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The Ocean Resource: A Scenario for Its Control

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I. INTRODUCTION

A. The Planning Approach

> "The time has come to dare to include the complete universe in our rationalizing." Limits are what we have feared, the broadest attitudes toward thought need to be encouraged.[1].

As man expands his horizons on planet earth, he is beginning to turn increasingly to the oceans as a source of resources, and at a pace commensurate with the growth of his needs and his technical ability. Traditionally the deep sea has always been a "no man's land", an unlimited source of space to be traversed and used infrequently. Suprisingly, apparently opposite processes - scarcity and abundance - are responsible for a change in orientation and an increasing emphasis on man's use of the sea. A scarcity of natural resources and an abundance of human extentions (i.e. technology) are together making deep ocean seclusion a thing of the past.

Increasing use of a particular resource in a limited space sooner or later implies an increasing need for management and control of that resource. The achievement of peaceful control mechanisms most often take the form of calculated compromise between the various users. This paper will attempt to develop a system through which compromise can be attained in the use of the deep ocean resources. A comprehensive planning framework will be used in this analysis. There are two basic processes which

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1. R. Buckminister Fuller, Nine Chains to the Moon, Southern Illinois Univer. Press, Carbondale, Illinois, 1967, p. VII.

Melvin Branch identifies as characteristic of the comprehensive planning process. These are a.) integration of the parts of a problem and b.) projection of its past and present trends into the future.[2] The specific planning format for this analysis will consist of:

1. An inventory and assessment of the natural and human aspects of the ocean resource and its environment.
2. A prescription of the ends and criteria sought in determining viable means of control over the resources of the oceans.
3. An identification of the sets of alternatives for control consistant with the general prescriptives.
4. A projection of probable alternatives chosen from a cursory assessment of international political realities.
5. A delineation of the actions required for attaining more desired ends, including the obstacles to be surmounted and guidance required to succeed.

B. Towards Comprehensiveness

The comprehensive concerns of this paper are graphically depicted in the grid in figure one. This grid is primarily a

2. Melvin Branch, Planning: Aspects and Applications, John Willey and Sons, Inc., New York, 1966, p. 298.

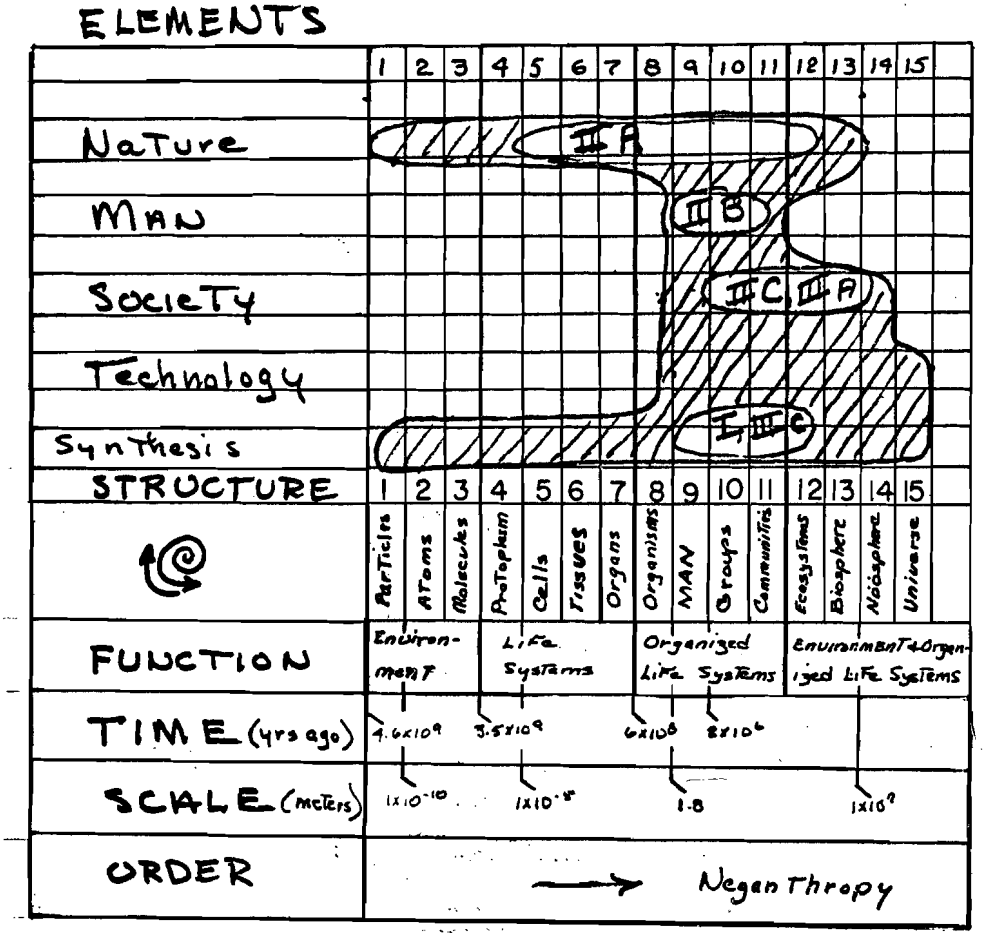

FIGURE I

descriptive tool designed to aid in visualizing the interrelationships between various phenomena in the marine as well as terrestial environments. The grid can be seen to have a wide variety of applications by changing the parameters on the vertical or horizontal axis to reflect interrelationships between various functional or structural characteristics of interest in the world ocean.

The grid in figure one depicts the concerns of each major section of this paper according to the alphebetical notions of found at the beginning of each section of this paper. It also indicates the various uses of the structural units on the horizontal axis to compare differing conceptual relationships and dimensions, such as Time, Scale and Order with the functional elements on the

vertical axis.[3]

The grid is essentially an attempt to force thinking and planning of human activities away from its traditional approach of dealing with bits and pieces of problems in isolation from the total experience. With the grid, a perspective can be taken that is indeed comprehensive and inclusive of all various phenomena, and can as well facilitate the projection and synthesis of a multiplicity of events.[4]

C. Problem Statement

As the level of interest and involvement in the marine environment increases, specific vested interests develop, emotions flare, and workable arrangements become more difficult to devise. The decision as to who owns what and therefore exercises control needs to be made before the stakes become too high and interests too strongly identified with. Therefore a definition of what might be expected in the future is mandatory in order to set the right perspective for action today. Also goals and interests need to be identified, problems appraised, and solutions proposed before the right controls can be proposed and implemented.

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3. A brief definition of each of the major units used in this grid is presented in Appendix I at the end of this paper.

4. A somewhat similar type of grid has been devised by Constantinos Doxiadis in his attempts at formulating a general theory of Ekistics, the science of human settlements. The Doxiadis grid is restricted to classifying various kinds of approaches or functions of human settlements in relation to their units or sizes on a logarithmic grid to the base of seven. See Constantinos Doxiadis, Ekistics, An Introduction to the Science of Human Settlements, Oxford University Press, New York, 1968, p. 1 - 52.

