International responses to technology: Concepts and trends

John Gerard Ruggie

With increasing frequency and growing vehemence, we are being told that on our "only one earth" we are, for the first time, living a single history. By this is meant that technological, ecological, political, economic, and social environments are becoming so globally enmeshed that changes taking place in one segment of international society will have consequential repercussions in all others. An equally frequent and no less vehement remonstration attending this observation is that the scope and complexity of new scientific and technological developments are outpacing the capacities of our systems of international organization to manage them. The necessity has emerged, this line of reasoning continues, to restructure our international institutional frameworks in keeping with the unhitching of nature's constants which science and technology have effected.[1] But on what basis? According to what principles? Toward what ends?

It would indeed be surprising if the technological changes we have witnessed in this century, particularly since World War II, were to have no impact on international organization. It would be equally surprising if the recent flurry of international meetings, conferences and institutionalized arrangements, in the fields

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As I always do, in preparing this essay I have benefitted from the critical counsel of Ernst Haas. I am much indebted to him.

[1] Note, in this connection, the preparations for a proposed UN Conference on Science and Technology; the UNA Report, *Science and Technology in an Era of Interdependence* (1975); the report commissioned by the Secretary General of the United Nations Environment Conference, edited by Barbara Ward and Rene Dubos, and entitled *Only One Earth* (New York: W. W. Norton, 1972); and Richard A. Falk, *This Endangered Planet* (New York: Random House, 1971); among many similar sources.

of the environment, population, food, the oceans, energy, trade and money, were not indicative of international organizational change of *some* sort. It would be nothing short of astonishing, however, if there existed a simple one-to-one correspondence between the two—if by unfolding technology we were able to divine and prescribe political futures. For, to adapt Ernst Haas' inimitable characterization,[2] when it comes to the international management of technology there is a hole in the technological whole, one which can be filled only by introducing political purposes.

Physical and technological parameters are important determinants of international responses to technology when those responses concern research, scanning and monitoring, and problem recognition in general—when, in a word, the issue is to *discover* or *understand* some process or situation. When, however, the issue is to *manage* some process or situation, the weight of political purposes becomes preponderant. For, the same response that maximizes fisheries catch, to cite an example, may reduce employment, or the same response that sets higher standards of environmental quality may reduce trade potential, or the same response that increases technological efficiency may lower foreign exchange earnings. In fact, the same response may well do all simultaneously. Deciding among them is not a question of physical and technological determinants; it is a question of social choice.

By introducing political purposes into the equation linking technological change to international organization we considerably complicate our descriptive and prescriptive tasks. International organization is itself then no longer a simple *response* to technology, but, rather, a more complex *product* of the intersection of two axes. Along the first is plotted the tension between science, heavily informed by consensual knowledge of cause/effect relations, and politics, heavily informed by normative purposes, negotiated priorities and available capabilities. The outcome of this tension may be said to define the *situation* which science and its products will have occasioned. Along the second axis is plotted the tension between the need of states to respond collectively to problems and opportunities such situations contain, and their desire to maintain national autonomy and flexibility in so doing. The outcome of this tension may be said to define the *response* which a new situation will have occasioned. These two axes, together with the concepts of situation and response taken over a group or collectivity of nations—that is, *collective* situation and *collective* response—define the analytical boundaries of the studies that follow.

The empirical studies in Part I are designed to demonstrate just how these two sets of tension, knowledge vs. politics, and internationalization vs. national control, are resolved, for however brief a period, in different non-military technological domains and under different policy configurations. Some of these studies deal with cases having an extensive history while others focus on relationships which are only beginning to emerge. Each offers generalizations supported by the

[2] In his essay, below.

evidence at hand. The theoretical chapters of Part II are designed to reflect on the broader issues of technology and international organization, analytical as well as normative. It is their purpose to evaluate what appear to be the dominant trajectories, and to draw inferences about how we should *study* the relationships between technology and international organization as well as how we should *organize* the international system in response to the new situations which technological developments have occasioned.

As for the purpose of the present essay, it is my task to explicate and illustrate the basic concepts used and the relationships examined in this volume. I begin by sketching out in greater detail the concepts of collective situation and collective response. I then suggest some patterns of association between the two which seem to hold in the context of the substantive materials presented below. I conclude with a discussion of the implications, for the design of future international organization, of the relationships we have discovered.

