

ONE YEAR AFTER STOCKHOLM

AN ECOLOGICAL APPROACH TO MANAGEMENT

By Maurice F. Strong

“**M**AN has the fundamental right to freedom, equality and adequate conditions of life in an environment of a quality that permits a life of dignity and well-being.” He bears “a solemn responsibility to protect and improve the environment for present and future generations.” And states have “the responsibility to ensure that activities within their jurisdiction or control do not cause damage to the environment of other states or of areas beyond the limits of national jurisdiction.”

A year after the U.N. Conference on the Human Environment, few people have begun to grasp the radical implications of these principles, from the Declaration approved by their countries at Stockholm. Despite the worldwide growth in public awareness of complex and interrelated environmental problems, it is apparent that coping with these issues is a far more revolutionary matter than has yet been generally acknowledged or comprehended.

For environmental actions taken to date are still of fairly marginal significance compared with those yet to be confronted. The difficult choices—about the imbalances created by man’s activities, about equity in the use of common resources, about the sharing of power both within national societies and internationally, about the fundamental purposes of growth and the sharing of its benefits as well as its costs—remain to be made. Above all are fundamental questions about participation in these decisions, to enable both peoples and societies to cope with, if you will to manage, world problems on a new scale.

II

Public awareness of the environmental problem has indeed expanded remarkably in a brief four and a half years. After all, it was only in the latter part of 1968 that the Swedish delegation to the United Nations first introduced a resolution in the General Assembly to convene a world conference in Stockholm, and only in mid-1969 that the consciousness of millions around the world

was heightened dramatically by the view of Planet Earth as seen from outer space—that exhilarating yet sobering sight of a small, finite Spaceship Earth with its living cargo sustained by a unitary, limited and vulnerable life-support system.

For the first time we began to see that all mankind literally is in the same boat—that the world community is faced with its first truly global problem. It was the truth that ecologists and poets before them had been trying to tell us: in nature everything is tied together.

But the problem was still being thought about in relatively narrow terms, largely as a disease of the industrialized countries suffering from the very processes to which they owed their affluence. In Asia, Africa and Latin America, the disposition was to regard the environment as something remote from the interests and concerns of the poor. To a man faced with immediate starvation and other diseases of poverty, the risks he runs from contamination of the seas or the atmosphere seem so remote as to be irrelevant. To him factory smoke smells of money—and of jobs and needed consumer goods. And what if fly ash and sulfur dioxide afflict the surrounding area!

So, in my travels in the developing countries from mid-1970 on, I found—not surprisingly—that the word “environment” had no magic there. Yet the issues it properly embraced were in fact no less real: polluted water supplies, degradation of agricultural lands, depletion of wildlife and fisheries and, perhaps most urgent, the problem of cities growing at rates unprecedented in human history. Indeed, some of these cities faced—and still face—the prospect of water contamination and health hazards that will make them unfit for habitation within the next decade or so. Ironically, the “eco-catastrophes” of which we hear so much are much *more* likely to occur in the poorer countries than in the wealthier ones, since the latter have the resources to deal with these problems or at least to put off their full impact.

I also found in the poorer countries a widespread fear that preoccupation by the rich with the new environmental “fad” would divert attention and resources from the basic and compelling needs of the developing world—needs arising mainly out of their poverty and underdevelopment. Thus these countries wanted the Conference to direct its attention to issues that were to them the essence of their peoples’ environment—food, health care, housing, education and jobs; the urgent demands of exploding urban

populations; massive problems of soil contamination and erosion which rob them of much of their "natural capital;" and the critical need for clean water in both rural and urban areas.

They also wanted to know how the growing environmental concern of the more industrialized countries would affect the flow of finances for their development, the cost of the capital equipment they buy, their access to markets for products that may be subject to new environment-based restrictions, and their ability to attract new industry to their countries.

It was something of a paradox that representatives of developing countries at that point appreciated far more than many in the industrialized world that the environmental problem required a new view of man's relationship not only with the natural world, but with his fellow man. Involved was not only pollution, but a whole series of threatening imbalances in which the fate of rich and poor alike is joined. We have the representatives of the poor of the world to thank, then, for expanding both Stockholm's and the world's environmental awareness to embrace not just the effluence and wastes, the dangers, disamenities and aesthetic insults found in industrialized societies, but the malnutrition, disease, illiteracy and human degradation which are the dominant characteristics of the human environment for most of mankind.