DEGREE OF CONCERN
CURVE GRID

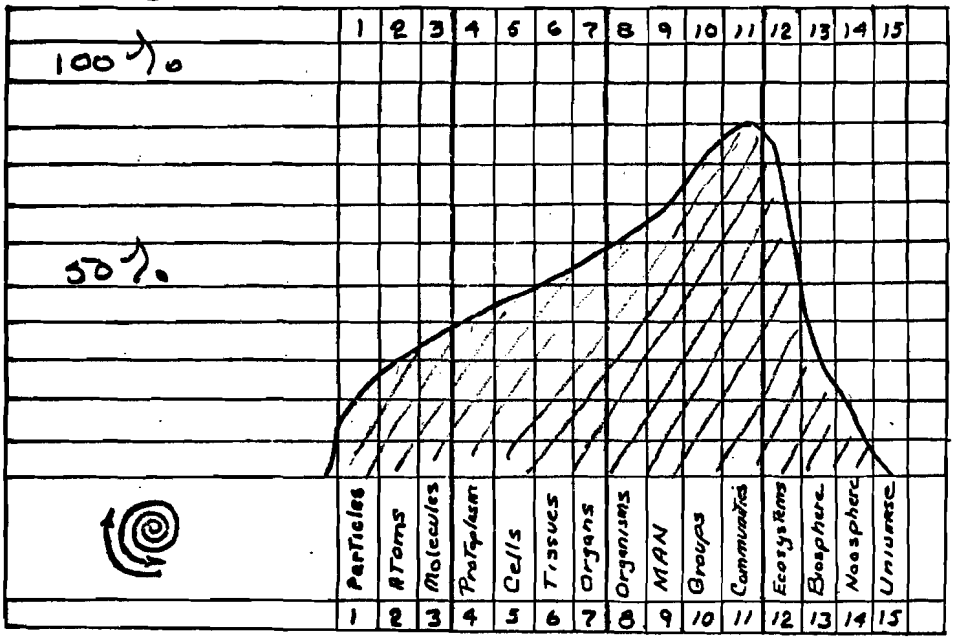

FIGURE II

Specifically, then, the deep ocean will be looked at from three vantage points (i.e. man, nature, society) with a view towards imposing controls. Using these parameters as sights for aiming towards predetermined goals, probable and potential scenarios will then be outlined for control of the ocean resource.

Control of the sea floor is an example of a case in international relations in terms of its socio-economic and political implications. It has various facets of interest as a political problem, but is perhaps most striking as an illustration of the possibilities of divergent outcomes and attitudes of individual nations in their relations with each other and the issues involved. Specifically, the case focuses on the questions: How are the resources of the sea to be apportioned? What kinds of international agreements and arrangements are most probable and which are most desirable? And how are these arrangements to be effectuated? Figure II depicts the approximate degree of concern taken in this paper for each of the major units of the grid according to

the vertical scale to the right of the grid.

The next section will attempt to sketch the basic ocean resource characteristics through three primary areas of emphasis in order to set the proper perspective for a workable solution in controlling the ocean's resources. Briefly, then, an ecological perspective will be provided for a discussion of the economic possibilities in light of the socio-cultural determinents of future policy.

II.. OCEAN RESOURCE CHARACTERISTICS

A. Ecological Perspectives

> Perhaps the ocean is itself
> a living creature - an organism
> so vast that we cannot
> comprehend that it is alive.
> Trapped by its own enormous
> weight in the deeper indentations
> of the planet; it reaches out
> great tentacles of rivers to scour
> the hearts of continents
> for the nutrients that give it life.[5.]

Whether or not the ocean organism lives, its influence is indeed pervasive and far reaching as it covers 71 percent of the earth's surface, and contains 350 cubic miles of sea water.

Life within the sea is composed of three major types of organisms: plankton, floating organisms, both plant (phytoplankton) and animal (zooplankton); nekton, swimming organisms such as fish and seals; and benthos, bottom living organisms like seaweed and clams.

A knowledge of the major food chains of marine life is

5. Don Fabun, The Dynamics of Change, Prentice-Hall, Inc., Englewood Cliffs, N.J., p. 15.

critical to gaining an understanding and appreciation of the function of the ocean organism. The food cycle begins with photosynthesis and the use by plants of inorganic substances which run through the long chain of plankton and nekton to continue through with the activities of the benthos bacteria, which reduce the organic wastes from the animals to inorganic substances which are then ready for use by plants. Interruption of the food chain can cause large scale reprecussions for populations of many organisms. For instance , some of the required inorganic substances such as phosphates and nitrates are available only in small amounts in the ocean, and when those vital nutrients are depleted, growth of marine life ceases.[6] The interconnections between marine organisms and other aspects of their habitat is also of critical importance to life. It is, for example, believed that the destruction of eel grass beds has a serious effect on the young of the commercial fishery species, since it removes their shelter and reduces their available food.[7]

Man has only begun to investigate the relationships and the natural mechanisms which are at work within the marine environment. An essential tool leading to better understanding is the use of the ecosystem concept which considers together the complex of organisms and their immediate environment. The factors of climate and soil, of organism community structure and purpose, and of human intervention are all aspects influencing and

6. R. E. Coker, The Great and Wide Sea, Harper and Row, New York, 1962. p. 197.
7. Jerome Williams, Oceanography - An Introduction to Marine Sciences, Little, Brown and Company, Boston, Mass., 1962, p. 57.

controlling the functioning of ecosystems which are clearly elucidated and considered together as an interacting whole. "One way to look at ecology and the ecosystem is not only as a method and technique, but as a point of view."[8] The maintenance of all marine species is important in order to meet any unforseen needs. Organisms appearing to have no function now may occupy important niches or roles in vital food chains.[9] Most important is the regulation of man's impact on the environment. As McHale has indicated, when man overturns the ecological balance in one area of the world, its repercussions can be felt afar off.[10]

Although inferences with natural physical processes is often disruptive of ecosystems, the implication is not that such ecosystems be allowed to exist without change. This in itself is against natural laws. Nature is constantly changing through a process called succession, where different organisms succeed others when environmental conditions favor the newcomers. With an understanding of natural processes, adjustments can be made without destroying total ecosystems by change that is too rapid or foreign. Organisms, given the opportunity, will adjust to new environmental conditions and attain some degree of stability with their new habitat. Destruction of a segment of a balanced natural ecosystem is not only possibly destructive of the ecosystem itself, but also indirectly potentially destructive of the human

8. Gordon Harrison, David Gates, and C.S. Holling, "Ecology: The Great Chain of Being", Ekistics, Vol. 27, No. 160, March 1969, p. 162.
9. I.M. Cowan, "Introductory Statement by the Deputy Chairman", Future Environments of North America, F. Fraser and J. Milton, eds., Natural History Press, New York, 1966, p. 12.
10. John McHale, Global Ecology: Towards the Planetary Society", American Behavioral Scientist, Vol. XI, No. 6, July-Aug. p. 29-33.

ecosystem. Continuing pollution of the oceans could, for example, eventually produce a mass die-off of pytoplankton which produce the bulk of the earth's oxygen. Such projections are already being made, based on actual destructive environmental changes (such as those which pesticides are causing) occurring today.[11.]

The ocean biosphere consists of numerous ecosystems in which many different creatures co-exist in interdependence, each with its own processes, apperception, roles, fitness, adaptations and symbioses.[12.] Thus in considering the ocean environment, one segment of a marine ecosystem or even one ecosystem must not be separated from the others for special treatment, otherwise basic interrelationships may be neglected. Ecosystems function and survive well only when interrelationships are carefully considered and provided for. Stability, yet with successful change, is thereby assured. The dynamic qualities and processes involved between and among ecosystems of the marine biosphere requires comprehensiveness in man's approach and interaction with the natural world. Figure three presents the functional processes of marine ecosystems in terms of the primary units of the grid, and indicates the structural position of marine organisms on a functional basis.

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11. Dr. Paul Ehrlich, "Eco-Catastrophe!", Ramparts, p. 24, Vol. 8, No. 3, September 1969.
John Davy, "Polluting the Planet", Ekistics, Vol. 27, No. 160, March 1969, p. 165-167.
12. Ian McHarg, Design With Nature, Natural History Press, New York, 1969, p. 197.

