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CONCEPTS IN DEVELOPMENT OF INTERNATIONAL ENVIRONMENTAL POLICIES

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"Concepts" are ways of interpreting what one perceives, hence they may be considered modes of thought or of understanding. The more clearly defined and influential concepts are formulated as propositions. For example, in the area of our concern, they include statements of belief regarding the natural world and man's relationship to it. Concepts range in precision and detail from very generalized interpretations of reality to sophisticated scientific theories. Representative of familiar concepts relevant to environmental policy, at the simple end of the range, are "balance of nature" and "natural resources"; more complex concepts include the "biosphere", "evolution", and steady state or "dynamic homeostasis".

SOME HISTORICAL PRECEDENTS

International policies relating to the natural environment were not initially based upon environmental concepts *per se.* Most international, and all global, policies relating to the protection of nature, of natural resources, and of the environment have been developed in the twentieth century. The earlier attempts at international cooperation on behalf of environmental issues were shaped more by legal rather than ecological considerations. In the earlier treaties, arbitrations, and adjudications involving environment-related disputes, established principles of international law were extended to environment-related issues rather than legal concepts being modified or enlarged by environmental concepts.

A basic legal principle applicable to environmental controversies has been that a nation should not permit action within its territorial jurisdiction to harm the interests of other nations. In the words of a standard treatise on international law, ". . . a State is, in spite of its territorial supremacy, not allowed to alter the natural conditions of its own territory to the disadvantage of the natural conditions of the territory of a neighboring State. . . ."[1] A corollary to this principle is that a state may be held responsible for activities originating within its territorial jurisdiction, the effects of which extend beyond that

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1. L. Oppenheim, *International Law* 175 (1905); *see also The Law of International Drainage Basins* 916 (A. Garretson, C. Olmstead, et al. 1967); Angelo, *Protection of the Human Environment—First Steps Toward Regional Cooperation in Europe,* 5 The Int'l Lawyer 511 (1970); Livingston, *Pollution Control: An International Perspective,* 10 Scientist and Citizen 172 (1968); Utton, *A Survey of National Laws on the Control of Pollution From Oil and Gas Operations on the Continental Shelf,* 9 Colum. J. Transnat'l L. 331 (1970).

jurisdiction to the injury of nationals of other states. A case frequently cited as demonstrative of this principle is that involving the destruction of two British destroyers in the Corfu Channel of the Adriatic Sea by mines placed in these waters by the Albanian government.[2] The International Court of Justice held that a state was obliged ". . . not to allow knowingly its territory to be used for acts contrary to the rights of other States." More clearly environmental was the issue in the Trail Smelter Arbitration, initiated in 1935 by agreement between the United States and Canada, regarding damages to farmers in the state of Washington from sulphur dioxide emitted by an iron ore smelter located in British Columbia.[3]

A second principle, more political than legal, is that nations should cooperate to serve the mutual interests of their respective peoples. An early application of this doctrine to an environmental issue was in the Convention signed in Paris in 1902 concerning the conservation of birds useful to agriculture. This Treaty culminated an effort of almost thirty-five years, initiated by an assembly of German farmers and foresters in 1868, requesting the aid of the Foreign Office of the Austro-Hungarian Empire in obtaining international protection of birds and animals useful to agriculture and forestry. At one point in the protracted negotiations, the Swiss government (1872) proposed an international regulatory commission for the protection of migratory birds; but the other sovereign states of Europe were not interested in institutional arrangements for this purpose.[4] The Anglo-American Treaty of 1916 for the protection of migratory birds in the United States and Canada was based upon political thinking similar to that underlying the European Treaty of 1902 but with a significant additional factor. The Treaty established or, at least, clarified the legal authority of the federal government of the United States to protect migratory birds. Under the United States Constitution, treaties between the United States and other powers become a part of the supreme law of the land overriding inconsistent or conflicting state legislation. Prior to the ratification of the 1916 Treaty, there had been question as to the constitutional competence of the United States government to adopt or enforce policies regarding migratory birds. It was widely believed that this function belonged to the respective state governments.