The fact that the industrialized countries accepted this conception pointed up how far they had come from some previously expressed beliefs that they were to be the "watchdogs" of the world's environment.¹ They came to recognize that their initial approach had been inadequate to the size and scope of the problem, that they had really not fully understood or appreciated the true nature of the developing countries' environmental concern, that in the final analysis there can be no environmental immunity for some unless there is immunity for all.

III

Thus, the preparations for Stockholm embraced a steadily widening view of the total environment problem. Under the guidance of the 27-nation Preparatory Committee established by the General Assembly, a vast array of knowledge and opinions was brought together—not only from governments and international organizations, but from a broad cross section of the world's

¹ For an early and tentative expression of this view, see George F. Kennan, "To Prevent a World Wasteland: A Proposal," *Foreign Affairs*, April 1970.

scientific and intellectual community. In making this first tentative inventory of what was known, and especially of what was not known, it was of critical importance from the outset that a maximum number of governments were engaged and brought to feel a sense of participation.

In the upshot, an East-West issue involving the status of the German Democratic Republic regrettably led the Soviet Union and several East European governments to absent themselves from Stockholm—but, as the realization of global interests in the environmental issue spread among the nations, many governments which originally did not intend to participate decided to do so, with many ultimately playing constructive and important roles.

Moreover, there was also significant involvement on the part of nongovernmental organizations, some already active in the field, others newly becoming so.

In this process, the Conference Secretariat did not stand in a hierarchical relationship to the players. It had no authority to wield from the top or from anywhere else. Rather, it served as activator, catalyst and orchestrator of work performed mainly by others.

In the end it was nothing short of remarkable that—given the tensions and realities of international life—113 nations were able to convene and in less than two weeks to achieve wide agreement on virtually all the specific proposals placed before the Conference. The Declaration on the Human Environment was the first acknowledgment by the community of nations of new principles of behavior and responsibility; it now provides an indispensable basis for the establishment and elaboration of new codes of international law and conduct. An Action Plan of 109 recommendations called for specific actions by national and international bodies. The Plan provided for an Earthwatch program of global assessment and monitoring for the systematic gathering of information, for its objective evaluation by scientists, and for its dissemination to policy-makers as a guide to help them better understand the consequences of the decisions by which we are shaping our future.

Then, at the General Assembly session last fall, there was set up a Governing Council for Environmental Programs, consisting of representatives of 58 governments with overall responsibility for policies and programs within the United Nations.² At the

same time, an Executive Director was elected by the General Assembly to carry out measures approved by the Governing Council, and to bring to the attention of the Council the issues or concerns considered to merit the attention of governments. The Executive Director also chairs an Environmental Coördination Board, established to facilitate coördination and coöperation among the agencies of the U.N. system itself. Finally, the General Assembly approved a World Environment Fund, with an initial target of \$100 million for the first five years, designed to provide the international control mechanisms and linkage that will enable national programs to operate as part of an international system or network in dealing with particular problem areas.

One of the actions of the General Assembly which surprised many people was the decision to establish the headquarters of the new Secretariat in Nairobi, Kenya. This resulted from the determination of the developing countries to have a significant new U.N. body headquartered in the developing world. It is thus the first global intergovernmental body to establish its headquarters outside of North America and Europe. In my view, the additional administrative costs and inconveniences which may temporarily result from this will be more than offset by the political advantages of assuring that the new body has the kind of global political constituency and support which will be so essential to the performance of its global task.

I dwell on these organizational features because they form the framework of the issues of management to which this article is addressed. But beyond the formal creation of these bodies, the Conference and the General Assembly action provided a critical stimulus for national activity, particularly in countries which previously had paid little attention to the environment issue. A total of 85 provided national reports to the Conference, comprising in most cases the first survey they had ever conducted of their own environmental concerns. Moreover, the majority of them initiated some form of governmental machinery, and many of them also enacted new environmental legislation—Brazil, for example, has recently announced a series of significant measures for environmental protection. While a number of these national measures might well have been taken anyway in the more indus-

* Here it is important to note that the universality which had eluded the Conference itself was reflected in the composition of the Governing Council—which includes both the German Democratic Republic and the Federal Republic of Germany.

trialized countries, most of what was done in the developing countries clearly is attributable to the Conference and to the special assistance which was provided to many of them during the preparatory period. It can now be said that most countries in the world have taken at least the first step toward the development of an environmental policy, set up some form of governmental mechanism, and in many cases also enacted new environmental legislation.

