advocate for community interests when the protection of these long-run interests runs contrary to the immediate interests and desires of the majority of its members.

Finally, perhaps this function may be performed by nongovernmental scientific or other organizations, such as the International Confederation of Scientific Unions, or national or international conservation groups. But these groups have, at best, very limited standing in international organizations and other forums, and at the present time, they have no standing before international courts. Thus, they now have little power to press their views by means other than publicity.

A variety of measures have been proposed to attempt to meet this problem. International agreements could be concluded clarifying the custodial environmental responsibilities of states and the right of any state to espouse international community environmental interests.

It is possible to imagine particularly concerned states forming an informal or formal group to perform this "watchdog" function. UNEP's responsibility, authority and capability in this respect could be strengthened. Suggestions to this effect include: that an international scientific advisory panel be established to assist UNEP in alerting the international community to emerging problems; that the Executive Director issue a formal annual report on the World Environment, speaking frankly to these issues and naming countries failing to live up to their international responsibilities; and that UNEP be permitted to intervene in relevant national or international procedures. Nongovernmental organizations and private groups could be permitted to call relevant environmental problems to the attention of UNEP and other international organizations, to contribute to relevant proceedings of these organizations, and, perhaps to file statements or even initiate proceedings before international courts. However, many of these suggestions are innovative and challenge traditional concepts, and they are not likely to be accepted readily or soon.

D. Prospects for the Future

Finally, let us look at the future. Are existing efforts to manage international environmental problems and disputes likely to be effective? Are we bringing these problems under effective international control? It is evident from our survey that the scope and intensity of present international efforts to deal with environmental problems are impressive. Concepts of international responsibility are becoming established, and useful rules, institutions and procedures are developing with unusual rapidity. We have at least begun to produce a set of tools capable of dealing with these issues in a sensible and cooperative way. However, environmental protection involves many complex and fundamental issues which may not be easily or quickly resolved.

The most basic of these issues is that of so-called "trade-offs." Protecting the environment inevitably involves costs. We are coming to realize that if we really want to achieve environmental goals, we may often have to give up things we want or activities we want to pursue. Or we may have to conduct our activities in a less satisfactory, less efficient or more costly way, foregoing desirable alternative uses of our energies and resources. Frequently the benefits and costs of such decisions will fall unequally upon different countries or different groups within such countries. No amount of law, no body of procedures, can avoid the emergence of continuing differences concerning what measures of environmental protection are desirable in view of the costs they entail and who should pay these costs or how they should be shared.

As I have suggested, this problem is most obvious in the clash of environmental philosophies between developing and industrialized countries. To developing countries, environmental goals are, at least for the moment, less important than development objectives. Indeed, in their view, environmental goals cannot be effectively realized except within the framework of an ongoing development process. Therefore, if something must give way, it should be the environment rather than development. Moreover, they believe that if environmental measures are desirable, developed countries are in the best position to

afford them and should pay the necessary costs. Developed countries have typically taken a different view. However, even in developed countries, environmental goals are now coming under increasing pressure. Inflation, energy shortages and economic problems are combining to make the costs involved more obvious and painful, and the choice to incur them more difficult. Where only limited resources are available to meet many pressing needs, effective action to protect the environment may often seem something that can be put off until tomorrow.

This suggests that any broadly effective approach to environmental dispute management must eventually deal with these problems. In particular, we will have to develop procedures capable of reaching widely acceptable decisions regarding the equitable allocation and sharing of the costs of the measures necessary to achieve our common environmental goals. This may involve recognition that differing types and levels of action to protect the environment may be appropriate as between industrialized and developing countries. It may require new concepts and attitudes concerning the responsibilities of states to give international assistance to meet other nations' environmental problems. We may wish to consider a broadened application of insurance and risk sharing principles and of international environmental protection funds, conceivably along the lines suggested by the International Compensation Fund for Oil Pollution damage.[17] We may need to develop new and innovative approaches to the calculation and management of social costs.

The issue of environmental protection is ultimately, of course, enmeshed with many other complex questions—the control of population growth, the management of burgeoning technology, problems of poverty and economic development, the depletion and management of resources, the control of weapons of mass destruction and restraints on the use of force, and the entire structure of world order. Some observers doubt that our present international society, based on the coexistence of a large number of separate sovereign states, can cope effectively with these problems. They call for a limiting of population, economic and technological growth and for a new political order.[18] Hopefully, such pessimism will prove unwarranted. However, in any event, one thing is clear. We cannot deal with either environmental or other pressing problems except through international cooperation.

It is in this area that international lawyers can make a vital contribution. For our special expertise is in helping nations to cooperate and to manage their differences. This suggests that, as international lawyers, we have a major responsibility to turn our efforts and imagination to the search for innovative and workable solutions to these complex and difficult environmental questions. Human beings have made these problems, and there is no innate reason why they cannot solve them. The enterprise is surely a worthy one, for it may, in the final analysis, be that of human survival.

FOOTNOTES TO LECTURES

INTRODUCTION

1. I would like to express my appreciation to the University of Wisconsin Sea Grant Program, which has facilitated my preparation of these lectures. I would also like to thank the American Society of International Law for making available certain of the papers presented at its recent conference on the Avoidance and Adjustment of Environmental Disputes, held at the Via Serbelloni, Bellagio, Italy, July 19-23, 1974. These papers, which may be published by the Society, are herein cited as "paper delivered at the 1974 Bellagio Conference."