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2. Corfu Channel Case [1949], I.C.J. 4.

3. Convention for the Settlement of Difficulties Arising From Operation of Smelter at Trail, B.C., Apr. 15, 1935, 49 Stat. 3245 (1935), T.S. No. 893 Effective Aug. 7, 1935; *See also* 33 Am. J. Int'l L. 182 (1939); 35 Am. J. Int'l L. 684 (1948).

4. Angelo, *supra* note 1, at 520; *See also*, S. Hayden, The International Protection of Wildlife: An Examination of Treaties and Other Agreements for the Preservation of Birds and Mammals 246 (1942).

These earlier legal precedents have not been extended to indirect damages such as deprivation felt by people not directly affected by action originating in other states. Impairment of a unique natural or cultural treasure of worldwide significance, such as the Grand Canyon of the Colorado, Murchison Falls, or Angkor Wat, might leave many people outside the responsible sovereign state with a sense of loss for which there was no legal redress. More tangible, but less direct than pollution emanating from a specific source, is the general deterioration of climate over a large continental area because of excessive dust in the atmosphere. Central and Southern Asia may afford cases in point. The dust results from a variety of activities, chiefly agricultural, and spreads over several countries with consequent reductions in rainfall.[5]

Examples of generalized or indirect injury are especially numerous with respect to the oceans, notably in pollution of the high seas, depletion of fisheries and threatened extermination of certain species of whales. Do inland states with no sea coast and no merchant or fishing fleet have a legitimate voice in human impact on the marine environment—upon the exploitation and pollution of the high seas?

The first major attempt to establish a general legal obligation among states for the protection of common interests in the environment related to the oceans. It was the 1958 United Nations Conference on the Law of the Sea, held in Geneva, which led to the drafting of four multilateral treaties, or conventions, on the law of the sea. Among these, the one most directly related to environmental protection and the conservation of nature was the Convention on Fishing and Conservation of Living Resources of the High Seas.[6] This Treaty was the result of careful preparation by the International Law Commission and an international technical conference on the living resources of the sea held in Rome in 1955 under the sponsorship of the United Nations.[7]

The Geneva Convention on Fisheries and Conservation of Living

5. *See* Paper by Reid A. Bryson, *Climatic Modification by Air Pollution*, presented at the International Conference on Environmental Future, Helsinki and Jyväskylä, Finland, June 27-July 3, 1971.

6. Convention on Fishing and Conservation of the Living Resources of the High Seas, Sept. 15, 1958 [1966] 1 U.S.T. 138, T.I.A.S. No. 5969, 559 U.N.T.S. 285 Effective Mar. 20, 1966; *See also* Goldie, *The Oceans' Resources and International Law—Possible Developments in Regional Fisheries Management*, 8 Colum. J. Transnat'l L. 1 (1969).

7. Among the papers delivered at this Conference, one of special pertinence to our topic was delivered by Michael Graham, Director, Fishery Research, United Kingdom Ministry of Agriculture and Fisheries. Graham shows how the concept which men have held concerning the life-cycle and regeneration of species of fish have influenced the policies of governments in the regulation and conservation of fisheries. Paper presented by Michael Graham, *Concepts of Conservation*, presented at the International Technical Conference on the Conservation of Living Resources of the Sea, Rome, Italy, Apr. 18-May 20, 1955.