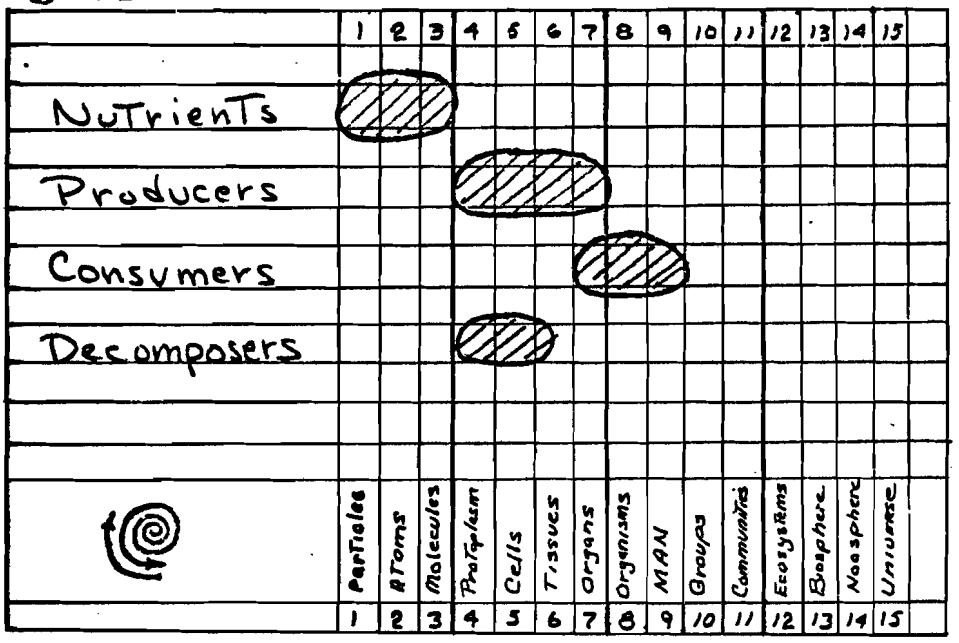


Figure III

B. Economic Possibilities

> Man, that "walking bag of sea water", is but another way the ocean has of going ashore. Now the prodigal returns - as have the porpoise and the whale before him - and the most exciting adventure of our next twenty years may be this dramatic home-coming, after a journey of eight million years.[13]

The demand for new resources prompted by expanding populations is redirecting man's attention to the oceans as a source and substitute for depleting, land-based resources. Some examples of the important resource uses which man is making of the oceans are: fresh water source, waste disposal, recreation, food, medicine, minerals, fuels and national defense.

A resource, according to Ciracy-Wantrup, "is a highly relative

13. Don Fabun, The Dynamics of Change, Prentice-Hall, Inc., Englewood Cliffs, N. J., p. 15.

concept changing with the ends-means scheme - that is, with the planning agent, with his objective, with the state of technology and with existing social institutions".[14] "In other words, resources are not, they become."[15] Natural resources are connected with characteristics of scarcity which therefore requires a concern for efficiency in their use. To maximize efficiency certain scales of output must be adopted which minimize production costs and maximize profits. Resource use patterns can be divided into two classes:

1. Resource use processes which are privately gainful, to individual and resource users.
2. Resource use processes which are publicly gainful, having a certain social utility function.

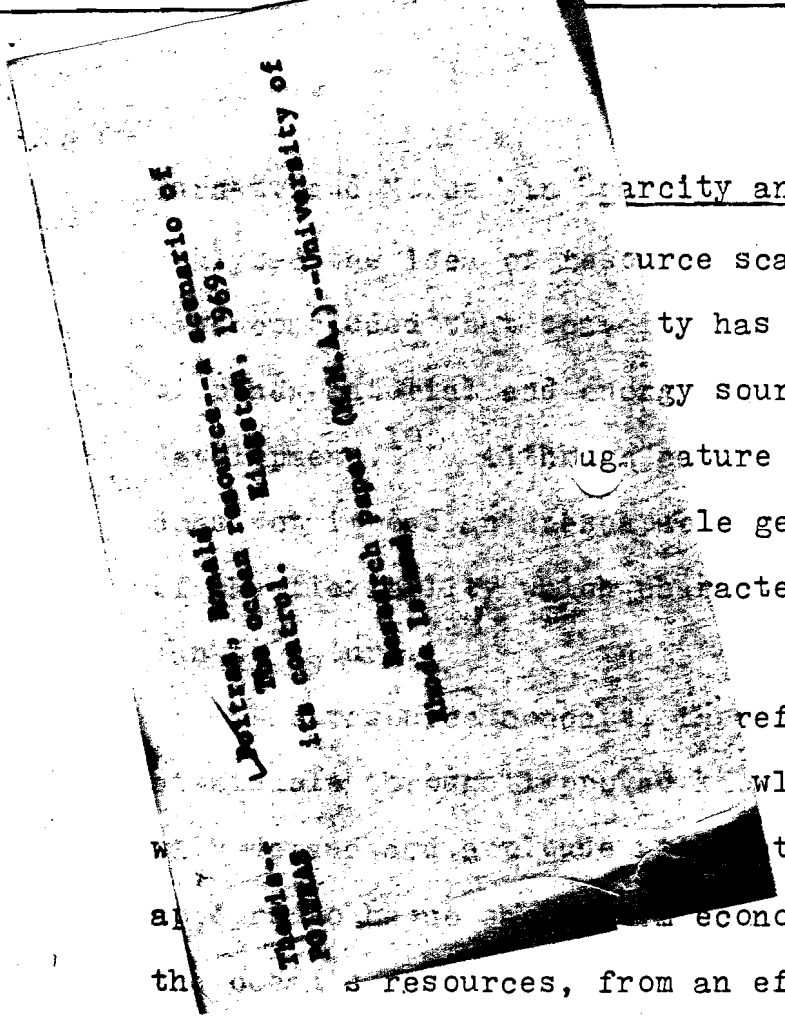
It is important, in this context, as stressed by Cowan, that the collision between private gain and social benefit be avoided in the use of resources.[16] Both use patterns are subjective evaluations of utility from two different vantage points, neither of which are necessarily intended to insure maximum efficiency. Maximum social efficiency is attained when different resource use processes (productive factors) are freely substitutable for one another, reaching some point at which total cost is minimized. The least cost condition is attained when resources are combined so that the ratio of their respective prices are equal to the ratio of their marginal physical products. This level of resource

14. Ciracy-Wantrup, Resource Conservation, Univer. of California Press, Berkely, California, 1968, p. 28.
15. Walter Firey, Man, Mind and Land, The Free Press of Glencove, Illinois, 1960, p.
16. I.M. Cowan, "Management, Response, and Variety", Future Environments of North America, F. Fraser and J. Milton, eds. Natural History Press, New York, 1966, p. 12.

use occurs when marginal revenue is equal to marginal cost. Under such conditions, resource use will have attained the criterion of efficiency for society. Effeciency, however, is no assurance of continued biophysical productivity. Carrying capacity (ability to withstand use) of natural areas such as the ocean are also important as an indication of value other than the economic considerations of efficiency[17]. Carrying capacity and therefore use rate of resources are dependent on whether a resource is a stock or flow resource. Flow resources are renewable and therefore for maximum long range use, care must be taken so as not to deplenish the ability for renewal - a certain amount of the resource must be left to perpetuate itself. With flow resources, man, through foresight and careful management is able to make continued use of it and in some cases man can even augment its usefulness to him.[18] The principle flow resource in the ocean today is fisheries but conceivably can also include some of the minerals found in the oceans.

Stock resources are non-renewable and therefore once used, can never be recovered. Ocean resources in this catagory are oil, gas and most metal ores. With total supply of stock resources limited in quantity, present use rates diminish some future rate of use and place a limit on the time over which a stock resource can be utilized. However, there is strong indication that the scarcity of stock resources in the oceans should not be of concern primarily because of the effects of inovation and replacement.

17. Ibid, p. 21.
18. Food and Agriculture Organization of the United Nations, "Management of Fishery Resources", Rome, Italy, 1967, p. 9.



arcity and Growth have carefully

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wledge and technology, which along

termine use rates. Thus there

economic problem in the utilization of

resources, from an efficiency criteria nor from a quantity standpoint. In summary then, in the utilization of stock resources, the state of technology plays a dominant role: in the utilization of flow resources, political, economic and social institutions are especially important.

Figure four indicates the subdivisions of flow and stock resources into their five basic types. Their components are indicated by comparing them with the structural units of the grid.

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19. Harold Barnett and Chandler Morse, Scarcity and Growth: The Economics of Natural Resource Availability, John Hopkins Press, Baltimore, Maryland, 1963.