I The framework of analysis

It is generally agreed that in the international arena "objective rights and duties are non-existent, so that no one is entitled to anything, and nothing can be expected of anyone."[3] At the same time, however, the area of unpredictability of state behavior is limited, complex relations are pursued within sets of mutual expectations, and jurisdictional competencies are allocated to a variety of actors other than states. In other words, international behavior is institutionalized. Institutionalization, as sociologists have defined it, is said to coordinate and pattern behavior, to set boundaries which channel behavior in one direction as against all others which are theoretically and empirically possible. Which activities are seen as being likely to become institutionalized? Taking any two actors, *A* and *B*, the general answer is those activities "relevant to both *A* and *B in their common situation.*"[4]

Thus, patterns of international institutionalization are what we are attempting to account for, and the common situation of *A*'s and *B*'s, or, more specifically, the collective situation of different groups of states occasioned by developments in science and technology, serves as our point of departure.

Collective situation

If there is one fact that each of our studies affirms, it is that the milieu or situation to which polities respond, as they construct international arrangements, is

[3] Alan James, "Law and Order in International Society," in A. James (ed.), *The Bases of International Order* (New York: Oxford University Press, 1973), p. 65.

[4] Peter L. Berger and Thomas Luckman, *The Social Construction of Reality* (Garden City: Doubleday Anchor, 1967), p. 57, emphases added.

not a physical or nautral or technological but a *social* milieu. It consists of the increasing number of "natural constants" (space, time, sources of energy, climate, genetic structure) that are coming to be objects of social choice and the manner in which choices made by different societies are perceived to affect patterns of international exchange and domination. Our case studies describe these collective situations in empirical terms. Here I will depict them in more general, conceptual terms, within which the empirical materials can be ordered and their theoretical significance assessed.

Four analytical dimensions of the collective situation seem to be particularly salient: (1) an increased politicization of issues connected with science and technology; (2) the type of policy interdependence exhibited by such politicized issues; (3) the loci of policy interdependencies; and (4) the distribution of interdependencies among the national polities concerned.

Politicization

The application of science and technology to human concerns has progressively made "nature" an object of public authority and public choice; that is, "nature" has progressively become politicized.[5] The fact of this is not new. The difference over time is in scale and social organization. First, in terms of scale, the process of politicization is both more intensive and more extensive today than ever before. It is more *intensive* in that increasingly more fundamental phenomena are coming to be understood, affected and even controlled: Nuclear and other knowledge-intensive sources of energy, the physics of the atmosphere, techniques of propulsion and communication (on land, in the seas and on the seabed, in outer space), the behavior of ecosystems, the biological bases of life, and the phenomenon of innovation itself. Hence, an increasing number of "ends and means of life" are being freed for deliberate choice, manipulation and control. This process is more *extensive* today in that both the production and the application of these techniques are increasingly seen as having externalities or indivisible consequences within societies, and, to some extent, across societies as well. This has had the consequence of reenforcing a second difference between past and present, that of social organization. With the increased role and growing scope of the state in all of the advanced industrial societies, the market has ceased to be the arbiter of certain kinds of social choices, especially in areas affecting military capabilities, national economic performance, and social well-being. In the realm of science and tech-

[5] In the parlance of the day, "politicization" usually means making things more controversial in society or pushing decisions to higher levels of decision making in government. Several of our authors subscribe to this meaning. I am here using the term in its broader and more classical sense of "making things political," that is, as denoting the process whereby phenomena are brought into the public domain "and their future course shaped according to 'public' considerations" (Sheldon Wolin, *Politics and Vision* [Boston: Little, Brown, 1960], p. 7). Under this definition, the popular usage would be subsumed as referring to two instruments of a broader process.

nology this has led to an increasing concern, on the part of governments, with research and development, the assessment of technology and the regulation of externalities, and the deliberate programming of innovation and change. In other words, as "ends and means of life" are increasingly freed for choice they become subordinated to public (that is, *societal*) choice rather than remaining subject to private (that is, *individual*) choice. This is true domestically and, to some extent, internationally as well.