Resources of the High Seas provides a point of illustration of the influence of concepts upon policy. Although the legal concept of obligation among states was broader than that which had customarily been applied to fisheries agreements, the concept of conservation was used in a very restrictive sense. J. A. Collier, Lecturer in International Law at Kings College, University of London, has provided the following commentary on the concepts embodied in the Fisheries Treaty:

> The Convention starts with a reiteration of the right of freedom of fishing, limiting this by treaty obligations, the interests of coastal states and the provisions of the Convention itself. It then imposes on all states the duty to adopt or co-operate with other states in adopting such measures for their respective nationals as may be necessary for the conservation of the living resources of the High Seas. There may be mentioned the concept of 'conservation' with which the Convention deals; it is defined as the 'aggregate of the measures rendering possible the optimum sustainable yield from those resources so as to secure a maximum supply of food and other marine products.' Conservation programmes (it continues) should be formulated with a view to securing in the first place a supply of food for human consumption. Pausing here for a moment, it may be inquired whether this is a satisfactory definition; there may well be other objects apart from this purportedly biological one; such as social or economic goals, or a combination of all these, which may lead states to propose conservation schemes.[8]

The principle of mutual obligation was expressed again in the Antarctic Treaty of 1959 in which the signatory states must take reasonable efforts to alleviate pollution of the coastal waters and ice shelves, and must not set off nuclear explosions or dispose of radioactive waste material on the Antarctic Continent.[9] By the late 1950's when these Treaties were consummated, ecological concepts were beginning to affect legal doctrines. It was becoming evident that an environmental impact, that could be caused to occur anywhere by a nation or group of individuals possessing the requisite technology, could not be warded off by some few nations or by a regional grouping of interested states acting wholly within their own political boundaries. Fall-out from atomic explosion offered a dramatic illustration of the issue. Universality of obligation among national

8. David Davies Memorial Institute of International Studies, *The Regime of the Seas—Exploitation and Conservation* in Report of Conference on Law and Science, held at Nesbitt Hall, King's Benchwalk, Temple, E.C. 4, July 11-12, 1964 at 56.

9. The Antarctic Treaty, Dec. 1, 1959, [1961] 1 U.S.T. 794, T.I.A.S. No. 4780 (Effective Dec. 10, 1959); *See also* Peavy & Gould, *Antarctica, International Land of Science*, 15 UNESCO Courier 9 (1962).

states and universal international organization, where worldwide protection measures are required, are the logical political and legal conclusions to an increasing number of studies assuming the concept of the biosphere.

BASIC ENVIRONMENTAL CONCEPTS

During the decade of the nineteen sixties, the growth of public awareness of threats to the human environment grew rapidly and progressively. At last, ecology was beginning to affect the substance of law in addition to the extension of traditional legal concepts to environmental issues.

State of the world concepts are formulations of the ways in which people see the world around them. Many of these concepts overlap one another, and some of them are contradictory. All are, in some measure, interrelated. Prominent among them, and of increasing relevance to political action, are the ideas represented by the terms biosphere, ecosystem, balance of nature or equilibrium and evolution. Under each of these terms there are, of course, numerous sub-concepts. These concepts may be considered neutral relative to man's behavior because, although man, as a part of nature, must be assumed in all of them, they are not necessarily man-centered even though they are human interpretations.

Another group of concepts regarding the state of the natural world may be described as man-dependent. The concepts frankly classify and evaluate phenomena in the natural world from the viewpoint of the effect upon man. The most prominent among these is that of "natural resources". This is primarily an economic concept categorizing the various elements of the natural world according to their usefulness to man. A second man-dependent concept, which has to some extent been used to correct or supplement a natural resources interpretation of the environment, is the natural world as a "life-support system". Some aspect of the life-support system concept relate to evolution as it is now believed that the atmosphere of the Earth, the conditions of the oceans and of soils, as well as all living organisms are the product of evolutionary development and change. Some evolutionary interpretations are of course man-centered, or are at least teleological, in the sense that man is conceived as a logical, if not intended, outcome of a long process of evolution developing from relative organic simplicity to ever greater complexity.