RESOURCE CLASSIFICATION GRID

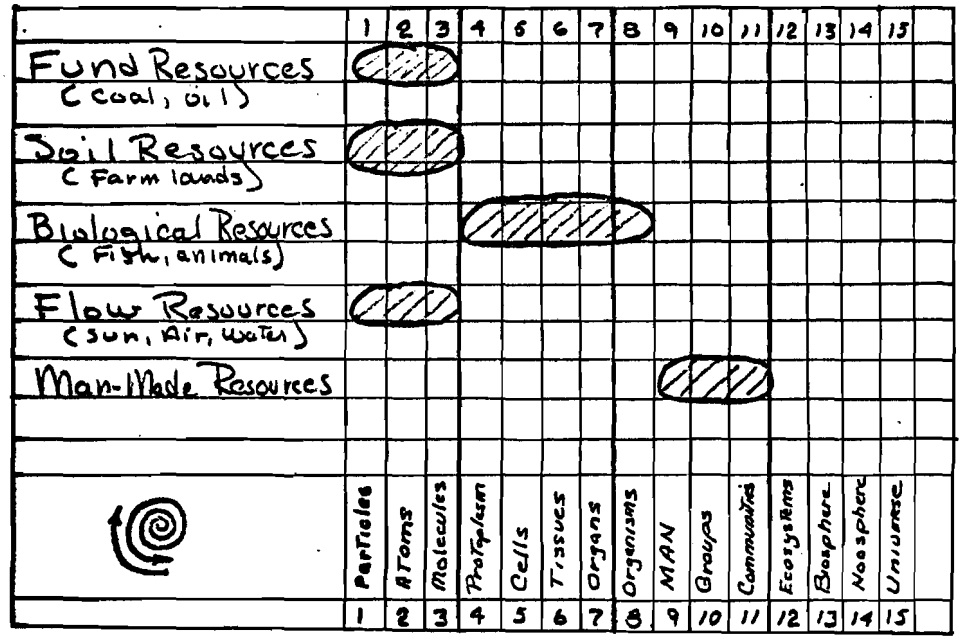

Figure IV

C. Socio-Cultural Determinents

> The paradox and irrationality of a rising economic standard of living, measured in dollar income, and a declining environmental standard of living, measured in ecological, esthetic, and social terms, is now manifesting itself.[20]

The notion of ocean resources running out may appear to be somewhat premature, considering the commonly held belief that the ocean's resources have only begun to be recovered. Yet, in actuality, certain scarcities of ocean resources do exist, although certainly no general scarcity has been yet perceived. Scarcities of ocean resources have occurred primarily in the flow resources category, the most obvious being certain of the fish resources. Other forms of apparent scarcity of the ocean resource

20. Sanford Farness, "Resources Planning Versus Regional Planning", Future Environments of North America, F. Fraser and J. Milton, eds., Natural History Press, New York, 1966, p. 497.

is its inability to continue to be used as a waste disposal sink. The means suggested in the previous section for mitagating flow resource scarcity is through effective social and political institutions, where in the ocean environment very few have jurisdiction..

The old fashion worry about certain stock resources running out may have been disproved, but it is being replaced by a more modern concern for the value of quality. The conventional standard for economic performance of resources is efficiency. Now the primary emphasis is to determine whether it is possible "...to adapt economic criteria to the kinds of decisions that determine the quality of the environment.[21].

The science of economics however, is not geared to measuring such normative values as quality. The study of social attitudes and practices concerning environmental quality needs to be undertaken. As Wollman has stated, knowledge must be obtained as to "what relationship,if any, existsbetween environmental quality and productivity."[22]. In the oceans the opportunity exists to determine the proper balance between quality and quantity before extensive exploitation of many of its resources takes place. Activity within the ocean should be oriented to improving the quality of real choices open to man over time.[23]. In the use of the ocean, improving the choices over time implies the imposition of

21. Ayers Brinser, "Standards and Techniques of Evaluating Economic Choices in Environmental Resource Development"; Future Environments of North America, American Natural History Press, New York, 1966, p. 236.
22. Nathaniel Wollman, "The New Economics of Resources", Daedalus-America's Changing Environment, Fall 1967, p. 1099.
23. Brinser, Ibid., p. 235.

certain controls over private resource users so as to be able to attain and maximize as many social or collective benefits as is possible. Any scheme for control of the oceans must first of all attempt to outline what its goals should be. Goals are, in essense, attempts at synthesizing a people's attitudes and beliefs and therefore involve determining their normative value scheme. The conception and acceptance of goals for the ocean must transcend a staggering number of cultural differences which exist in the world today. The role of culture has a pervasive influence in fixing people's perception and manipulation of natural phenomena. Yet, according to Hall, "the hidden structure of culture is one of the most consistently ignored features of our 20th century life."[24] "Where a resource use involves beliefs and techniques that are incongruous with a people's, it will not be adopted by that people, however superior it may be by other criteria."[25] For example, in countries close to the subsistence level, full exploitation of the ocean resources will be of predominant value. In industrialized countries the conservation of the ocean resources for quality preservation or some other criteria is liable to be a much more readily accepted value. The possible conflict over setting acceptable goals in the oceans can be clearly perceived. Furthermore, it is difficult to divorce the setting of goals in the oceans from the setting of goals for mankind in general. An attempt to begin to set such general goals has been proposed in the Prometheus Project.[26] Through the

24. Edward Hall, "Human Needs and Inhuman Cities", Fitness of Man's Environment, The Smithsonian Institute, Washington, D.C., 1968.
25. Walter Firey, Ibid, p. 29.
26. Gerald Feinberg, The Prometheus Project, Doubleday & Co, Inc., Garden City, New York, 1968.

project it is hoped the common goals of mankind will be identified and adopted.

A discussion of the long range goals for man in the ocean, in spite of the difficulties involved, is of crucial importance for dealing with the problems arising from expanding technological capability in the oceans. An acceptable goal for the ocean at this point is one which is liable to be extremely general. such a goal might be: to insure the full and wise use of the marine environment in the best interests of the world. To have meaning this goal must be translated into its specifics which might be:

1. Most modern ecological research in the oceans, as indicated in previous sections, has agreed and stressed the importance of the essential unity of the ocean's environmental elements. On this basis, all uses of the ocean and exploitation of its resources must be undertaken with full knowledge of its total effects in order to assure the fitness and health of the marine environment.[27]
2. The view of the ocean as a commodity fails to evaluate its physical and biological processes as well as its all-important quality. On this

27. Dansereau has called for a complete analysis of "all of the processes involved in the laws of ecology and to classify the emerging variety of patterns that specifically result from man's presence and action in this universe." See Pierre Dansereau, "Ecological Impact and Human Ecology", Future Environments of North America, F. Fraser Darling, and John Milton, Natural History Press, New York, 1966, p. 449.

DISCIPLINARY MATRIX

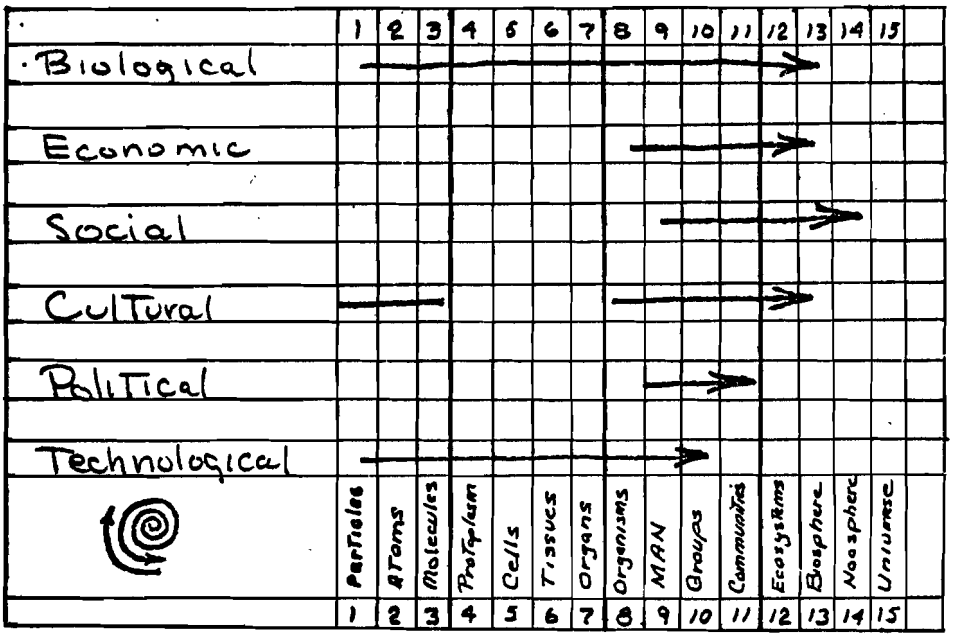

Figure V

basis an evaluation of the marine environment must be undertaken to rank and evaluate its esthetic natural resources in terms of social and cultural values, and then to compare and balance these with the traditional economic values of worth. "The essence of human welfare is to aim for improving the quality of choices that will come in the future."[28.]