Since the Stockholm Conference, three international conventions have already been enacted: an agreement reached in London in October, dealing with the need to control the dumping of toxic substances into the seas and oceans; an agreement establishing a world heritage trust to help preserve some of the unique cultural sites and natural areas which are part of man's common heritage; and an agreement concluded at a conference in Washington, D.C., seeking to limit international trade in certain species of wildlife. In addition, significant progress has been made on a convention for the preservation of special islands for science.

Finally, widespread concern with the very purpose of economic growth has been increasing in both industrialized and developing countries. In the presently affluent areas of the world, it is now widely felt that it is essential to identify and pursue new directions for growth—to perceive alternative patterns for consumption that have less impact on the natural environment, that are less energy-intensive, less demanding of nonrenewable resources, and more amenable to recycling and reuse—that, in a word, shift from quantitative toward qualitative criteria in national decision-making.

In most developing countries, prevailing plans for economic development are, not too surprisingly, patterned largely on models of countries which already have gone through the process of industrialization. Some leaders in the developing world are now beginning to ask whether this is what they and their peoples really want. There is a new searching for development goals that are more consistent with their own historical traditions and their own cultural proclivities. This may result in future patterns of growth with more emphasis on compatibility between the natural and man-made environments. It also would imply brighter long-term prospects for the perpetuation of cultural diversity—perhaps the most precious of all assets of the human race.

Thus a lively intellectual ferment goes on in both developing

and industrialized societies, in response to growing understanding that the present scope and intensity of human activities have raised societal problems that are new in man's experience, and that these issues cannot be dealt with apart from the values and goals that people and societies set for themselves. Such an awareness obviously must precede and underlie effective action in the environmental field.

IV

Yet if man is to realize his fundamental right to "an environment of a quality that permits a life of dignity and well-being," something more than enlightened awareness is needed. Somehow such an environment must be created through some form of management which will involve, on both national and international levels, new kinds of institutional arrangements and novel procedures for decision-making. It is here that the Age of the Environment will have its most radical impact.

What are the alternatives to learning how to deal with these environmental and societal problems? Nuclear holocaust and ecological disaster each, with some reason, have their prophets. One can never fully relax while governments hold in their arsenals weapons of mutual suicide; the prospect of Planet Earth as a radioactive wasteland, however, now seems rather remote, perhaps because the destructiveness of nuclear weapons has simply surpassed the outer limits of usable military power.

According to the ecological version of doomsday, a vast breakdown in an overloaded natural system would be followed by a new biospheric equilibrium in which there would be no place or role for the human race as we have known it. These projections cannot be entirely shrugged off—there *are* outer limits to the carrying capacity of the biosphere. Therefore simple prudence impels us to discover as much as we can about them on an urgent basis. A large-scale global scientific research effort to identify and measure these constraints should be mounted by national governments, the United Nations and, above all, the world's scientific community. We must know what we are putting into the environment; we must monitor the vital changes in the "life-system" of oceans, atmosphere, food chains, and plant and animal worlds—we must know when we are facing risks that may be irreversible.

Physical limits, however, do not pose the only threat and per-

haps not even the most urgent one. Another vision of potential disaster is less dramatically cataclysmic than either nuclear destruction or catastrophic physical breakdown, but not less dangerous for that. It is the prospect of a slow but probably accelerating slide into chaos due to social limits on our ability to cope with the complexity inherent in a high-technology society. Political, psychological and institutional limitations could condemn the world to a vicious cycle of interlocking crises, with the institutional structure of society breaking down or becoming paralyzed by the sheer weight and complexity of problems it cannot handle. And this could happen well before resource limitations put physical restraints on man's activities.

In this gray scenario the human race would not be destroyed or rendered obsolete by a new equilibrium in nature. Man would prove once more his extraordinary capacity for adaptation. But to what? To the erosion of cultural and social structures, to the corruption of ideals and corrosion of dignity, to the collapse of respect and loss of loyalty, vision and hope—to the withering, in short, of all that makes him distinctively, admirably human. On the political level he would learn to adapt to mindless anarchy or the long night of tyranny.