Perhaps the most highly-developed statement of this teleological perception is found in the writings of Pierre Teilhard de Chardin, and especially in his book *The Phenomenon of Man.*[10] This evolutionary

10. First published in French, P. de Chardin, Le Phénomene Humain (1955); later published in English, P. de Chardin, The Phenomenon of Man (1959).

process, moving from inert physical matter to pure intelligence, was also developed in greater detail in the writings of the Russian mineralogist V. I. Vernadsky.[11] From these interpretations of the state of the natural world, there is a logical transition to concepts regarding the behavior of man in relation to whatever view of the natural world that has been postulated. The focus of these concepts is not so much upon the substance of the world and how it is put together as it is upon how man acts, or ought to act, in relation to a particular interpretation of the world. Obviously, how one understands the world may affect one's opinions regarding the propriety or justification of human behavior in relation to the environment.

Throughout most of Western history, the predominant popular view, and the one that has most inflenced public policy, is of man as master of his environment. This concept places man and nature as adversaries. Man's dominance over nature has been sanctioned by the dominant current of historical Judaeo-Christian thought, although there have been counter currents in which man was seen as a custodian of nature rather than as a conqueror. Both views find support in the Book of Genesis. Lynn White, Jr. has argued that those biblical passages justifying man's dominance over the living world are most often the ones rationalizing human exploitation of the natural world.[12]

Historically less influential, but now of growing importance, is the countercurrent of "stewardship".[13] Although this concept finds support in religious doctrine, it draws also upon the natural sciences for guidelines toward ethical conduct. As more is learned about the intricate and ever-changing balances among the forms and forces of the natural world, it becomes easier to delineate cause and effect relationships and to trace out the ecological consequences of human action. Action that can be shown, in the long run , to be destructive to human welfare and to the life-support systems of the planet generally, may be held to be ethically wrong. This view, moreover, encourages the development of science in such fields as ecology. If man has assumed the responsibility for the management of the natural world, he cannot afford to exercise his stewardship in ignorance. Responsible conduct requires informed conduct. The stewardship concept of the behavior of man in relation to his environment has very clear implications for public policy including efforts toward developing public understanding of man's environmental dependencies and their relationship the the natural systems of the biosphere. A practical

11. V. Vernadsky, La Biosphere (1929). A Russian version was published in 1929. *See also* Vernadsky, *The Biosphere and the Noösphere*, 30 Am. Scientist 1 (1945).

12. L. White, *The Historical Roots of Our Ecological Crisis*, 155 Science 1203 (1967).

13. *Cf.* Open Space Action Committee of New York City, Stewardship: The Land—The Landowner—The Metropolis, (1965).

expression of the stewardship concept was the recommendation of the General Conference of UNESCO at its Twelfth Session (9 November to 12 December, 1962) concerning the safeguarding of the beauty and character of landscapes and sites.[14]

EMERGING POLICY PROPOSITIONS

The environmental policies of governments and international organizations are not merely interpretations of law and reflections of environmental concepts. Many other influences and events enter into the shaping of environmental policies. Nevertheless, environmental concepts, even when unarticulated or unrecognized, underlie all environmental policies and, in the long run, may decisively influence their developement. When these concepts are embedded in our everyday conventional assumptions about the world, we cease to be aware of them. They are taken for granted. To single them out as determining factors in our thinking appears to be making much out of little. Nevertheless, these concepts, inchoate as they sometimes are, affect our behavior. But it is also true that many of the prevailing environmental concepts do not belong or are not fully represented in many present-day cultures. Few of them have dominated popular thinking or public policies in major political systems in the past.

Contemporary environmental policies at all governmental levels are influenced by five socioecological concepts which we will identify by the following phrases: 1) Unity of the biosphere; 2) Unique nature of Earth; 3) Universality of man's natural and cultural heritage; 4) Natural limitations of political fiat; and 5) Man's obligation as custodian of the Earth. We shall now examine the propositions through which these concepts are translated into public policies and programs. But to repeat, these policies and programs are seldom direct and conscious reflections of explicit environmental doctrines. The emergence of these propositions and the objectives they define can be fully understood only if their underlying conceptual assumptions are understood. Were it not for these assumptions the policies would either have not emerged in the form they did or they would have been aimed toward other goals. Moreover, to the extent that these concepts become universalized in the modern world through programs for environmental awareness and environmental education, and to the extent that they are reinforced by the findings of science, especially through ecology, these concepts may be expected to weigh more heavily in the public policies of the future than they do at present. And their influence will be greater to the extent that

14. General Conference of UNESCO, U.N. Doc. CPG. 63/VI. 12/A (1963), 12 UNESCO at 139-42 plus annexes (1963).

environmental disorders and disasters provide dramatic occasions for their being invoked.