3. Although the facts of economics and ecology provide the proper reference points and place restrictions on what values are relevant in the world, the effectiveness of any measure to implement workable solutions in the oceans depends upon the ability to achieve consent among those with vested interests. Since men share a common biology as well as some elements of common upbringing, measures should be taken to identify those elements of interest which all of

28. Joseph Fisher, "Economic Patterns and Processes", Future Environments of North America, Darling and Milton, Natural History Press, New York, 1966, p. 219.

> mankind has in common in the use of the ocean. Montagu suggests that man's principle means of adapting himself to the physical environment is culture.[29] Therefore, with the pervasive influence of the oceans, there is good reason to believe that a cultural basis may exist for identifying common elements of interest in the oceans.

Within the framework of the above goals a compromise for management of the oceans based on common interests should be created and implemented. An attempt at devising such a compromise is undertaken in the next section and means for bringing it about are also suggested.

29. E. Montagu, Culture and the Evolution of Man, p. IX.

III. OCEAN RESOURCE CONTROL

A. The Alternatives Available for Control of the Ocean's Resources

> The characteristics of individual persons, and of societies, are largely determined by feedback reactions between man's nature and environmental forces. Since man has much freedom in selecting and creating his environment, as well as his ways of life, he can determine by such decisions what he and his decendants will become. In this light he can truly "make himself" consciously and willfully.[30]

As recorded in previous sections, the development of the ocean resources must be preceeded by a thorough attempt to analyze its consequences. In addition, the ultimate human goals need to be explicitly considered before the choice is made to use marine resources. Ecological interdependencies stressed in previous sections necessitate consideration of all resources of the ocean - living and non-living together. It is inconceivable that living and mineral resources, or any other resource, should for political or legal reasons be separated. They are in reality part of the total biosphere. Consideration of the deep sea bed resources without taking into account the dependent fishery resources can only result in a piece-meal, stop-gap solution. Nations must begin to identify with natural regions, instead of political ones. Exploitation of the fishery resources has, in many cases, already proceeded towards depletion of the resource.

30. Rene Jules Dubos, "Man Adapting: His Limitations and Potentialities", Environment for Man, William R. Ewald (ed.), Indiana University Press, Bloomington, Indiana, 1967, p. 25.

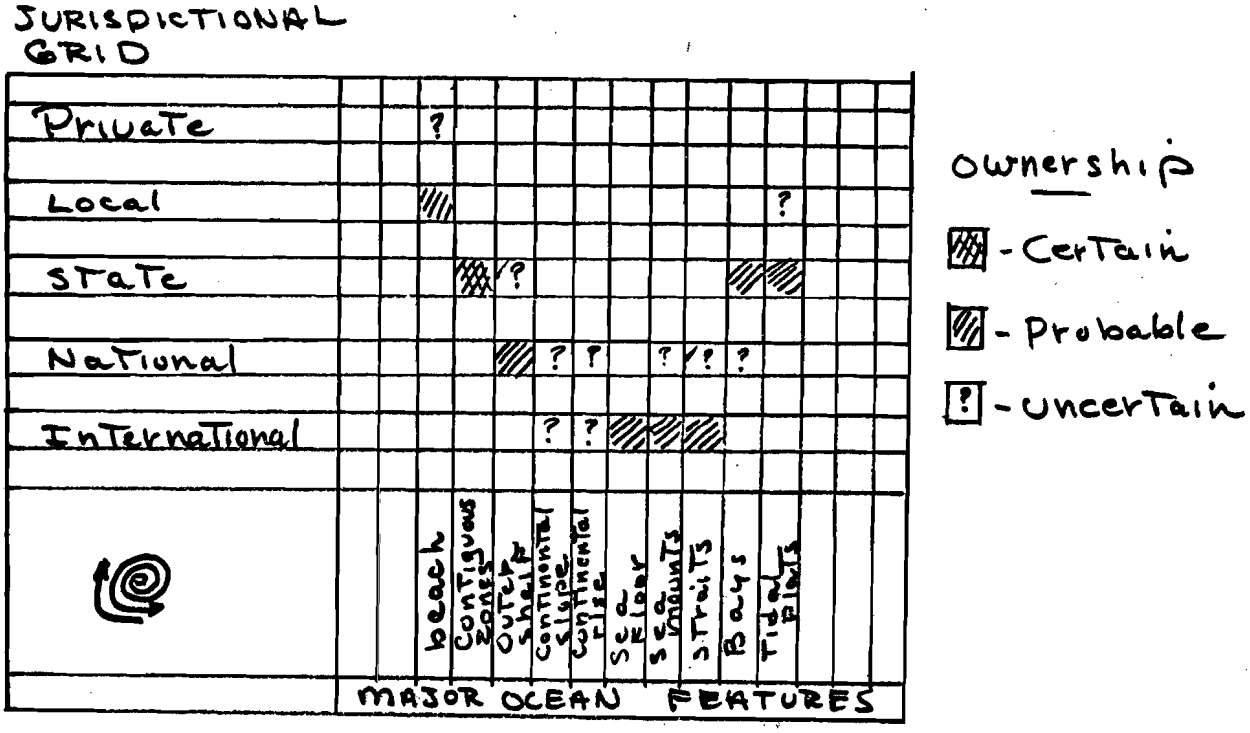

Figure VI

For instance, "at the present rate of development few substantial unexploited stocks of fish accessible to today's type of gear will remain in another twenty years."[31] The need for proper control and management of this resource is urgent. Some fragmented attempts at mangement of fishery resources do exist and these are summarized in Appendix II. These fishery arrangements are for the most part hampered by: 1.) their voluntary nature, 2.) short-term nature, and 3.) applicability only to signatory states.[32] An international and comprehensive solution needs to be implemented to prevent the rapid depletion of this resource.

The current extent of political jurisdiction excercised in the marine environment is depicted in Figure VI. The jurisdictional

31. Food and Agriculture Organization of the U.N., The Management of Fishery Resources, Rome, Italy, 1967, p. 2.
32. Dr. Lewis Alexander, "National Jurisdiction and the Use of the Sea", National Resources Journal, Vol. 8, No. 3, July 1968, p. 386.

status of major ocean features is rated as being either certain, probable or uncertain.

Increasing activity in the world ocean is providing a meeting ground between otherwise opposing groups. These groups have advocated many different approaches for control of the ocean's resources. These proposals can be grouped into three major types of approaches, and these are:

1. The "do-nothing" type approaches. In the first set of alternatives, nations can choose to do nothing in deciding what to do with the sea's resources, and thereby continue to maintain the status quo.
2. The "do-little" type approaches. The nations of the world can choose to do little, which would most likely entail a weak organization and control over the ocean's resources and their allocation.
3. The "do-something" type approaches. This third set of alternatives would be to take decisive action and would probably entail definate controls over the exploitation and use of the ocean's resources.

The types of approaches advocated by various individuals and organizations are summarized in the following table according to the above three basic kinds of available alternatives. The essential features and proponents of each proposal are given, as well as each approach being ranked according to the degree of change each proposal advocated.

A TABULATION OF OCEAN RESOURCE CONTROL PROPOSALS

approach	features	proponents
"do-nothing" types		
1. Dead-bed	moratorium on seabed exploration until matter is settled.	Scandanavian countries, Uruguay.
2. Wait and See	wait and see what's in the ocean before conferring title to it and deciding what to do with the resources.	Congressmen Pelly, Hanna, Lennen; National Oceanographic Association.
3. Finder's-Keepers	res nullius - ocean belongs to nobody; resources allocated on a first come first serve basis.	official U.S.S.R. position; National petroleum Council.
4. Strong-Arm	limit to national exploitation only on the basis of a country's technological ability to operate in the ocean environment.	Congressman Rogers; Northcut Ely.
"do-little" types		
5. General Purpose Zone	nations claim and occupy oceans near them which seem to fit under some definition of adjacency or contiguity.	some Latin and South American countries.
6. Special Purpose Zone	claims are made for special jurisdiction control or competence in an area of the sea.	David Mitrany; Douglas M. Johnson.
7. Revenue Lines	lines are drawn parellel to national boundries which denote decreasing revenues to coastal nations and increasing revenues to an international body as lines move out into the ocean.	Louis Henkin; President's Commission on Marine Science, Engineering and Resources.