One dramatic illustration of this phenomenon is that of weather modification. "Meteorological conditions which were attributed to nature or to God will now be blamed on man and his institutions," is how Edith Brown Weiss begins her discussion of the politicization of the global climate.[6] More specific forms of politicization may result from several possible developments: Weather modification by one may cast adverse effects upon others; the means of exploiting the climate are asymmetrically distributed as will be the benefits, whereas the external costs will be borne by all; modification techniques may become instruments of political blackmail or of warfare; and the race may be on to appropriate for national exploitation yet another international commons. Each of these as well as other conceivable developments will thrust governments into one another's paths as procedures for advance notification of actions planned, claims for compensation for damage caused, technical assistance for equal access, and arrangements for collective management or ownership may be demanded. Although other illustrations may not be as dramatic, and although the severity of potential consequences may vary, in all of our case studies international politicization is the catalyst of subsequent developments. It is the first indication of the existence of a collective situation: It places an issue on the international agenda.

Politicization results in the recognition *that* a collective situation exists. The intensity of politicization and the sense of importance and urgency an issue is accorded, and the manner in which that issue will be dealt with, will also depend on *what sort* of collective situation exists. It is clear that a mutuality which decision makers perceive as a result of potential nuclear proliferation, for instance, differs from one resulting from a lack of adequate statistics concerning fisheries exploitation. Our case studies suggest that, over and above the obvious *substantive* differences between issues (nuclear materials vs. fish, proliferation vs. statistics gathering) there exist more fundamental *structural* factors distinguishing one issue from another. Below I depict this difference in terms of the types, loci and distributions of perceived policy interdependence in the politicized domain of behavior.

Types of policy interdependence

By type of policy interdependence is meant how policy making in one polity is perceived by participants as affecting, and as being affected by, that same process

[6] In her paper, below.

in other polities.[7] Several types of policy interdependence may be discerned:

> *Cognitive.* The recognition that a collective situation exists and that continued national isolation would be mutually inefficient, whereas collective awareness and attention may be mutually beneficial.

Several instances of policy interdependence of this particular type exist in the fields of concern to us here. They are generally to be found when the interplay between technology and policy has not gone very far. One example is the case of a recognition that technologies of fisheries exploitation have positive as well as adverse effects on catch, without being quite clear about what those effects are. The purpose of several Fisheries Commissions is to serve as instruments of collective awareness and, toward that end, they conduct studies, collect information and disseminate findings.[8] Another example is science policy in general. It would be no particular burden for most countries to "go it alone" in formulating science policies, but it would be unwise because none would be aware of what others were doing and none would be aware, until after the fact, of what impact the science policy of one might have on the rest. Thus, collective awareness of and attention to science policy is institutionalized in the European Community, the OECD and UNESCO. In each case, studies of national science policies are conducted and, in the OECD, "policy confrontation" meetings held.

> *Opportunity costs.* The recognition that autonomous action in pursuit of one national objective would require that other objectives be foregone or reduced, whereas collective action might alleviate the burden of a particular objective, allowing resources to be allocated elsewhere, or that it might facilitate national objectives in some other manner.

Most instances of international cooperation in the R&D sector have resulted from policy interdependence of this sort. The West European experience offers numerous examples.[9] It is not always easy to determine whether it would have been *absolutely* "beyond the capabilities" of every European state to pursue research and development programs, in nuclear energy and space applications for instance, but the decision to do so would have been a costly one even for the most capable. Cooperative oceanographic research through global agencies offers another case in point.[10]

There exists a second, and more subtle, aspect of policy interdependence of this sort. In the case of INTELSAT, for example, the United States possessed the overwhelming preponderance of capabilities and therefore could have constructed

[7] A more elaborate typology and its more extensive application to a single case, together with specific references to the literature on interdependence, may be found in Haas' paper, below.

[8] See the papers by Heck and Johnson in this volume.

[9] Cf. Nau's paper, below.