A. Unity of the Biosphere

Although its philosophical origins are ancient, the biosphere as an operational concept has had much less than a century of practical usage. This concept, basic to global environmental policy, is multinational in origin. Its beginnings have been traced to the French naturalist, Lamarck. It was first applied in the descriptive geographical writings of the Austrian geologist, Suess, and, as we have noted, was elaborated by the Russian mineralogist, V. I. Vernadsky, into a comprehensive biophysical theory. The dissemination of the theory was assisted by the published writings of the French Jesuit paleontologist, Pierre Teilhard de Chardin.[15]

The translation of this socioecological concept into a conceptual basis for public policy was evidenced by the so-called Biosphere Conference of 1968 (the Intergovernmental Conference of Experts on the Scientific Basis for Rational Use of the Biosphere), in which sixty-four nations, fourteen intergovernmental, and thirteen nongovernmental organizations were represented. It was sponsored by UNESCO with the United Nations, the Food and Agriculture Organization, and the World Health Organization participating; and with the cooperation of the International Union for Conservation of Nature and Natural Resources (IUCN) and the International Biological Programme (IBP). The Biosphere Conference adopted twenty resolutions, all of which were in some respects policy recommendations, including specific recommendations for regional and international structures for research and for administration. Recommendation 20 involved proposals for a long-term intergovernmental and interdisciplinary program which has since developed as a UNESCO-sponsored, intergovernmental, interagency effort entitled *Man and the Biosphere.*[16]

The concept of the biosphere has now found expression at the national level also. The interrelationship between national policy and the global biosphere is implicit in Section 2 of the National Environmental Policy Act of the United States (PL 91-190), which declares as its purpose ". . . a national policy which will encourage productive and enjoyable harmony between man and his environment; to promote efforts which will prevent or eliminate damage to

15. Hutchinson, *The Biosphere*, 223 Scientific Am. 45 (1970).

16. UNESCO, Man and the Biosphere, Sc 69/XII. 16/A (1969); UNESCO, *Intergovernmental Conference of Experts on the Scientific Basis for Rational Use and Conservation of the Resources of the Biosphere, Paris, Sept. 4-13, 1968, Final Report* 35 plus annexes (1969).

the environment and the biosphere and stimulate the health and welfare of man. . ."

The Earth as a complex, biophysical unity is now obviously implicit in a series of scientific and conservation efforts exemplified by the International Geophysical Year and the International Biological Programme, both organized by the International Council of Scientific Unions; and especially in the Union's most recent major effort, the Scientific Committee on Problems of the Environment (SCOPE), whose frame of reference embraces the entire globe. This concept of the biosphere as an indivisible unity has political implications for international organization. If mankind, as a whole, is to act effectively to protect the biosphere, all people and nations must be brought into a common effort. If major nations, or groups of nations, are excluded from international efforts to protect the biosphere, that effort will most assuredly be incomplete and inadequate. The logic of the biosphere is universal participation of all responsible political jurisdictions in any effort or attempt to cope globally with man-environment relationships.

B. Unique Nature of the Earth

The dramatic views of the Earth from outer space, resulting from the Apollo Program, added an emotional impact to what men had already scientifically known regarding the singular character of the Earth and its biosphere. The policy implications of the concept of the Earth as unique are qualitative rather than substantive. The Apollo flights emotionally confirmed what was already known intellectually. It had already been known that the evolutionary processes of the living Earth are irreversible; that a species once extinct can never be restored; that life itself is an extremely rare phenomenon in the universe; and that only statistical probability supports a belief that it may occur elsewhere than on the Earth. Thus, the concept of uniqueness provides, at very least, a reinforced argument for conservationist and preservationist measures. It also provides a major element in the reasoning that has led to the imposition of quarantine measures on astronauts returning from outer space to avoid the possibility of back-contamination by microorganisms unknown on Earth and to which no immunity or resistance would have evolved.