This, then, is the measure of the social catastrophe we must avoid through prudent management. But what is it we must do and how should we set about doing it? To answer these questions requires analysis of the kinds of problems that fall under our new, broader—and more realistic—concept of the environment.

First, it should by now be axiomatic that these problems transcend the capacity of any nation to handle or to avoid. They are quintessentially, in the current jargon, transnational. Inevitably, environmental considerations have become basic factors in the whole structure of international relations.

Second—and I hope becoming axiomatic—environmental issues by their very nature involve trade-offs. If individual nations pursue their own goals without restraint, they will harm other nations. But equally, activities common to many nations must be assessed from the standpoint of competing goals. For example, to deal with many problems of the environment, especially the poverty of developing nations, requires a constantly growing and reasonably priced supply of energy—which has been after all a key to material progress in the whole Industrial Revolution. Thus, one form of environmental problem demands

energy, while some of the means to produce that energy have costs in terms of other aspects of the environment. So the trade-off must be made—how much of one at what cost to the other? Or can some new form of action eliminate the conflict and enable both “environment” goals to be met?

The requisite action may be national or international. And it may be regulatory—setting up guidelines for national action, controlling activity within nations or in areas outside national jurisdiction; or it may be positive—meeting environmental problems by affirmative action that prevents damage or devises means to meet crucial resource needs without heavy penalties.

In the eventful past four years, nation after nation has moved to impose controls on the most manifest forms of environmental pollution; an obvious example is the legislation in the United States to purify air and water to acceptable standards. In this process, nations have moved to the water's edge of the truly big decisions that now loom—to engage in major conservation, changes in transportation habits, and in essence a change in national life-styles themselves. Costs of cleaning up to meet proper standards are heavy and will be more so; in the classic case of Japan, which had neglected the problem for years, the projected economic plans for the next five years, announced last January, envisage a basic diversion of effort and a significant alteration in the shape of the Japanese economy—including its emphasis on exports—to deal with pollution.

In addition, constructive measures have been taken to resolve problems that have appeared in specific areas of the world, such as the discovery that sulfur fumes from other parts of Europe have been causing substantial damage in Scandinavia. Negotiations for regional regulation of this hazard are now proceeding.

But inevitably, regulation is needed on a wider international basis. Here the prime example concerns the oceans of the world. A resource-hungry world will increasingly depend on exploitation of the oceans' beds beyond any national jurisdiction. The Law of the Sea Conference which will begin later this year will have an opportunity to make important progress in creating not only a new system of laws but a means for the coöperative international management of that 70 percent of the earth's surface which lies beyond national jurisdiction.

Here I have a specific suggestion. The protection of the vast international commons—the oceans and the atmosphere beyond

national jurisdiction—will engender growing and continuing costs. Perhaps these might best be met by some form of international toll or levy based on the use of the commons by aircraft and ships—in effect, an “ocean toll-booth” system. Or perhaps the toll or levy could be based on the use of fossil fuels—at any rate a formula should be designed to have these costs borne by those who primarily utilize and benefit from, and thus deplete or damage, these resources. Estimates vary as to the amounts that would be realized, but one very preliminary and tentative study using the year 1970 as a basis indicates that the imposition of a one cent tariff on each net ton of maritime merchandise entering all countries with the exception of the developing countries would result in an annual total of \$12.6 million. A toll on air passenger transport, assuming one dollar per passenger between Europe and North America, would bring in about \$10 million. And a toll on petroleum whereby two cents per barrel would be charged in some cases and one cent in others—with the developing world charged nothing—would realize on the order of \$100 million. This could be used for research, monitoring and cleanup operations in the international commons.

Another significant area for international coöperation is man’s potential impact on world climate and weather. Quite apart from the danger of inadvertent modification of these, the technologies by which man may seek to make deliberate changes are advancing very rapidly. The use of such technologies promises to produce a number of significant benefits, but in some cases the benefits to the nation employing them might be bought at the expense of its neighbors. Certainly it is not at all uncommon these days to cause rainfall by seeding clouds with silver iodide. It might well happen that a country in need of added rainfall, or impelled by other reasons, might use techniques such as this to divert rain which otherwise might go to its neighbor, and this is but one possibility of weather manipulation that may be a potential area of international conflict. Would it not be advisable, therefore, to draw up guidelines now to help assure the constructive and beneficial use of such technologies, avoid unnecessary conflict and help resolve it if it does occur? In fact, is not the question of weather manipulation itself becoming ripe for a treaty or convention?