[10] These are explored by Brenner in his contribution to this volume.

the system unilaterally. Yet the Europeans could have foregone using the system, leaving the US in possession of a satellite telecommunications system with few if any outlets abroad. The Europeans used this advantage to increase their control over INTELSAT and to build up their regional and national capabilities in space technology. The United States had little choice but to comply.[11] Likewise, in the case of the European space applications themselves, France would have been perfectly capable of constructing a communication satellite without seriously affecting its ability to pursue other objectives. However, France realized that unless the act of producing such a satellite was performed collectively by the European states others might choose not to consume the product. In the event, France chose not to go it alone.[12]

> *Contingencies.* The recognition that autonomous action by one raises serious uncertainties for others as to their ability to continue to pursue their own affairs, whereas collective action might serve as an early warning system and perhaps even regulate such uncertainties.

The threat of nuclear proliferation attending the increased use of nuclear energy and materials for peaceful purposes is a particularly striking instance of policy interdependence of this type. The international safeguarding system has been revised several times as technological and political changes have made this contingency more plausible and more costly.[13] The issue of emplacing nuclear arms in the seabed, and environmentally destructive behavior in general, also fall into this category. In all probability, there are aspects of weather and climate modification that will trigger policy interdependence of this type as well.

> *Constraints.* The recognition that autonomous action by one makes it impossible for others to engage in that action, whereas joint action can regulate national behavior for mutual benefits.

The current negotiations on the Law of the Sea constitute a good example of policy interdependence in the form of mutual constraints. Already in the preliminary discussions in the General Assembly's Seabed Committee, it was clear how difficult it is to come to grips with this situation and how complex are the trade-offs between taking one's chances unilaterally and attempting to devise collective solutions. A sense of finality hovers above such discussions: Once national appropriation of a given zone or good is agreed to it is no longer available to others.[14] Subsequent proceedings in the LOS Conference have simply added to the

[11] Cf. Levy's paper, below.

[12] France's decision was part of a more complex package deal, under which the Germans assumed the largest share of the cost of the European-NASA Spacelab program, Great Britain of the maritime satellite, France and Germany for the 'Symphonie' program and France for launchers (ESRO/ELDO *Bulletin*, 22 [August 1973], pp. 2–4).

[13] Consult Pendley and Scheinman, below.

[14] See Løvald's demonstration in his paper, below.

complexity of calculating trade-offs without resolving the issue. More specific instances of this situation have long existed in the case of certain fisheries, where it has led to a variety of international management schemes.[15]

> *Deprivation.* The recognition that autonomous action by one deprives another of a good that is rightfully his, whereas joint action can allocate such goods for mutual benefits.

Using highly mobile, technology-intensive long-distance fleets to fish off the shores of others is one case of such deprivation. It has led to innumerable conflicts, to the creation of some international arrangements, and is also at issue at the LOS Conference.[16] To cite another illustration, although the physics of the atmosphere is insufficiently known to justify the claim today, it may be that the amount of moisture in the atmosphere is fixed, so that rain-making by one could deprive a neighbor of a resource rightfully his under present international law and practice.[17]

In sum, the type of policy interdependence exhibited by a politicized domain of behavior offers one clue as to *what sort* of collective situation exists. A second may be found in the locus of that interdependence.

Loci of policy interdependence

By the term "locus" I mean the point defined by the functional distance of a given situation of policy interdependence from the domestic policy domain of states in the particular sector concerned. Put differently, the term describes how directly the domestic policy pursuits of states are linked to the situation of interdependence. Four cases will be distinguished:

> *External.* The situation of policy interdependence exists external to the domestic policy domain and affects it indirectly only.

This situation holds in most instances in which international politicization has led to demands for the collective production of knowledge. That is, it holds in those situations in which the issue concerns the recognition, identification or definition of problems or alternative paths of action. It has occurred in each of the fields we have studied. The locus of interdependence remains external in the sense that before the domestic policy scene will be affected by the existence or by the consequences of the interdependence a domestic actor will have to make a deliberate attempt to introduce it there. Whether it concerns statistics about overfishing, studies of the comparative advantages of different science policies or innovations in reactor design, the link between the situation of interdependence and the domestic policy scene is indirect and must be deliberately established.

[15] These are discussed at some length by Heck.
[16] Ibid.
[17] Cf. Weiss, below.

External Manifestations. The situation of policy interdependence exists in the external manifestations of domestic behavior and it affects the domestic policy domain more directly.