C. Universality of Man's Natural and Cultural Heritage

Politically and ethnically, men are divided. Biologically, all are "citizens" of the Earth. The mobility of the human species and the mixtures, ethnically and racially, of populations have led to a situation in which men may not only consider the global world as

their home and natural heritage, but may also look to the past works of other men as somehow belonging to their own cultural legacies. This concept of universality has historically been confined largely to scientists, artists, and poets. It is only in very recent times that it has gained something like a popular recognition. The major institutional symbol of this concept today is UNESCO, United Nations Educational, Scientific and Cultural Organization. The IUCN and World Wildlife Fund exemplify the universality of our natural heritage.

On the cultural side, the International Council of Museums (ICOM—1946) and the International Council of Monument Sites (ICOMOS—1965) are organizational expressions of man's collective determination to preserve his common heritage. The most explicit recognition of this universality is the World Heritage Proposal which has been advanced in several forms in recent years, particularly through the IUCN and UNESCO. A Convention for Protection of the World Cultural and Natural Heritage was adopted by the General Conference of UNESCO on November 16, 1972 and will take effect when ratified by twenty countries. The World Environmental Fund is closely related, at least in concept, to the World Heritage Trust, although the World Environment Fund would extend financial aid to countries needing assistance for a range of activities broader than the preservation and protection of specific sites, monuments and species. It is difficult to believe that the concept now so widely shared among thoughtful people and, more particularly, among officials of government will not have a significant influence in national, regional and international policies in the future.

D. Natural Limitations of Political Fiat

Much of the world, and certainly the United States of America, has moved a long way from the position taken in 1895 by an Attorney General of the United States who declared that: "The fundamental principle of international law is the absolute sovereignty of every nation, as against all others, within its own territory."[17] The irrationality of this doctrine becomes evident when one considers its total ineffectiveness in protecting a nation and its people from the consequences of environmental abuse by other nations. Sovereignty is a poor barrier against the death of the oceans or the contamination of the atmosphere or the impoverishment of man's global environmental heritage. Insistence on the arbitrary right of a government to determine its own internal environmental policies is contradicted by

17. 21 Op. Att'y Gen. 281 (1885). In his opinion Attorney General Judson Harmon cited the judicial opinion of Chief Justice of the United States, John Marshall, in *Schooner Exchange v. McFaddon*, 11 U.S. (7 Cranch) 74 (1812).

a principle of international law illustrated, as we have noted, in the Corfu Channel Case before the International Court of Justice; by the Trial Smelter Arbitration between the United States and Canada. A state may not legitimately permit its territory to be used in ways directly injurious to another state. This principle was endorsed in several resolutions (*e.g.* 3, 37, 48, 51, 70 and 92), adopted by the United Nations Conference on the Human Environment.

Science works in two ways to reinforce the concept of limitations on political behavior. First, as ecological interrelationships are better understood and as the flow of contaminants and other residual products of man's activities are met in the oceans and in the atmosphere, peoples will increasingly become aware that they may be suffering environmental damage originating on the territory of other nations; but of which they have been hitherto unaware or which, in fact, had not heretofore occurred. An example of the latter circumstance is radioactive fallout, which has become a factor in international relations only since the advent of atomic weapons. But science also indicates that an arbitrary unecological decision by a political leader cannot be realized if the natural circumstances contradict it. Unfortunately, the record shows that people and governments do not necessarily learn from past errors.[18] But the influence of ecological thinking appears to be growing, and governments are increasingly establishing agencies for the surveillance and protection of the natural environment. It seems probable that governments and international organizations in the future will make fewer ecological errors than in the past. Hopefully, this will prove to be the case; and the doctrine of national sovereignty, like the flag on the masthead of the ship Pequod in Melville's *Moby Dick*, will not flutter its last defiant gesture before the ship of state disappears beneath the waves, its destruction being the consequence of the arbitrary, unyielding perversity of its single-purposed commander.