Recent writings in the field of international environmental law are very extensive. To avoid unduly burdening these lectures, I have cited in the footnotes only the more important instruments referred to and several representative writings on each of the principal subjects discussed. A more complete list of books and articles relied upon is contained in the Selected Bibliography. I have abbreviated certain of the principal references cited in the footnotes, including the following: the American Journal of International Law is cited as A.J.I.L.; the American Society of International Law's periodical collection International Legal Materials is cited as I.L.M.; the United Nations Treaty Series is cited as U.N.T.S.; and the annual Reports of the International Court of Justice are cited as I.C.J. Reports.

2. See Report of the United Nations Conference on the Human Environment, U.N. DOC. A/CONF. 48/14 (1972). The texts of the Declaration and Action Program are reprinted in 11 I.L.M. 1416 (1972). The text of the Declaration is reprinted in 67 U.S. Dept. State Bull. 116 (1972).

3. Strong, "One Year After Stockholm," 51 Foreign Affairs 690, at 697 (1973).

4. See, e.g., Agreement on Cooperation in Environmental Affairs between the United States and the Federal Republic of Germany, done May 9, 1974, text in 13 I.L.M. 598 (1974); Agreement on Cooperation in the Field of Environmental Protection between the United States of America and the Union of Soviet Socialist Republics, done May 23, 1972, text in 11 I.L.M. 761 (1972).

5. U.S. Treaties and Other International Acts Series 7312, text in 11 I.L.M. 694 (1972).

6. Convention on the Protection of the Environment between Denmark, Finland, Norway and Sweden, done Feb. 19, 1974, text in 13 I.L.M. 591 (1974).

7. Convention on the Protection of the Marine Environment of the Baltic Sea Area, done March 22, 1974, text in 13 I.L.M. 544 (1974).

8. Declaration of the Council of the European Communities of 22 Nov. 1973, on the Programme of Action of the European Communities on the Environment, and Annex Containing Program of Action, European

Communities Official Journal, Vol. 16, No. C.112 (Dec. 20, 1973), text in 13 I.L.M. 164 (1974).

9. Issued November 14, 1974, text in 72 U.S. Dept. of State Bulletin 92 (Jan. 20, 1975).

10. Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter, done Nov. 13, 1972, text in 11 I.L.M. 1291 (1972).

11. UNESCO Convention for the Protection of the World Cultural and Natural Heritage, done Nov. 16, 1972, text in 11 I.L.M. 1358 (1972).

12. International Convention for the Prevention of Pollution from Ships, done Nov. 2, 1973, text in 12 I.L.M. 1319 (1973).

13. Convention on International Trade in Endangered Species of Wild Fauna and Flora, done March 3, 1973, text in 12 I.L.M. 1085 (1973).

14. U.N. General Assembly Resolution 2997 (XXVIII) of Dec. 15, 1972, text in 12 I.L.M. 433 (1972).

15. For texts of significant decisions of the UNEP Governing Council reached at its first, second and third annual sessions, see, respectively, 12 I.L.M. 1183 (1973); 13 I.L.M. 1027 (1974) and 14 I.L.M. 1070 (1975).

16. See Bilder, "The Role of Unilateral State Action in Preventing International Environmental Injury," (University of Wisconsin Sea Grant Publication 1973), to be published in R. Stein (Ed.), International Responsibility for Environmental Protection (American Society of International Law, 1976); Gotlieb and Dalfen, "National Jurisdiction and International Responsibility: New Canadian Approaches to International Law," 67 A.J.I.L. 229 (1973).

17. Strong, supra, n. 3 at 690.

18. See, e.g., the Founex Report on Environment and Development, the Report of a Panel of Experts Convened by the Secretary General of the United Nations Conference on the Human Environment, printed in International Conciliation (No. 586, Jan. 1972); Castro, "Environment and Development: The Case of the Developing Countries," 26 International Organization 401 (1972).

19. Among the many useful recent discussions of international environmental law, see, e.g., the papers collected in Hague Academy of International Law, Colloquium 1973 on "The Protection of the Environment and International Law" (A.C. Kiss, Ed.) (1975); J.L. Hargrove (Ed.), Law, Institutions and the Global Environment (1972); L. Teclaff and A. Utton (Eds.), International Environmental Law (1974); and Bleicher, "An Overview of International Environmental Regulation," 2 Ecology Law Quarterly 1 (1972); more extensive references are contained in the Selected Bibliography at the end of these lectures. For a very useful collection of relevant texts, with commentary, see J. Barros and D.M. Johnston, The International Law of Pollution (1974).

20. 3 U.N. Reports Int'l. Arb. Awards 1911 and 1938 (1949).

21. Done May 12, 1954, 327 U.N.T.S. 3.

22. See, e.g., A.W. Koers, International Regulation of Marine Fisheries: A Study of Regional Fisheries Organizations (1973).

23. Done December 1, 1959, 402 U.N.T.S. 71, text in 54 A.J.I.L. 477 (1960).

24. Done October 10, 1963, 480 U.N.T.S. 43.

25. Stockholm Declaration on the Human Environment, Principle 21, supra, n.2. For an excellent discussion and negotiating history of the Declaration and each of its principles, including Principles 21 and 22, see Sohn, "The Stockholm Declaration on the Human Environment," 14 Harvard International Law Journal 423 (1973).