There are numerous instances of this situation, including weather observation, environmental and oceanographic monitoring, civil aviation, shipbuilding, telecommunications and the use of the frequency spectrum. In each case, the external manifestations of what each state normally considers a national concern run into one another internationally. The problem in each case is to construct a viable international system within which each nation's behavior in these fields becomes compatible with the behavior of others. The consequences of this situation may include decisions about equipment standardization and performance harmonization, which will have domestic commercial and bureaucratic implications. Thus, while the locus of interdependence remains external, the link to the domestic policy scene is more direct and automatic.

Commons. The situation of policy interdependence exists in the attempt to define property rights in the international commons.

The major instance of this situation now on the international agenda is, of course, the negotiations over the seabed. Their purpose is to determine precisely what becomes domestic to each nation and what should and will be external to all. The immediate and potentially profound political economic and military consequences require no elaboration. As scientific and technological developments make exploitable other international commons, such as the atmosphere and deep space, the same situation will emerge there. The linkage between this situation of interdependence and domestic policy pursuits is direct and allocative.

Domestic. The situation of policy interdependence directly links domestic policy pursuits and choices in one state to those in others.

International attempts to control the use of nuclear materials, establish environmental standards, impose population control measures and even to formulate livestock feeding policies, are all indicative of situations in which domestic policies and activities in one state have recently come to be linked to those in others. Calls for the international indexing of prices of manufactured products, commodities, and raw materials illustrate the same point. The locus of interdependence in these situations is domestic. What a society can and should do internally is the issue at stake, and it is deliberated in terms of the consequences of internal activities for others. Hence, this situation establishes direct and potentially reallocative linkages among the domestic policy domains of the states concerned.

In sum, the *type* of interdependence exhibited by a newly politicized domain indicates the *character* of the issue on the international agenda; the *locus* of interdependence tells us how closely *linked* that issue is to domestic policy pursuits

and choices. Together, type and locus provide a measure of the *intensity* of the collective situation that developments in science and technology have occasioned. One further dimension of the collective situation remains to be explicated: How symmetrically or asymmetrically interdependencies are distributed among the states concerned.

Distribution of interdependencies

It is not often that situations of interdependence are distributed symmetrically among all states affected by them. In general, not every state will be equally sensitive to any given type of interdependence, nor will the cost of disentangling from a particular locus of interdependence be equally distributed. Our case studies indicate that the extent to which a situation of interdependence is more or less shared by those affected by it is a function of the capabilities states possess and the objectives they pursue *in the sector concerned.*

With respect to the distribution of capabilities, all of our case studies take note of the special role played by the United States since World War II. Particularly in the early post war years, but well into the 1950s and even 1960s, American technological hegemony defined an order of relations within which others had to find their place. The United States was the major stimulus in launching international programs, and its technological superiority set the agenda and defined the parameters of debate more often than not. International safeguarding, communications by satellite and global weather observation are but three instances of this more general fact. Even situations in which other states deliberately set out to establish an independent alternative to American superiority involved them in collaboration with the United States. The "three wise men" preparing the EEC's nuclear research program in the mid-1950s had to rely heavily on information and expertise provided by the US.[18] And the only sensible means for the Europeans to acquire a space communications capability was to first join with the Americans in INTELSAT.[19] Thus, in several of our cases the order of relations was first defined by the unique position of the United States, and the management of asymmetrical interdependence proceeded within that order.

However, the United States was not the dominant actor in every case. Shipping and fisheries were two instances in which it was not, and its hegemony is now waning in several fields of high technology. One result has been that the order of relations American superiority once automatically defined is now subject to broader political redefinition. In any case, the unique position of the United States must not obscure the more general point that even in situations in which the United States was not involved, the extent to which any given case of policy interdependence was identically experienced by those affected by it was strongly influenced by the capabilities different participants possessed. That the nuclear capabilities of

[18] The consequences for Euratom are explored by Nau.
[19] Cf. Levy, below.