V

As one readily sees from these examples, the boundary between

what is national and what is international quickly becomes blurred; the fact is, we need coöperative action at both levels. Similarly, the line between regulation and positive action can be quickly erased in practice: to bring the oceans back to an acceptable state takes a good measure of both restraint and new technology actively employed to deal with what has happened before or may be inescapable in the future.

The establishment of machinery for the prevention and settlement of environmental disputes and for the allocation of costs and benefits of development projects which have important environmental impacts across national boundaries will become increasingly necessary. Implementation of the principle of the Stockholm Declaration by which nations accept responsibility for the effects of their actions on the environment of others or on the global commons could lead to a growing number of cases in which the benefits which accrue to one country from a given development project must be reconciled with the environmental costs it engenders for others, particularly in respect to developments impinging on international waterways. In most cases, preventive action and predevelopment agreement on the sharing of costs and benefits will be the only viable alternatives.

Turning to the areas of positive action, the foremost example is surely the spreading effort to control population growth. The continuation of such growth in many parts of the world at a time when the borders of virtually all nations are being closed to large-scale immigration will generate mounting pressures on international life. While some countries can accommodate larger populations, others in which population pressures are already acute want and need much more in the way of international assistance for population control. This, of course, is a very delicate and complex issue on which each society must make its own decisions, but ultimately all societies will be required to achieve a balance between the level of their population and the standard of living which available resources can sustain. The already wide consensus that the question must receive international attention is evidenced in the U.N's World Population Conference that will be held next year.

To put it bluntly, just as the preparations for Stockholm uncovered major differences in outlook between rich and poor nations, so one must recognize that the handling of environmental problems can involve acute potential conflict between rich and

poor. Meeting the problems will require a much more enlightened attitude on the part of the rich countries toward the poor. It would be unrealistic to assume that this can be achieved—or even should be achieved—through a greater manifestation of charity on the part of the rich. The real question is the self-interest of all, in a world fit for all.

For example, the environment issue points up some potentially large-scale shifts in comparative advantage which could give the developing countries significant new leverage in negotiating better arrangements with the rich countries. These derive from the growing dependence of the industrialized world on natural resources, particularly petroleum, and from the fact that the natural capacity of the environment to absorb and dissipate wastes without intolerable levels of damage must itself be regarded as an economic resource which is still under-utilized in the developing world and which can provide a basis for the attraction of new industry. This will be particularly true of labor-intensive industries based on use of local resources.

In those instances where it produces a significant dislocation in the interests of particular industries and areas, there will be a natural tendency in the industrialized countries to resist such shifts in comparative advantage. But this does not alter the fact that it is in their long-term interest to encourage and support a much broader and more equitable distribution of the world's industrial capacity and to deal with the short-term disruptions this may occasion as transitional problems.

Finally, there will have to be major changes in the deployment and use of the world's scientific and technological capability to facilitate the access of developing countries to new technologies and to support the accelerated development of their own research and development capabilities. Particular efforts must be made to deal with the loss of vital soil resources through erosion and encroaching deserts, problems of water-borne diseases, the need to provide pure water supplies and to cope with the unprecedented rates of urban growth.

VI

So, in every direction, the environment issue points to the need for a whole new set of approaches and adjustments. Man's future development is likely to be constrained by the difficulties of coping with problems arising from the distribution of natural

resources well before it is limited by finite amounts of such resources. What we come back to is the need to develop at the national and international levels the kinds of structures and institutions required for societal management.

At the present time we lack the concepts and the institutional arrangements for this kind of management. By "management" I do not refer here to the technical, legal and administrative ability to direct, say, a system of water quality standards or to control the use of pastureland. I refer, rather, to arrangement of the decision-making process—to organizing the necessary research and analysis and monitoring functions, formulating alternative courses of action, and evolving procedures through which conscious choices can be made in the fullest possible knowledge of their consequences. These are essential, and largely missing, service and support functions for decision-making at the highest political level.