26. I.C.J. Reports, 1949, page 4 at 22.

27. 3 U.N. Reports of Int'l. Arb. Awards 1938 (1949) at p. 1965.

28. U.N. General Assembly Resolution 3281 (XXIX) of December 12, 1974, text in 14 I.L.M. 251 (1975).

29. Stockholm Declaration on the Human Environment, Principle 22, supra, n. 2.

30. Supra, n. 8.

31. Supra, n. 9.

32. O.E.C.D. Council Recommendation on Principles Concerning Transfrontier Pollution, adopted November 14, 1974, O.E.C.D. Doc. C (74) 224 of November 21, 1974, text in 14 I.L.M. 242 (1975).

33. U.N. General Assembly Resolution 3129 (XXVIII) of December 13, 1973, text in 13 I.L.M. 232 (1974).

34. U.N. General Assembly Resolution 2669 (XXV) of 8 December 1970.

I. PRELIMINARY QUESTIONS

1. Compare, for example, the Permanent Court of International Justice's definition of a "dispute" as "a disagreement on a point of law or fact, a conflict of legal views or interests between two persons," Mavrommatis Palestine Concessions (Jurisdiction), P.C.I.J. Ser. A., No. 2 (1924) at 11; and Charles De Visscher's definition of an international dispute as "a disagreement between states on a matter sufficiently circumscribed to lend itself to definite claims susceptible of rational examination," C. De Visscher (trans. P.E. Corbett), Theory and Reality in Public International Law (Rev. Eng. Ed. 1968) at 353.

2. See, e.g., G.F. White, "The Role of Scientific Information in Anticipation and Prevention of Environmental Disputes," paper delivered at 1974 Bellagio Conference.

3. See Garrett Hardin, "The Tragedy of the Commons," 162 Science 1243 (1968).

4. See, e.g., J. Barros and D.M. Johnston, The International Law of Pollution (1974), at pp. 3 et. seq.

5. For a very useful discussion of the legal aspects of international dispute settlement, see International Disputes: The Legal Aspects, Report of a Study Group of the David Davies Memorial Institute of International Studies (1972).

6. U.N. General Assembly Resolution 2625 (XXV) of 24 October 1970, text in 9 I.L.M. 1292 (1970).

7. See, generally, United Nations, Systematic Survey of Treaties for the Pacific Settlement of International Disputes 1928-1948 (1948) (U.N. Pub. Sales No. 49.V.3; and United Nations, A Survey of Treaty Provisions for the Pacific Settlement of International Disputes 1949-1962 (1966) (U.N. Pub. Sales No. 66.V.5).

8. Done 26 Sept., 1928, 93 L.N.T.S. 345. On 28 April 1949 the U.N. General Assembly adopted the Revised General Act for the Pacific Settlement of International Disputes, 71 U.N.T.S. 101, which, in effect, amends the 1928 General Act to reflect the new post-war institutions of the United Nations and International Court of Justice.

9. Done April 30, 1948, 119 U.N.T.S. 3.

10. Done April 29, 1957, 320 U.N.T.S. 243.

11. Done May 25, 1963, text in 58 A.J.I.L. 873 (1964).

12. I.C.J. Reports, 1949, p.4.

13. U.N. General Assembly Resolution 2995 (XXVII) of 15 Dec. 1972.

14. This was a compromise version of so-called "Principle 20," which was widely supported at the Stockholm Conference, but which failed, because of differences between Brazil and Argentina, to win approval. Principle 20 would have read:

> Relevant information must be supplied by States on activities or developments within their jurisdiction or under their control whenever they believe, or have reason to believe, that such information is needed to avoid the risk of significant adverse effects on the environment in areas beyond their national jurisdiction.

Draft Declaration on the Human Environment, U.N. Doc. A/Conf. 48/4 Annex, para. 20, at 4 (1972). For discussion, see e.g., Sohn, "The Stockholm Declaration on the Human Environment," 14 Harvard Int'l. L. J. 423, 496-502 (1973).

15. U.N. General Assembly Resolution 3129 (XXVIII) of December 13, 1973, text in 13 I.L.M. 232 (1974).

16. See Chapter II, supra.

17. Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, Including the Moon and Other Celestial Bodies, done January 27, 1967, 610 U.N.T.S. 205, text in 6 I.L.M. 386 (1967).

18. Convention on the Protection of the Environment between Denmark, Finland, Norway, and Sweden, done February 19, 1974, text in 13 I.L.M. 591 (1974).

19. Done March 26, 1975, text in 14 I.L.M. 589 (1975).

20. O.E.C.D. Council Recommendation on Principles Concerning Transfrontier Pollution, adopted November 14, 1974, O.E.C.D. Doc. C (74) (224) of November 21, 1974, text in 14 I.L.M. 242 (1975).

21. See Report of the Executive Director on Cooperation in the Field of the Environment Concerning Natural Resources Shared by Two or More States, UNEP/GC 44, 20 Feb. 1975 at pp. 41-44.

22. See The Avoidance and Adjustment of Environmental Disputes, Summary of discussion of a Conference, July 1974, Villa Serbelloni, Bellagio (Italy), A Special Publication of the American Society of International Law, April 1, 1975.

23. Fisheries Jurisdiction Cases (U.K. v. Iceland, Federal Republic of Germany v. Iceland), Judgments of 25 July 1974, I.C.J. Reports, 1974, pp. 3 and 175.