France far exceeded those of her European partners in Euratom set the tone for much of that organization's plight. It meant that the situation of interdependence was not symmetrically distributed and resulted in the attempt by the other members to make it so and to limit France's opportunity to exploit her position within Euratom. The complex package deal the Europeans have managed to construct in the space applications sector was designed to avoid having single sector predominance determine the success or failure of European technological collaboration.

The objectives states pursue also affect the extent to which situations of interdependence are symmetrically or asymmetrically distributed. As the "technology gap" debates of the 1960s illustrate, the United States has been a crucial factor in others' determination of their objectives. But once again the special role of the US must be filtered out so that a more general case can be seen. That more general case is that, even where capabilities among states in a given domain are roughly identical and the same configuration of interdependence seems to hold for all, subtle differences in objectives may skew the relationship. In the case of fisheries, for instance, one state may weight employment problems associated with technological innovations over the nutritional gains. Or, in the case of scientific research or high technology, one state may emphasize the symbolic importance of achievement over its scientific virtues or commercial value. Or, in the case of nuclear safeguarding, some states may favor economic benefits over security problems in calculating the trade-off between the two. Subtle differences such as these are not always articulated by participants, making effective negotiations and management difficult. These differences stem from different domestic structures, differential access to policy making of scientific, commercial and other groups, and differences in the extent to which a national policy actually exists in a given field.

In sum, the "collective situation" of a group of states that developments in science and technology have occasioned may be conceived of as a product of these four factors: The politicization of some issue; the character of that issue, or the type of policy interdependence it poses; how closely that issue is linked to domestic policy pursuits and choices, or the locus of policy interdependence; and the distribution of this configuration of interdependence among the states affected.

Conclusion

The "collective situation," our point of departure in this study of international responses to technology, is a *social* milieu, not a physical or natural or even technological one. It does not emerge out of nature but out of patterns of international exchange and domination. It is not characterized by physical holism but by policy interdependencies of varying sorts which are rarely symmetrically distributed. Moreover, there is nothing inevitable about any particular collective situation. Each is *negotiated* by the parties concerned. Each represents an agreement that one particular configuration and not some other will constitute the collective situation. It follows that any given expression of the collective situation

will not capture the *individual* situations of participants equally well, and it will not conform to the individual situation of any single member perfectly. Thus, any given collective situation is *inherently unstable.* It may change as knowledge of cause/effect relations increases, as the knowledge content of policy formulation is altered, as configurations of interdependence come to encompass new actors, and, of course, as capabilities and objectives change. Each collective situation is, therefore, subject to continued re-negotiation, which becomes ever more likely and pressing if and as new individual situations move further away from it.

Collective response

The concept "collective situation" depicts the *problematique* to which states respond. By "collective response" we refer to the international institutionalization of certain aspects of national behavior which results from the responses of states. Our concern in this volume is to discuss the forms that institutionalized collective behavior has taken and to link them to different configurations of collective situations. My purpose in this section is to explicate and illustrate these concepts, and to differentiate them from the concepts normally used in relating technology to international organization.

In its infatuation with the "only one earth" metaphor, the literature relating technological developments to international organization has adopted a limited perspective. The standard strategy has been to focus, not on *institutionalization,* but on institutions or *organizations.* Thus: "To appreciate the nature of the future environment within which states will interact, it is necessary to examine the role of international institutions."[20] Upon this predicate projections have been developed of the number of international organizations which may be expected to exist in the future, both public and private and at both regional and global levels, together with the many tasks they may be expected to perform and the capabilities they may or may not come to possess with which to perform their tasks. The conclusion is then often reached—and it may be perfectly accurate—that "international organizations themselves are likely to become a more important element in the international system."[21] *But compared to what?*

This perspective tends to take the behavior of international organizations as being synonymous with institutionalized collective behavior. There is nothing novel about this point, yet until recently it has been virtually impossible to find conceptualizations and measuring schemes of international collectivities or of institutionalized collective behavior other than those implicitly or explicitly based upon

[20] Donald W. McNemar, "The Future Role of International Institutions," in Cyril E. Black and Richard A. Falk (eds), *The Future of the International Legal Order,* 4, *The Structure of the International Environment* (Princeton, N.J.: Princeton University Press, 1972), p. 454.