E. Man's Obligations as Custodian of the Earth

A consequence of man's pretentions to dominate and control nature is that he becomes responsible for the consequences of what he does to and through nature. Were this merely a moral conclusion, it could not be expected to have any greater influence than moral conclusions that have long been propounded by religious leaders and political ideologists. But man's obligations as Earth's custodian have been reinforced by the demands of his fellows that they not be required to suffer from the Earth-destroying activities of other men. As man

18. *See e.g.*, The Careless Technology: Ecology and International Development (J. Milton and M. Farvar ed. 1972).

undertakes to shape the environment, the environment becomes potentially a subject of social conflict. Again, the evidence of science influences perceptions and, indirectly, influences policies. As it becomes evident that some action that men might take could be disastrous to all men, prevention of this kind of action becomes a universal human concern. As danger is perceived to become more threatening, the human tendency is to seek laws, institutions, and procedures to forestall disaster. It is for this reason that the General Assembly of the United Nations has convened the Conference on the Human Environment, that UNESCO and associated organizations convened the Biosphere Conference, and that the International Council of Scientific Unions created its Scientific Committee on Problems of the Environment. The concept is the fundamental proposition underlying the purposes of the IUCN.

A NEW CONCEPT NEEDED?

We have seen that there is a direct relationship between the foregoing five socioecological concepts and a large number of political, scientific and institutional developments. But have we all the ideas we need to cope with modern man's worldwide environmental impact in all its complexity and comprehensiveness? This question can only be answered with the passing of time; but it is the thesis of this essay that our present structure of concepts in relation to policies is not adequate to our need. The deficiency is principally one of synthesis. The five groups of concepts that we have just discussed have yet to be woven into a comprehensive and coherent interpretation of man and his place in nature that is fully socially and politically operational. We do not, as yet, have a body of ecological concepts that are simultaneously political concepts.

Each in his own different way, Pierre Teilhard de Chardin and Karl Marx, provide us with illustrations of what is needed. Their work does not provide models, but rather indicators of how knowledge must be related to action. Teilhard's synthesis of scientific and cultural concepts within an evolutionary context, and related to the "purposes" or outcomes of human effort, illustrates the kind of task that needs to be undertaken if the coherent and purposeful philosophy of man within his environmental context is ever to be achieved. Marx illustrated how historical explanation and analysis can be developed into philosophical propositions and moral imperatives which can then be stated as propositions capable of being acted upon. One need neither agree nor disagree with the action-oriented philosophy of Karl Marx to recognize the power and effectiveness of the Marxist technique of action-oriented synthesis.

If, as we have argued, concepts do affect policies, and policies are the expression of political intentions, fundamental changes in human concepts may be expected in time to induce political consequences. No really great new persuasive or compelling political ideas have emerged in the twentieth century. The twentieth century brought to an end the five hundred year effort of man's exploration of the Earth, beginning with the great sea voyages of the Portuguese and Christopher Columbus and drawing to a close with the first departure from the surface of the Earth and the landing on the Moon. The surface of the Earth, at last and for the first time in human history, was totally pre-empted by political man.

The future, whatever it may be, cannot resemble the past that man has experienced in his relationship to a seemingly endless and inexhaustible Earth. It is difficult to believe that the tremendous changes that have occurred during the twentieth century will not, perhaps even before its end, result in some new configuration of ideas, attitudes, and policies. The shaping of this configuration may be a part of our work; and, if the criteria by which this work will be judged is that which has been applied to man's finest efforts in the past, we must endeavor to insure that the outcome of this work will be simultaneously valid, humane and effective.