24. Id., at pp. 31 and 200, compare also North Sea Continental Shelf Cases (Federal Republic of Germany v. Denmark, Federal Republic of Germany v. Netherlands), I.C.J. Reports, 1969, p. 3, 46-47, 53-54.

25. See, generally, e.g., R. Stein and D. Straus, "International Mechanisms for the Avoidance and Adjustment of International Environmental Disputes," paper delivered at the 1974 Bellagio Conference.

26. Ibid.

27. See, generally, International Disputes: The Legal Aspects, Report of a Study Group of the David Davies Memorial Institute of International Studies (1972). The United Nations Institute for Training and Research (UNITAR) has sponsored a number of innovative studies relating to international dispute settlement. See, e.g., S.D. Bailey, Peaceful Settlement of Disputes: Ideas and Proposals for Research, UNITAR P.S. No. 1 (1971).

II. DISPUTES CONCERNING INTERNATIONAL RIVERS AND LAKES

1. See generally on this subject, e.g., C.B. Bourne, "Avoidance and Adjustment of Disputes Concerning the Waters of International Drainage Basins," paper delivered at the 1974 Bellagio Conference, and other articles by Professor Bourne listed in the Selected Bibliography; A.H. Garretson, R.O. Hayton and C.J. Olmstead (Eds.), The Law of International Drainage Basins (1967); and G. Gaja, "River Pollution in International Law," in Hague Academy of International Law, Colloquium 1973 on "The Protection of the Environment and International Law" (Ed. by A.C. Kiss) (1975), at p. 353.

2. For surveys of these agreements, see United Nations, Legislative Texts and Treaty Provisions Concerning the Utilization of International Rivers for Other Purposes than Navigation (ST/LEG/SER. B./2) (U.N. Sales No. 63V.4); Report of the Secretary General of the United Nations on "Legal Problems Relating to the Utilization and Uses of International Rivers" (A/5409, 15 April 1963, Vols. I,II and III) and the supplement thereto (A/C n. 4/274, Vols. I and II).

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6. Report of the Fifty-Second Conference of the International Law Association, held at Helsinki, August 14-20, 1966 (1967), reprinted in Helsinki Rules on the Uses of the Waters of International Rivers (I.L.A. London, 1967).

7. U.N. General Assembly Resolution 2669 (XXV) of 8 Dec. 1970.

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Jan. 1975); Weinberg, "Salt Talks: United States and Mexican Style: A Case Study of the Lower Colorado River Salinity Dispute," to appear in R. Stein (Ed.), International Responsibility for Environmental Protection (A.S.I.L. 1976). The U.S. announcement of the final agreement and press release is reprinted in 69 U.S. Dept. State Bulletin 388 (Sept. 24, 1973).

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16. For discussions of the Indus Waters experience, see e.g., N.D. Gulhati, Indus Waters Treaty: An Exercise in International Mediation (1973), and R.R. Baxter, "The Indus Basin," in A.H. Garretson, R.O. Hayton, and C.J. Olmstead, The Law of International Drainage Basins (1967) at p. 443. For text of the 1960 Indus Waters Treaty, done 19 September 1960, see 419 U.N.T.S. 125.

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19. For discussion of this experience, see, e.g., Bilder, "Controlling Great Lakes Pollution: A Study in United States-Canadian Environmental Cooperation," 70 Michigan Law Review 469 (1972), also published in J.L. Hargrove (Ed.), Law, Institutions and the Global Environment (1972) at p. 294, and, more generally, M. Cohen, "The Environment and Boundary Rivers: The Canadian-American Juridical Experience," 1975 Recueil des Cours ———————— ; L.M. Bloomfield and G.F. Fitzgerald, Boundary Waters Problems of Canada and the United States (The International Joint Commission 1912-1958) (1958); and Panel discussions on "Rehabilitating Our Continental Neighborhood" and on "Entente Cordiale? Bilateral Commissions and International Legal Methods of Adjustment" in 1974 Proceedings of the Amer. Soc. Int'l. L., at pp. 138-56 and 226-50.

20. Treaty With Great Britain Relating to Boundary Waters, and Questions Arising Between the United States and Canada, Jan. 11, 1909, United States references 36 Stat. 2448 (1910), Treaty Series No. 548.

21. IJC, Canada and U.S., Pollution of Lake Erie, Lake Ontario and the International Section of the St. Lawrence River (1970).

22. United States Treaties and Other International Acts Series 7312, text in 11 I.L.M. 694 (1972).

23. But see the Gut Dam arbitration, discussed in 59 A.J.I.L. 612 (1965), text of decision in 8 I.L.M. 118 (1969).

III. DISPUTES CONCERNING THE MARINE ENVIRONMENT

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2. Strong, "One Year After Stockholm," 51 Foreign Affairs 690 (1973), at 704. See also U.S. National Academy of Science, Petroleum in the Marine Environment (1974).

3. See, e.g., U.S. National Academy of Science, Assessing Potential Ocean Pollutants (1974).

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5. See, e.g., Blumer, Sanders, Grassle and Hampson, "A Small Oil Spill," 13 Environment, p. 2 (March 1971).

6. Stockholm Declaration on the Human Environment, Principle 7, Report of the U.N. Conference on the Human Environment, U.N. Doc. A/CONF. 48/14 at 2-65 and Corr. 1 (1972); text in 11 I.L.M.1416 and 67 U.S. Dept. State Bulletin 116 (1972).