Tabulation--continued

approach	features	proponents
"do-something" types		
8. National Lakes	ocean's floor is devided up and parcelled out among shore states of the world.	Congressman Rogers; Bernfield.
9. Pell's Mell	administrative solution which would set up an office (registry), rules and regulations and a bureaucracy to handle the allocation problem--some versions advocate a policing function also.	Senator Clairborne Pell; L.F.E. Goldie.
10. Pardo's Scheme	U.N. control with financial gains received from the sea floor's resources used for development of poor countries.	Arvid Pardo--Malta ambassador.
11. U.N. Independence	U.N. control with financial gains used to provide U.N. with independent income.	Organization of Peace--research affiliate of U.N. association.
12. Philosopher King	international control through a maritime commission chosen on the basis of competence in the field--the commission would be responsible to the Maritime Assembly, a body of representative nations.	Center for the Study of Democratic Institutions.
13. Super Agency Proposal	ocean resources would be turned over to an international agency to be administered as a monopoly.	Francis T. Cristy; The American Assembly.
14. United Republics of the Ocean	independent country formed, consisting of an association of the various ocean regions federally organized.	Author--R. A. Poitras.

B. A Probable Projection for Control of the Ocean Resources

As fast as the technological developments are moving, the political and legal machinery to excercise control in the marine medium appear to be moving in the opposite direction by slowing down. The oceans, because of their immense size and coverage over the earth's surface, demand world-wide arrangements for initiating controls and regulations over the increasing multiplicity of users in the marine environment.

In terms of determining what will be a viable regime for control of the sea floor's resources, the history of international agreements must be looked at. For the purpose of this analysis, this will entail a brief review and a qualitative evaluation of the accomplishments of the United Nations. The record of the U.N. achievements is to be analyzed in the context of the previously derived evaluative scheme for considering the alternatives proposed for the control of the sea floor.

It must be remembered however, that the state of man's predictive ability in any realm is still a matter of the utmost difficulty.[33.] The assumption is that the best predictions can be obtained by extending past trends into the future. The question then is "What has the U. N. achieved, and what can be reasonably expected of it in the future?"

The general trend of U. N. achievements in international relations is not very encouraging in terms of the "do-something" types of approaches for controlling the ocean resource.

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33. Gerald Feinberg, The Prometheus Project, Doubleday & Co., Inc., Garden City, New York, 1968, p. 23.

Fehrenbach in This Kind of Peace says that "the U. N. is at best a hopeful ideal, at worst a total irrelevancy".[34] Alf Ross puts it this way, "Prospects for political initiative and leadership on the part of the U. N. are not very bright."[35] John G. Stoessinger says "It has been often said that between the two great chess players - Russia and the U. S. - the U. N. is a pawn.[36] If past performance is a guide, therefore, it appears that international agreements will most likely waiver between the "do-nothing" and "do-little" type approaches in regard to control of the sea bed. The most viable regime for control of the sea floor will be a result of compromise between the "do-nothing" and the "do-little" forces. International compromise and consensus on the sea floor will most likely be reached on the"finder"s keepers" type of approach with allowances being made for nations to claim more ocean areas near their boundries.

The factors which could change such a prediction are obviously many. The purpose here is only to indicate the potential direction international agreements will take concerning the sea's resources if past and present trends prevail. The projection presented here is by no means definite, but only suggestive of the possibilities. It is unfortunate that the dull thud of pessimism must be sounded, but it is clear that with the U. N.'s past reluctance to take meaningful steps, the probability is high for a weak solution to the problem of control of the sea's

34. T. R. Fehrenbach, This Kind of Peace, McGraw-Hill, New York, 1966, p. 396.
35. Alf Ross, The United Nations, Peace and Progress, Doubleday & Co., Garden City, N.Y., 1966, p. 408.
36. John G. Stoessinger, The United Nations and the Superpowers, McGraw-Hill, New York, 1965, p. 188.

PLANNING PROCESSES GRID

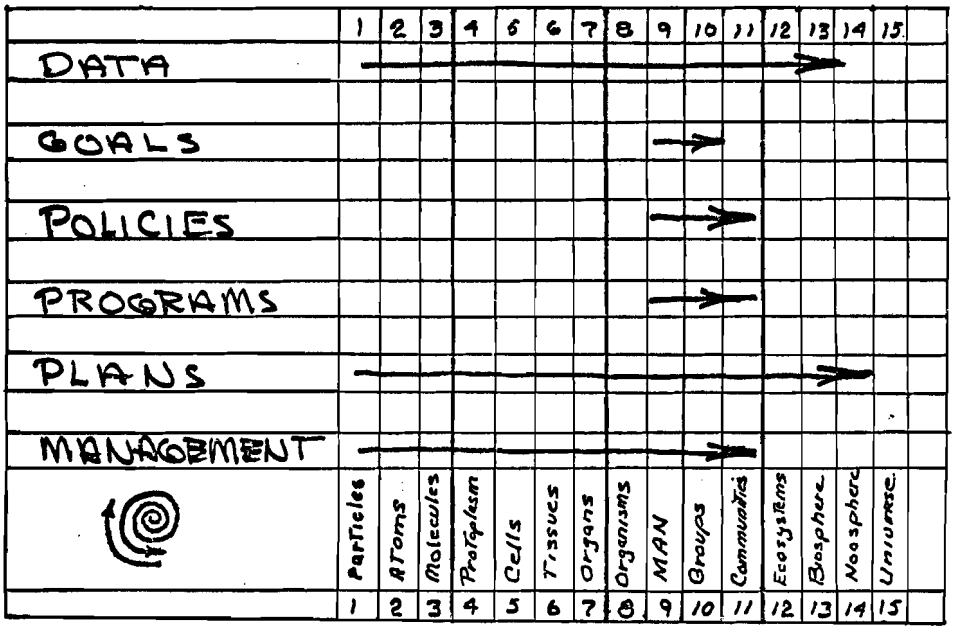

Figure VII

resources.

The extent of coverage of various planning processes is indicated in Figure VII, by comparing them with the typical units which are generally included in these processes.

C. A Scenario for Control of the Ocean's Resources

> All revolutionary ideas have to pass through three stages which Arthur C. Clarke has summarized as "(1) its crazy — don't waste my time; (2) its possible, but not worth doing; (3) I always said it was a good idea." Rate of advancement from one stage to the next depends on the degree of need and urgency of the matter at hand.[37]

With past and present trends for agreement prevailing, the picture for progress is dim indeed. Steps must be taken to prevent the certain clash over control and ownership of the sea's resources. Such action will demand strong, forceful leadership

37. Arthur C. Clark, "Next the Planets", Playboy, March 1969, p. 95.

capable of achieving meaningful compromise by transcending strictly national interests.

The scenario for effectuating control of the ocean's resources presented in the following pages offers such a possibility by proposing a new alternative for exercising control and achieving compromise. The proposal advocated is a logical extension of all the schemes proposed for the control of the sea's resources so far as shown in the previous table. The essential features outlining the regime are:

1. The initiation of a new country, organized on a functional as well as geographic basis, to govern the ocean from 2500 meters or 100 miles off each coastal nation. The zone between 200 meters and 2500 meters depth and 50 and 100 miles is to be a zone of transition with revenue sharing and major control being excercised by the coastal nation.
2. The structure of the country is to consist of federal organization of the major ocean regions of the world, and to be called the United Republics of the Oceans.
3. The governing body of each ocean region is to consist of a tricameral governing authority composed of the coastal national interests, ocean resource exploiters organized on a functional basis and the regional underdeveloped nations.
4. A formal governing authority for each major ocean region to be set up only when the level

of resource exploitation has reached a point where conflicts have begun to develop. Then the region would be organized as an ocean region member of the United Republic of the Oceans. Until then the regions would be open to anyone with initial "territorial" status.