So construed, it is manifest that more rather than less management is in store for us. Yet there is little in our experience to guide us. Most public and private institutions through which decisions are now made and executed at local, national or international levels are designed to deal with sectors or sub-sectors of problems—agriculture, or aerial transport, or electric power—but not with the issues that cut across the whole of society, like environment or energy or population. And perhaps here we have a clue as to what went wrong, why we were so slow in perceiving many of our environmental dangers.

In the sphere of sectoral decision-making and action, simple tests such as profitability—often short-term—form the basis for embarking upon an activity which may impose severe, long-term costs on the public and may produce adverse effects that are outside the sector originating action. If one wanted to carry current concepts and methods to the extreme, it could be said that, given current interest rates and carrying present methods of cost-benefit analysis to their logical conclusion, it would not be good economics to preserve the oceans, the atmosphere or other precious resources of the earth for the next generation. On a purely economic basis, in fact, it would just not pay to save Planet Earth!

One of the dangers of a purely economic approach is its inherent narrowness and shortsightedness. Imagine how little would be left today of the impact of Greece and Rome on human development if these societies had made all their major decisions

on the basis of the economic criteria we apply today to so many of our decisions.

Business and industry define their objectives and measure their accomplishments in terms of return on investment; universities and professional associations are organized around particular disciplines and fields of study; governments have largely been organized around functional ministries and agencies, and their counterparts in the intergovernmental organizations have been similarly structured. And in virtually all cases the characteristic form or organization is hierarchical, the power flowing from the top down.

This form of organization worked well in the past, and facilitated the rapid and even spectacular progress made in so many fields of human endeavor. But it has also made it difficult to perceive—and even more difficult to deal with—complex environmental cause-and-effect relationships that transcend traditional disciplinary and institutional boundaries.

For the inescapable fact is that the environment cannot be sectoralized. It is a system of interacting relationships that extends through all sectors of activity, and to manage these relationships requires an integrative approach for which present institutional structures were not designed.

What is required now is the addition of the ecological dimension to the management of man's activities. The basic function is to adjust and readjust the intricate balance of environmental integrity and social well-being. I believe that a drastically new concept of management is vital—one which leads in the opposite direction from overblown, centralized, permanent super-bureaucracies with decision-making authority concentrated at the top. Indeed I believe that we are fast approaching, and in some cases may have exceeded, the effective limits of centralized bureaucratic structures, especially in public institutions.

This means that lines of communication and decision-making must be given much greater horizontal and trans-sectoral dimensions than are provided for in existing structures. It means evaluation of important activities in terms of their social and environmental consequences as well as their economic consequences. It means allocating the real costs of activities to those who benefit from them, assigning real value to such traditionally free goods as water and air, and radically revising our concepts and methods of valuing the future.

And it means a much broader and more extensive participation in decision-making by those who will be directly affected by the decisions made. For there is a direct linkage between individual and local attitudes and actions on the one hand, and a larger concern affecting the fate of all mankind. An example is the impact of petroleum-base pollutants. We hear a great deal about oil spills at sea and, indeed, they are extremely damaging to the environment, in particular the visible environment of our beaches and shorelines. But the total amount of petroleum-base pollutants that find their way into oceans from direct sources of all kinds, including oil spills, is on the order of 2.1 million metric tons a year. On the other hand, some 90 million metric tons are vaporized through the combustion of fossil fuels, primarily the internal combustion engine, and go into the atmosphere every year, ending up in the oceans. Thus there is a direct link between our willingness as consumers to take action that, on the one hand, would restrict our use of automobiles or leave us with higher costs of emission control, and what we do, on the other, as concerned citizens to help preserve the health of the oceans and to avoid risks of possibly decisive climate change.

And so it goes across the gamut of environmental problems and their relationship to societal decision-making. As nothing else it points up that the ecological society is an interdependent society—and why it so urgently needs new skills and institutional patterns, new attitudes and new values.

So the new patterns of organization in an era of societal management must be based on a multitude of centers of information and of energy and of power, linked together within a system in which they can interact with each other. Whether it be called a "systems concept" or an "ecological concept," this idea of management is not simply a new gimmick, but a necessary accommodation of our traditional linear concepts of management.