7. See, infra, note 19.

8. Done May 12, 1954, 327 U.N.T.S. 3.

9. Done April 11, 1962, 600 U.N.T.S. 332.

10. Done Oct. 21, 1969, text in 9 I.L.M. 1 (1970).

11. Done Oct. 15, 1971, text in 11 I.L.M. 267 (1972).

12. Done April 29, 1958, 450 U.N.T.S. 82.

13. Done April 29, 1958, 499 U.N.T.S. 311.

14. Done August 5, 1963, 480 U.N.T.S. 43.

15. Done November 29, 1969, text in 9 I.L.M. 45 (1970).

16. Done December 18, 1971, text in 11 I.L.M. 284 (1972).

17. Done Nov. 29, 1969, text in 9 I.L.M. 25 (1970).

18. Done November 2, 1973, text in 13 I.L.M. 605 (1974).

19. Done November 13, 1972, text in 11 I.L.M. 1291 (1972).

20. Done November 2, 1973, text in 12 I.L.M. 1319 (1973).

21. Done June 9, 1969, text in 9 I.L.M. 359 (1970).

22. Done February 15, 1972, text in 11 I.L.M. 262 (1972).

23. Done February 21, 1974, text in 13 I.L.M. 352 (1974).

24. Done March 22, 1974, text in 13 I.L.M. 544 (1974).

25. Done February 19, 1974, text in 13 I.L.M. 591 (1974).

26. For citations to the instruments mentioned, see supra, notes 8 through 25.

27. For text of the resolution, see 13 I.L.M. 476 (1974).

28. See UNEP, Report of the Intergovernmental Meeting On The Protection of Mediterranean, UNEP/WG.2/5 of Feb. 11, 1974, text in 14 I.L.M. 464 (1975).

29. This account is based principally on a summary of Brazilian and Finnish official statements and press reports kindly made available by the Finnish Desk of the U.S. Department of State (letter of April 22, 1975). See also, e.g., N.Y. Times, March 24, 1975, p. 16:4; Washington Post, March 24, 1975, p. A-3:2.

30. Can. Rev. Stat; 18-19 Eliz. 2, c.47 (Can. 1970), text in 9 I.L.M. 543 (1970). For discussion and citations to sources, see, e.g., Bilder, "The Canadian Arctic Waters Pollution Prevention Act: New Stresses on the Law of the Sea," 69 Michigan L. Rev. 1 (1970); Beesley, "Rights and Responsibilities of Arctic Coastal States: The Canadian View," 3 J. of Maritime Law and Commerce 1 (1971); Pharand, "The Arctic Waters in Relation to Canada," in R. St. J. MacDonald, G.L. Morris, and D.M. Johnson (Eds.), Canadian Perspectives on International Law and Organizations 434 (1974).

31. Notes for an Address by Prime Minister Trudeau to the Annual Meeting of the Canadian Press, Toronto, Ontario, April 15, 1970, text in 9 I.L.M. 600 (1970).

32. N.Y. Times, Nov. 12, 1969, at p. 7:1.

33. As quoted in Beesley, supra, note 30, at p. 6.

34. Among the many discussions of the work of the Conference, see e.g., Stevenson and Oxman, "The Preparations for the Law of the Sea Conference," 68 A.J.I.L. 1 (1974) and "The Third United Nations Conference on the Law of the Sea: The 1974 Caracas Session," 69 A.J.I.L. 1 (1975). My discussion of the results of the 1975 Geneva session of the Conference and current status of the negotiations is principally

based on the unclassified Report of the U.S. Delegation to that session of the Conference, kindly made available by the U.S. Department of State, as well as on informal discussions with several participants.

35. Third U.N. Conference on the Law of the Sea, Informal Single Negotiating Text, A/CONF.62/WP.8 of 7 May 1975, text in 14 I.L.M. 682 (1975). For a good discussion of the 1975 Geneva Session, published subsequent to the delivery of these lectures, see Stevenson and Oxman, "The Third United Nations Conference in Law of the Sea; 1975 Geneva Session," 69 A.J.I.L. 763 (1975).

36. Third U.N. Conference on the Law of the Sea, Working Paper on the Settlement of Disputes, S.D.Gp/2nd session/No. 1/Rev. 5 of 1 May 1975, text in 14 I.L.M. 762 (1975).

37. See Informal Single Negotiating Text, supra, note 35, Part III.

38. Id., Article 7. See also, Arts. 6,8,9 and 10.

39. Id., Articles 13 and 14.

40. Id., Article 15.

41. Supra, note 36. For a recent discussion of the work of the Geneva Session of the Law of the Sea Conference with respect to dispute settlement, published subsequent to the delivery of these lectures, see Adede, "Settlement of Disputes Arising Under the Law of the Sea Convention," 69 A.J.I.L. 798 (1975).

42. Id., Arts. 1,2,3 and 4.

43. Id., Annex I.

44. Id., Annex II.

45. Id., Annex 1A.

46. Id., Annex 1B.

47. Id., Annex 1C.

48. Id., Annex I, Art. 12.

49. Id., Annex I, Art. 11.

50. Id., Annex III.

IV. DISPUTES CONCERNING AIR POLLUTION AND OTHER ENVIRONMENTAL CONTEXTS, AND SOME GENERAL DEVELOPMENTS

1. See, generally on this subject, e.g., A.C. Kiss, "Problems Juridiques de la Pollution de L'Air," in Hague Academy of International Law, Colloquium 1973, on "The Protection of the Environment and International Law" (Ed. by A.C. Kiss) (1975) at p. 145; and A.C. Kiss, "Transnational Pollution Carried in the Medium of the Air," paper delivered at the 1974 Bellagio Conference.