5. Resource concerns of a regional nature are to be handled by ocean region governments while major international ocean resource problems are to be settled by the United Republic of the Oceans government.
6. "X" percent of the profits from removal of the resources of the oceans are to be turned over to the United Republic of the Oceans to accomplish its general goals for ocean resource utilization.

The above regime for control of the sea floor may appear at first glance to be somewhat unrealistic, yet it becomes more feasible when examined in terms of the total range of alternatives that have been advocated. The proposal is in many respects a conglomerate of many of the previous alternatives that were tabulated and in this respect becomes highly desirable. Some of the advantages of the proposal are:

1. It follows traditional patterns of development of new areas in its "homesteading" provision.
2. Restrictions on exploitation of the sea's resources are not placed before the need for them.
3. The revenue sharing characteristics appease both

developed and underdeveloped countries, as well as the wide shelf proponents through its transition zone provision.

4. The humanitarian concerns are satisfied by large profit allocations to underdeveloped countries, yet a certain degree of control is maintained by coastal states and the major exploiters of the sea floor's resources.
5. The separate country aspect of the proposal divorces the ocean resource issue from the political power plays of the U. N. and enables it to act on its own.

The major problem with the proceeding proposal, aside from some of the technical details of working out the regional arrangements, would be to gain initial acceptance for such a scheme. Certainly the slow moving decision making capabilities of the U. N. would make adoption of the scheme or a viable variation of it very difficult. The extremely large number of participants on a world scale, all with varying kinds of interests, attitudes and approaches which would need to reach a concensus, is staggering. It is a basic truism that the larger the number of persons making decisions, the less decision making takes place. The conventional manner for reaching a consensus over any international issue is for over eighty different countries to come to an agreement. Any workable solution to a problem under such conditions requires a phenomenal degree of acceptance of the general goal and a willingness to compromise. Often times the result of such extensive compromising is a watered-down solution

that lacks effectiveness. History indicates that accord among nations is best attained during a crisis situation, when action is demanded. At the original conception of the U. N., the security council was formed essentially to be able to act immediately in matters which clearly threatened world security or peace. The council's performance has been far from effective in such matters, however, primarily because of its inability to obtain sufficient force to make its policies credible.[38] An event which could clearly precipitate an international crisis of sorts, and conceivably prompt the Security Council to act, has been hinted at by Hull..."..the technology exists for anyone who cares to occupy one or more of these seamounts (70 within 600 feet of the ocean surface) for purposes of extending sovereignty or establishing new sovereignty. ..there is nothing short of the use of force that can prevent anyone who wishes and has the wherewithall from setting up one ~~or~~ more entirely new nations."[39]

Such action taken concerning the ocean seamounts might precipitate the needed incentives to set up proper legal controls in the use of the ocean resource. International agreement can only be reached through elaborate schemes for compromise over the various alternatives advanced. It is important however that the compromise acheive significant change. As Lindblom has said, "What every modern political system requires is moving compromise - specifically a never ending sequence of compromises, each successive one respondong to a new alignment of preferences or interests."[40]

38. Alf Ross, Ibid, p. 291.
39. E. W. Seabrook Hull, unpublished paper for Geography 271 at the University of Rhode Island, entitled "Legal Regime of the Non-Sovereign Ocean", Oct. 1, 1969, p. 7.
40. Charles E. Lindblom, The Policy-Making Process, Prentice-Hall, Inc., Englewood Cliffs, N. J., 1968, p. 106.

Therefore the objective should be to aim for independence of the ocean as an intregal functioning political unit, as well as comprehensive concern for the interdependencies of the ocean resource, and not immediate adoption of the proposed scheme. The moves to achieve comprehensive designs "should be incremental rather than comprehensive," as Brisner puts it, "in order to avoid limiting ourselves, in part because of the inadequacy of out data, and in part because of the changing situation in which we find ourselves."[41].

41. Brisner, Ibid, p. 219.

APPENDIX I

GLOSSARY

1. Particles - elementary sub-atomic particles that do not appear to be composed of still smaller particles.

2. Atoms - smallest unit of matter that retains characteristics of the 103 known elements.

3. Molecules - combinations of atoms forming chemical compounds of elements or combinations of elements capable of retaining a chemical identity.

4. Protoplasm - highly organized combinations of organic and inorganic elements or compounds endowed with certain characteristcs the summ of which is life.

5. Cells - smallest structural unit of protoplasm that has all the properties essential for its maintainence and propagation.

6. Tissues - groups of cells of similar appearance performing a specialized function.

7. Organs - differentiated structure made up of various tissues performing a specialized function, grouped with others performing a specialized function.

8. Organisms - an entity having an existance independent of or more fundamental than its organs and having distinct functions of ots own.

9. Man - an entity having an existance distinguished by notable development of the brain with a resultant capacity for articulate speech and abstract reasoning.

10. Populations - groups or body of organism or persons organized according to or manifesting some unifying trait.

11. Communities - populations occupying a given area.

12. Ecosystems - Communities of organisms or persons and their immediate environment.

13. Biospheres - ecosystems of a given area and the portions of the earth where they operate.

14. Noosphere - characterizes the realm of man's deployment of energy, and represents the reconciliation of spirit and matter in the conscious environment of man.

15. Universe - the totality of the observed or postulated phenomena and physical whole of the entire celestial cosmos.

APPENDIX II

INTERGOVERNMENTAL FISHERY BODIES

Source: Food and Agriculture Organization of the U. N.

"The Management of Fishery Resources"

ANNEX TABLE 16. – INTERGOVERNMENTAL FISHERY BODIES

	Headquarters	Date established and auspices	Area of competence	Resources covered	Functions	Membership	
						Eligible	Actual
International Council for the Exploration of the Sea **ICES**	Copenhagen, Denmark	1902 Conference (now 1964 Convention)	Atlantic Ocean and adjacent seas (but with particular reference to the north Atlantic).	All	Promotion and publication of research.	Any state signing Convention for ICES 1964.	Belgium, Denmark, Finland, France, Fed. Rep. of Germany, Iceland, Ireland, Italy, Netherlands, Norway, Poland, Portugal, Spain, Sweden, U.S.S.R., United Kingdom. Canada and United States also participate.
International Commission for the Northwest Atlantic Fisheries **ICNAF**	Dartmouth, Nova Scotia, Canada	1949 International Convention	Northwest Atlantic, as defined (eastern limit approximately 42° W. Long., Southern limit approximately 39° N. Lat.). Excluding territorial seas.	All, but with particular reference to cod group, flatfish and rosefish	To carry out studies and research; propose government action for stock conservation through closed areas and seasons, size limitation, gear control, catch limits.	Any state signing 1949 Convention and others by giving notice of adherence.	Canada, Denmark, France, Fed. Rep. of Germany, Iceland, Italy, Norway, Poland, Portugal, Romania, Spain, U.S.S.R., United Kingdom and United States.
North-East Atlantic Fisheries Commission **NEAFC**	London, United Kingdom	1959 International Convention	All waters of northeast Atlantic and Arctic oceans and their dependent seas, as defined (western limit approximately 42° W. Long., southern limit 36° N. Lat., eastern limit 51° E. Long.). Excluding Baltic and Mediterranean.	All	To keep all fisheries under review; consider conservation action; recommend to governments control measures in respect of mesh sizes, size limitation, gear control, closed seasons and areas and improvement of resources generally.	Any state signing Convention and others adhering thereto.	Belgium, Denmark, France, Fed. Rep. of Germany, Iceland, Ireland, Netherlands, Norway, Poland, Portugal, Spain, Sweden, U.S.S.R. and United Kingdom.
International Whaling Commission **IWC**	London, United Kingdom	1946 International Convention (amended by 1956 Protocol)	All waters in which whaling is prosecuted by factory ships, land stations and whale catchers under jurisdiction of contracting governments.	Whale stocks	To carry out studies and research on whales; adopt regulations protecting stocks, by close seasons and areas, size limitation, gear control, species protection; time, method and intensity of whaling.	Any state signing 1946 Convention and others giving notice of adherence.	Argentina, Australia, Canada, Denmark, France, Iceland, Japan, Mexico, Netherlands, New Zealand, Norway, Panama, South Africa, U.S.S.R., United Kingdom United States
International North Pacific Fisheries Commission	Vancouver, B.C., Canada	1952 Convention	All waters of north Pacific and adjacent seas. Excluding territorial waters.	All, with particular reference to halibut, herring and salmon	To study fish stocks; determine stocks requiring conservation; administer abstention system; enforce conservation measures by international control on high seas, as among member countries.	Signatory states.	Canada, Japan, United States.
International Pacific Halibut Commission	Seattle, Washington, United States.	1953 Convention	Territorial seas of members, and high seas off western coast of Canada and United States, including southern and western coasts of Alaska.	Halibut	To study halibut stocks; establish conservation measures in area by catch regulation, size control, open and close season, vessel and gear control, licensing; organize international enforcement on high seas.	Signatory states.	Canada, United States.