It is some help to refer again to the several lessons learned in the preparatory process for the Stockholm Conference a year ago. These were, first, the vital importance of the widest possible participation; second, the linking of the interests and expertise of many different specialized organizations—for multi-disciplinary study, for convergent approaches, and in the end for coöperative action; third, the active involvement of nongovernmental organizations; and fourth, a central group—then the Conference Secretariat—that does not stand in a hierarchical relation

to others, but rather is the catalyst for work done mainly by others.

The relevant institutional networks for ecological management can and should take a great variety of forms and permit a diversity in size and orientation. The outcome must lead not to bigger and bigger bureaucracies, or greater centralization, but toward broader participation in managing complexity—not to more and more rigid hierarchies but toward flexible arrangements for pursuing the coöperative way of life. An integrative approach to society-wide problems might draw us, too, away from excessive concentration on strictly quantitative factors toward a more humane concern for the quality of the whole fabric of society.

VII

What, then, is the United Nations' role for the future? Before Stockholm many people were understandably skeptical of the United Nations' ability to deal with an issue so complex—an issue with so much potential for conflict among the industrialized and the developing nations. Stockholm, I believe, indicated that the United Nations *can* deal with it. At the global level, no one nation or group of nations commands the air and water. If we are to ensure the health of our common property, we have to act as the whole community of man—and here the United Nations alone has the necessary institutional framework to undertake the task.

Many of the main environmental issues must be dealt with at the regional level—such as the management of river valley systems, arid areas and enclosed seas. Here, the regional commissions of the United Nations have an especially important role and new opportunities for coöperation with other regional bodies.

We hear altogether too much these days about the limitations and shortcomings of the U.N. family of agencies. In my own experience over the past few years I have become equally aware of the resources, the skills and the strengths that reside within the U.N. system for coping with the environmental predicament. Certainly, without the United Nations the Conference could not have been proposed, authorized, organized and brought to fruition—nor could the new U.N. Environment Program be put into effect. Moreover, I believe that the environmental challenge and the new needs for preventing environmental conflict go directly to the basic purposes of the United Nations. They make

the United Nations more essential than ever.

But the development of new international machinery to deal with the complex problems of an increasingly interdependent technological civilization will not come about through the surrender of sovereignty by national governments but only by the purposeful exercise of that sovereignty. It is only when nations find themselves incapable of exercising their sovereignty effectively or advantageously on a unilateral basis that they will agree—reluctantly—to exercise it collectively by agreement with other nations. It is seldom that nations enter into arrangements which restrict their ability to exercise their sovereignty until circumstances compel them to do so.

This is one of the basic dangers in the present situation. The threats to man's existence from nuclear warfare can be avoided right up to the moment that someone pushes the button. But the threat to man's survival which derives from his interventions in the natural environment is of a different nature.

Such dangers as contamination of the world's air and water supplies to the point of affecting man's genetic development and impairing the very qualities which make him human, changes in the world's climate which could destroy the heat balance on which human life depends, the large-scale destruction of plant and animal species—none of these seems to have immediately explosive manifestations. They will be beyond remedy by the time they are perceived as imminent threats. To deal with such issues we need a degree of enlightened political will on the part of the peoples and nations of the world that is without precedent in human history.

Our recent experience in dealing with other specific issues provides some hopeful examples of what can be done. The treaties which provided for coöperative scientific explorations of the Antarctic Continent and its insulation from military activities, as well as the treaties banning nuclear weapons from the seabeds and from outer space, demonstrate that important international agreements can be reached both for collective positive measures and the avoidance of mutual hazards. The interesting common denominator in all of these agreements is that they dealt with areas of concern in which the individual interests of nations had not yet developed to the point of significant conflict. I believe there is an important lesson for us in this which should encourage us to proceed as quickly as possible to seek agreements such as

those I mentioned before environmental conflict becomes imminent.

The world is not likely to unite behind a common ideology or a super-government. The only practical hope is that it will now respond to a common concern for its own survival, an acknowledgement of the essential interdependence of its peoples and an awareness that coöperative action can enlarge the horizons and enrich the lives of all peoples.

In establishing its new Environment Program, the United Nations has a rare opportunity to take the lead in developing new approaches to the problems of managing the technological society at the international level, provide new impetus to its institutions, and thus find new ways of achieving the goals and realizing the hopes enshrined in the Charter.

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