2. Council of Europe Recommendation 68 (4), adopted 8 Mar. 1968.

3. Adopted by the Meeting of the Environment Committee of the OECD at the Ministerial level, 13 and 14 November, 1974, see Press Communique of November 14, 1975, text in 72 U.S. Dept. State Bulletin 91-2 (Jan. 20, 1975).

4. Ibid.

5. The interim decision of the arbitral tribunal is reported, at 3 U.N. Repts. Int'l. Arb. Awards 1911 (1949) and 33 A.J.I.L. 182 (1939). The final decision is reported at 3 U.N. Repts. Int'l. Arb. Awards 1938 (1949) and 35 A.J.I.L. 684 (1941). The history of the arbitration is well covered and the decision analyzed in, e.g., Read, "The Trail Smelter Dispute," 1 Can. Yrbk. Int'l. L. 213 (1963), and Rubin, "Pollution by Analogy: The Trail Smelter Arbitration," 50 Oregon L. Rev. 259 (1971).

6. 3 U.N. Repts. Int'l. Arb. Awards 1938 (1949), at p. 1965.

7. See, generally, e.g., Note, "United States and Canadian Approaches to Air Pollution Control and the Implications for the Control of Transboundary Pollution," 7 Cornell Int'l. L. J. 148 (1974).

8. I.C.J. Report on the Pollution of the Atmosphere in the Detroit River Area (1960).

9. I.C.J., Transboundary Air Pollution: Detroit and St. Clair River Areas (1972).

10. See, e.g., Note by the Secretariat of the Economic Commission for Europe on Transboundary Air Pollution Problems, prepared for Third Session of the Senior Advisers to ECE Governments on Environmental Problems, (Geneva, 24-28 Feb. 1975), ENV/R.25.

11. The ozone problem has been widely discussed in the American press. See, e.g., New York Times, Sept. 26, 1974, p. 1:6; Id., Jan. 22, 1975, p. 33:1; Id., Feb. 7, 1975, p. 11:5; Id., Feb. 28, 1975, p. 20:1; Id., March 31, 1975, p. 36:1; Id., July 8, 1975, p. 10:3; Id., Aug. 28, 1975, p. 33:3 and Newsweek, June 23, 1975, p. 63.

For a broad study, published subsequent to delivery of these lectures, see "The International Legal and Institutional Aspects of the Stratosphere Ozone Problem," Staff Report prepared for the use of the U.S. Senate Committee on Aeronautical and Space Sciences (94th Congress, 1st Session, Aug. 15, 1975), (prepared by Dr. C. Christol).

12. See, generally, e.g., Gorove, "Pollution and Outer Space: A Legal Analysis and Appraisal," 5 New York University Journal of International Law and Politics 53 (1972), and Kirgis, "Technological Challenge to the Shared Environment: United States Practice," 66 A.J.I.L. 290, 307-11 (1972).

13. Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, Including the Moon and Other Celestial Bodies, done January 27, 1967, 610 U.N.T.S. 205, text in 6 I.L.M. 386 (1967). See also U.N. General Assembly Resolution 1962 (XVIII) of 13 December 1963.

14. Done August 5, 1963, 480 U.N.T.S. 43, text in 2 I.L.M. 883 (1963).

15. Done March 29, 1972, U.S. Treaties and Other International Acts Series No. 7762.

16. See, E. Weiss, "Project West Ford: Needles in Space," to be published in R. Stein (Ed.), International Responsibility for Environmental Protection (A.S.I.L. 1976); Kirgis, note 13, supra, at 307,308.

17. Done Dec. 1, 1959, 402 U.N.T.S. 71, text in 54 A.J.I.L. 477 (1960).

18. Recommendation VIII-14 of the Eighth Consultative Meeting. See also, N.Y. Times, June 29, 1975, Sec. 1, p. 9:1.

19. But see, e.g., U.N. General Assembly Resolutions 1762A (XVII) of 6 November 1962, and 2828 (XXVI)of Dec. 16, 1971, condemning such tests and calling for their urgent suspension. Principle 26 of the Stockholm Declaration on the Human Environment exhorts states not to carry on such tests, but does not in terms prohibit them. For discussion of Principle 26, see Sohn, "The Stockholm Declaration on the Human Environment," 14 Harvard Intl. L. J. 423 (1973), at p. 508-11.

20. Done August 5, 1963, 480 U.N.T.S. 43.

21. Done May 25, 1962, text in 57 A.J.I.L. 268 (1963).

22. Done May 10, 1963, partial text in J. Barros and D.M. Johnston, The International Law of Pollution (1974), at p. 445.

23. Nuclear Tests Cases, (Australia v. France, New Zealand v. France), Interim Orders of 22 June, 1973, I.C.J. Reports, 1973, pp. 99, 135, text in 12 I.L.M. 749 (1973).

24. Nuclear Tests Cases (Australia v. France, New Zealand v. France), Judgment of 20 Dec. 1974, I.C.J. Reports, 1974, pp. 253, 457.