ANNEX TABLE 16. — INTERGOVERNMENTAL FISHERY BODIES (*continued*)

	Headquarters	Date established and auspices	Area of competence	Resources covered	Functions	Membership	
						Eligible	Actual
International Pacific Salmon Fisheries Commission	New Westminster, B.C., Canada	1930 Convention and Protocols of 1937 and 1956	Fraser river and its tributaries; territorial and high seas off the estuary.	Sockeye and pink salmon	To study stocks; control fishing and gear used; equalize catch between signatories; organize international enforcement on high seas as between members.	Signatory states.	Canada, United States.
Japanese-Soviet Fisheries Commission for the Northwest Pacific	None (two national committees)	1956 Fisheries Treaty	All waters of northwest Pacific (excluding territorial waters), including Sea of Japan, Sea of Okhotsk and the Bering Sea.	All, with particular reference to salmon, trout, herring and crab	To prescribe fishing methods and regulate catch; to organize international enforcement on high seas as between members.	Signatory states.	Japan, U.S.S.R.
North Pacific Fur Seal Commission	Washington D.C., United States	1957 Convention and Protocol 1963	North Pacific Ocean.	Fur seals	To formulate and co-ordinate research programs; to determine number of seals to be marked, consider possibility of pelagic sealing; organize international control on the high seas as between members.	Signatory states.	Canada, Japan, U.S.S.R., United States
Standing Committee of the Conference on the Use and Conservation of the Marine Resources of the South Pacific	Lima, Peru	1952 International Agreement At present inactive.	South Pacific (not defined)	All	To determine measures for fishery regulation and conservation; exchange information; encourage research.	Signatories of the Agreement.	Chile, Ecuador, Peru.
Commission for Fisheries Research in the Western Pacific	Peking, China (Mainland)	1956 Convention	Western Pacific Ocean, including Sea of Japan, Yellow Sea and east and south China seas. Including territorial seas of members.	All	To plan joint research and exploration; exchange information; elaborate measures necessary for conservation.	Any states in western Pacific basin.	China (Mainland), Mongolia, North Korea, North Viet-Nam, U.S.S.R.
Inter-American Tropical Tuna Commission **IATTC**	La Jolla, California, United States.	1949 Convention	Eastern Pacific Ocean (not defined)	Yellowfin and skipjack tuna, fish used as bait for tuna and other fish taken by tuna vessels	To carry out research on tuna by own research staff, including exploratory fishing. Recommend joint action for resource conservation; publish reports and statistics.	Signatory states, and others by unanimous agreement of contracting parties.	Costa Rica, Ecuador, Mexico, Panama, United States.
International Commission for the Conservation of Atlantic Tunas **ICCAT**	To be determined	1966 Convention	All waters of the Atlantic Ocean, including the adjacent seas.	Tuna and tuna-like fishes, and other species exploited in tuna fishing	To organize and promote research on the stocks; collect and disseminate information; recommend studies; recommend conservation actions.	All members of United Nations or any United Nations specialized agency.	Signatories of Convention as at 1 March 1967: Brazil, Japan, Rep. of Korea, Spain, United States.

ANNEX TABLE 16. - INTERGOVERNMENTAL FISHERY BODIES (*concluded*)

	Headquarters	Date established and auspices	Area of competence	Resources covered	Functions	Membership	
						Eligible	Actual
Great Lakes Fishery Commission	Ann Arbor, Michigan, United States	1954 Convention	Great Lakes and connecting waters.	All	To co-ordinate research; recommend conservation measures; control predators.	Signatory states.	Canada, United States.
Joint Commission for Black Sea Fisheries	Meets in member countries in rotation	1959 Convention	Black Sea.	All	To develop co-ordinated measures for fishery regulation and develop commercial fishing techniques; regulate sizes, co-ordinate research.	Black Sea states.	Bulgaria, Romania, U.S.S.R.
International Commission for the Scientific Exploration of the Mediterranean Sea CIESMM	Monaco	1919 Conference	Mediterranean Sea and adjacent waters.	Not specified	To promote oceanographic and biological studies.	All coastal states in area.	Algeria, France, Greece, Israel, Italy, Monaco, Morocco, Romania, Spain, Tunisia, Turkey, United Arab Republic, Yugoslavia.
General Fisheries Council for the Mediterranean GFCM	FAO, Rome, Italy	1949 International Agreement under aegis of FAO (Article XIV of FAO Constitution)	Inland waters of member countries and the Mediterranean Sea and contiguous waters.	All	Mainly advisory. To encourage and co-ordinate research and improvement in fishing methods; assist governments in development planning dissemination of information.	All FAO members and other members of United Nations (if approved by two-thirds majority of the Council).	Cyprus, France, Greece, Israel, Italy, Lebanon, Libya, Malta Monaco, Morocco, Spain, Tunisia, Turkey, United Arab Republic, United Kingdom, Yugoslavia.
European Inland Fisheries Advisory Commission EIFAC	FAO, Rome, Italy	1957 FAO regional body (Article VI)	Inland waters of member countries.	All	To promote improvement in inland fisheries, through information, meetings; co-ordination of development.	All European nations of FAO.	Austria, Belgium, Denmark, Finland, France, Fed. Rep. of Germany, Greece, Ireland, Israel, Italy, Netherlands, Norway, Poland, Portugal, Spain, Sweden, Turkey, the United Kingdom, Yugoslavia.
Indo-Pacific Fisheries Council IPFC	FAO, Regional Office, Bangkok, Thailand	1948 International Agreement under aegis of FAO (Article XIV)	Inland waters of member countries and the Indo-Pacific area (undefined)	All living aquatic	Mainly advisory. To encourage and co-ordinate research and improvement in fishing methods; assist governments in development planning; dissemination of information.	All FAO members and other members of United Nations (if approved by two-thirds majority of the Council).	Australia, Burma, Cambodia, Ceylon, France, India, Indonesia, Japan, Rep. of Korea, Malaysia, Netherlands, New Zealand, Pakistan, Philippines, Thailand, United Kingdom, Rep. of Viet-Nam, United States.
Regional Fisheries Advisory Commission for the Southwest Atlantic CARPAS	FAO, Regional Office, Rio de Janeiro, Brazil	1961 FAO regional body (Article VI)	Southwest Atlantic and inland waters of its members (including territorial sea).	All	Mainly advisory. To encourage co-operation, promote liaison and discussion.	All FAO members bordering on west Atlantic south of Equator.	Argentina, Brazil, Uruguay.
Regional Fisheries Commission for Western Africa WAF	Not yet fixed	1961 FAO regional body (Article VI)	Inland waters and territorial sea of member countries and waters of southeast Atlantic (not defined).	All (marine and inland)	Mainly advisory. To encourage co-operation in fishery exploitation, promote research liaison and discussion.	All FAO members with territories in the region or responsible for international relations of non self-governing territories in the region	Cameroon, Congo (Brazzaville), Dem. Rep. of the Congo, Gabon, Guinea, Ivory Coast, Liberia, Mauritania, Morocco, Nigeria, Portugal, Senegal, Spain United Kingdom.