25. See Nuclear Tests Case (Australia v. France), I.C.J. Reports, 1974, p. 253 at pp. 312 et seq. (Joint Dissenting Opinion of Judges Onyeama, Dillard, Jiminez de Arechaga and Sir Humphrey Waldock).

26. Id., at p. 271.

27. See generally, e.g., Weiss, "International Responses to Weather Modification," 29 International Organization 805 (1975); Samuels, "International Control of Weather Modification Activities: Peril or Policy?" 13 Natural Resources Journal 327 (1973); Taubenfeld, "Weather Modification and Control: Some International Legal Implications," 55 California L. Rev. 493 (1967).

28. See UNEP Governing Council Decision 8 (II), reached at its Second Session, UNEP Doc.A/9625, p. 67.

29. Done March 26, 1975, text in 14 I.L.M. 589 (1975).

30. See generally, e.g., Kirgis, "Effective Pollution Control in Industrialized Countries: International Economic Disincentives, Policy Responses, and the GATT", 70 Michigan L. Rev. 859 (1972); Note, "International Trade Implications of Pollution Control," 58 Cornell L. Rev. 368 (1973).

31. See, e.g., discussion in Environmental Quality—1974. The Fifth Annual Report of the Council of Environmental Quality (Washington, D.C., Dec. 1974) at p. 440.

32. Press release of November 14, 1974, text in 72 U.S. Dept. State Bulletin 92.

33. Adopted May 26, 1972, OECD Doc. C(72) 128 of June 6, 1972, text in 14 I.L.M. 236 (1975).

34. See e.g., OECD Council Recommendation on the Implementation of the Polluter-Pays Principle, adopted 14 Nov. 1974, O.E.C.D. Doc. C (74) 223 of Nov. 21, 1974, text in 14 I.L.M. 234 (1975), and Note on the Implementation of the Polluter-Pays Principle, O.E.C.D. Doc. ENV (73) 32 (Final) of Jan. 21, 1974, text in 14 I.L.M. 238 (1975).

35. Done March 3, 1973, text in 12 I.L.M. 1088 (1973).

36. Done Nov. 15, 1973, text in 13 I.L.M. 13 (1974).

37. See, e.g., N.Y. Times, June 28, 1975, p. 1:4.

38. See, e.g., Stein, "Cannikin," to be published in R. Stein, note 17, supra.

39. See N.Y. Times, Feb. 28, 1975, p. 1:4. But see, Id., July 28, 1975, p. 22 M:3, indicating that the World Health Organization Advisory Committee has advised the Director General of W.H.O. that work on genetic manipulation should continue.

40. See, e.g., Vol. 2, No. 5 of The Interdependent (monthly newsletter of U.N. Assoc. of the U.S.), May, 1975, at p.1.

41. Message to the U.N. Committee on Disarmament, Geneva March 4, 1973.

42. See, e.g., Treaty on the Nonproliferation of Nuclear Weapons, done July 1, 1968, 21 U.S.T. 483, T.I.A.S. 6839; Treaty for the

Prohibition of Nuclear Weapons in Latin America, done Feb. 14, 1967, 634 U.N.T.S. 281; Treaty on the Prohibition of the Emplacement of Nuclear Weapons and Other Weapons of Mass Destruction on the Seabed and the Ocean Floor and the Subsoil Thereof, done February 11, 1971, 23 U.S.T. 701, T.I.A.S. 7337.

43. Geneva Protocol for the Prohibition of the Use in War of Asphyxiating, Poisonous or Other Gases and of Bacteriological Methods of Warfare, done June 17, 1925, 94 U.N.T.S. 65.

44. U.N. General Assembly Resolution and Convention on the Prohibition of the Use and Stockpiling of Bacteriological (Biological) and Toxin Weapons and their Destruction, U.N. General Assembly Resolution 2826 (XXVI) of 16 December 1971.

45. U.N. General Assembly Resolution 3264 (XXIX) of 9 December 1974, text in 13 I.L.M. 1472 (1974).

46. See N.Y. Times, July 12, 1973, p. 12:3.

47. U.N. Doc.A/C.1/L.675 of September 24, 1974, text in 13 I.L.M. 1472 (1974).

48. N.Y. Times, June 24, 1975, p. 1:8. On August 21, 1975, the U.S. and Soviet Union submitted to the Conference of the Committee on Disarmament, in parallel, identical draft texts of a Convention on the Prohibition of Military or Any Other Hostile Use of Environmental Modification Techniques. 73 U.S. Dept. State Bulletin 417 (Sept. 15, 1975), reprinting text at p. 419. See also N.Y. Times, August 22, 1975, p. 3:1.

49. Done February 19, 1974, text in 13 I.L.M. 591 (1974).

50. O.E.C.D. Council Recommendation on Principles Concerning Transfrontier Pollution, adopted Nov. 14, 1974, O.E.C.D. Doc. C(74) 224 of Nov. 21, 1974, text in 14 I.L.M. 242 (1975).

51. See UNEP Governing Council Decision 44 (III), adopted at its Third Session, 25 April 1975, Report of Third Session, p. 124, text in 14 I.L.M. 1087 (1975) (which includes minutes of the 38th meeting, 25 April 1975, in which this subject was discussed).

52. See Report of the Executive Director to the Third Session of the UNEP Governing Council, on Item 13 of the Provisional Agenda, "Cooperation in the Field of the Environment Concerning Natural Resources Shared by Two or More States," UNEP/GC/44, 20 February 1975.

53. Declaration of the Council of the European Communities of 22 November 1973 on the Programme of Action of the European Communities on the Environment, and Annex Containing Program of Action, European Communities Official Journal, Vol. 16, No. C.112 (December 20, 1973), text in 13 I.L.M. 164 (1974).

54. See The Avoidance and Adjustment of Environmental Disputes, Summary of Discussions of a Conference, July 1974, Villa Serbelloni, Bellagio (Italy), A Special Publication of the American Society of International Law, April 1, 1975.

V. CONCLUSION

1. Subsequent to delivery of these lectures, this area of activities and needs has been comprehensively examined at the International Conference on Environmental Sensing and Assessment, held at Las Vegas, Nevada, U.S.A. in September 1975, sponsored by the World Health Organization and the United States Environmental Protection Agency. See N.Y. Times, September 16, 1975, p. 25:2 and Id., Sept. 18, 1975, p. 7:1. For a good, recent survey of existing programs see Jensen, Brown and Mirabito, "Earthwatch; Progress in Stockholm," 1970 Science 432 (31 October 1975).

2. See, e.g., the speech of Christian A. Herter, Jr., U.S. Deputy Assistant Secretary of State for Environmental and Population Affairs, at the Las Vegas Conference, note 1, supra, suggesting the establishment of an international scientific agency, "essentially private but funded by governments" to spur action against ecological hazards. Noting the problem of credibility, he commented that: "We need an international voice . . . that is so authoritative and so persuasive that decisionmakers in all countries cannot fail to respond." N.Y. Times, September 18, 1975, p. 7:1.

3. See, e.g., P.Sand, "The Role of Domestic Procedures in Transnational Environmental Disputes," paper delivered at the 1974 Bellagio Conference.

4. See, e.g., the discussion in C.B. Bourne, "The Avoidance and Adjustment of Disputes Concerning the Waters of International Drainage Basins," paper delivered at the 1974 Bellagio Conference.

5. The review was concluded by U.N. General Assembly Resolution 3232 (XXIX) of 12 November 1974.

6. Jessup, "Do New Problems Need New Courts?" 65 Proceedings of the American Society of International Law 261 (1971). See also Lachs, "Some Reflections on the Settlement of International Disputes," 68 Proceedings of the American Society of International Law 323 (1974).

7. Order of August 17, 1972, I.C.J. Reports, 1972, pp. 12 and 30, text in 11 I.L.M. 1069 (1972).

8. Orders of 22 June 1973, I.C.J. Reports, 1973, pp. 99 and 135, text in 12 I.L.M. 749 (1973).

9. I.C.J. Reports, 1974, pp. 1 and 175.

10. UNEP has been actively concerned with measures to facilitate the development of international environmental law. For the proposals of the Executive Director for the future development of the UNEP Programme relating to the development of international environmental law, see Document UNEP/GC/14/Add.2, Chapter IV, Section E. At its Second Session, the Governing Council, it its Decision 8 (II) of 22 March

1974, directed the Executive Director to have regard to the following considerations:

(a) "The solutions to many environmental problems are dependent on adequate law relating to the environment, taking into due account regional requirements and approaches;

(b) The development of international environmental law requires the collaboration of Governments and intergovernmental bodies;

(c) UNEP has no formal mandate in this connection. However, it can facilitate this development by initiating appropriate consultations between experts;

(d) In initiating such consultations, there is a need to inform all Governments, as well as intergovernmental bodies concerned with the environment, in order that the viewpoint of all interested Governments and the widest range of expertise possible may be brought to bear on this problem." Text in 13 I.L.M. 1030 (1974) at 1042.

At its Third Session, the Governing Council, in its Decision 35 (III) of 2 May 1975, requested the Executive Director "to take such measures as may be necessary for the realization of the objectives and the implementation of the strategies mentioned above [relating to the UNEP Programme in the field of environmental law], emphasizing the preventive character of environmental law, and in particular to take measures designed to provide technical assistance to developing countries at their request for the development of their national environmental legislation." Text in 14 I.L.M. 1085 (1975).

11. See N.Y. Times, April 19, 1975, p. 23:1.

12. I.C.J. Reports, 1970, p. 3 at 32.

13. See L.F.E. Goldie, "A General View of International Environmental Law" in Hague Academy of International Law, Colloquium 1973 on "The Protection of the Environment and International Law" (1975), 25 at pp. 103-09.

14. I.C.J. Reports, 1966, p. 6.

15. Judgement of 20 December, 1974, I.C.J. Reports, 1974, p. 253, Jt. Diss. Op. 312, at pp. 369-70.

16. U.N. General Assembly Resolution 2997 (XXVII) of Dec. 15, 1972.

17. Done December 18, 1971, text in 11 I.L.M. 284 (1972). See, e.g., Strong, "One Year After Stockholm," 51 Foreign Affairs 690 (1973).

18. See, e.g., R.A. Falk, This Endangered Planet (1971); and see also D.H. Meadows et al, The Limits to Growth (1972).

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Several collections of relevant documents will shortly be published. The British Institute of International and Comparative Law reportedly will soon publish a volume titled Selected Documents on International Environmental Law, as well as a Report of a Conference on this subject held at the Institute in London, 1-3 September 1975. Oceana Publications will reportedly shortly issue the first three volumes of a series titled International Protection of the Environment: Treaties and Related Documents, a work planned in ten volumes.

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