[21] Eugene B. Skolnikoff, *The International Imperatives of Technology* (Berkeley: Institute of International Studies, 1972), p. 97; I should add that Skolnikoff focuses on the functions of organizations rather than on institutions themselves.

the behavior of formal organizations.[22] This has three consequences. First, it leads to a tendency to ignore or deliberately exclude, from the study of international organization, collective behavior not performed by international organizations. Second, having no conception of the broader collectivities within which international organizations operate, it is impossible to determine precisely what role they *do* play in international relations. There exist cases in which the collectivity is coterminous with a particular organization, and there are instances of collectivities existing without formal organizations altogether. There are cases in which international organizations play a substantial operational role, in others their task is purely facilitative. But whatever their role, it cannot be determined or its international significance assessed without prior knowledge of the broader context. Third, this orientation has led to the pernicious and misleading "sovereignty at bay" syndrome:[23] the assumption that what new organizations gain old organizations must somehow lose. So that, if international organizations or multinational corporations, for example, are becoming *more* important, other actors, including states, must be becoming *less* important. The alternative, that within international collectivities, international organizations, multinational corporations, states and sub-state actors may be becoming stronger, coexisting as allies as well as competitors as the domain of public as opposed to private choice increases, is ruled out. The perspective employed in our studies is both broader and more complex.

In depicting the "collective response" of states to collective situations occasioned by science and technology, I will differentiate among three levels of institutionalization: (1) the purely cognitive, which I will call "epistemic communities;" (2) that consisting of sets of mutual expectations, generally agreed-to rules, regulations and plans, in accordance with which organizational energies and financial commitments are allocated, and which we are calling "international regimes;" and (3) international organizations. Most of our case studies focus on the second of these, the construction and transformation of international regimes. I also touch upon the other two, so as to demonstrate their interrelationships.

Epistemic communities

Institutionalization involves not only the institutional grid of the state and the international political order, through which behavior is acted out, but also the *epistemes* through which political relationships are visualized. I have borrowed this term from Michel Foucault,[24] to refer to a dominant way of looking at social

[22] Two important exceptions are, Leon N. Lindberg, "Political Integration as a Multidimensional Phenomenon Requiring Multivariate Measurement," *International Organization,* 24 (Autumn 1970), and Robert O. Keohane and Joseph S. Nye, "Transgovernmental Relations and International Organizations," *World Politics,* 27 (October 1974).

[23] In borrowing Vernon's depiction I do not mean to imply that he succumbs to the syndrome. See his *Sovereignty at Bay* (New York: Basic Books, 1971).

[24] Michel Foucault, *The Order of Things* (New York: Vintage Books, 1973).

reality, a set of shared symbols and references, mutual expectations and a mutual predictability of intention. Epistemic communities may be said to consist of interrelated roles which grow up around an *episteme;* they delimit, for their members, *the* proper construction of social reality.[25]

The epistemic community that derives from the role of representing national public authority internationally suggests behavior rules for the determination of collective responses to new situations that may be characterized roughly as follows. No state goes out of its way to construct international collective arrangements. Therefore, where possible, unilateral or bilateral arrangements are to be preferred. Collective arrangements are turned to only when objectives cannot be pursued in their absence. Collective arrangements are derivative and their purpose is to compensate for the "imperfections" of the state system. Since they are derivative and compensatory, it follows that collective arrangements must not impose a greater "cost" on states than does the situation to which they are to respond. If they do, the continuation of a problem the collective situation poses, or foregoing an opportunity it contains, is preferable to the collective arrangements designed to respond to the problem or exploit the opportunity. Lastly, future interests are to be discounted in favor of more immediate ones, and the viability of the collectivity of states is simply an instrument for the viability of individual states.

One crucial question is the extent to which behavior rules from other more specialized or more universal epistemic communities are becoming institutionalized internationally. Other contemporary epistemic communities derive from bureaucratic position, technocratic training, similarities in scientific outlook and shared disciplinary paradigms. Several of our case studies touch upon this question and two address it directly.[26] Although no conclusive trend can yet be discerned, two findings seem to recur. First, it appears that scientific and technological images and roles inform patterns of institutionalization as long as a given issue remains at a relatively low level of political concern. With involvement by higher levels of government, the issue tends to become redefined in accordance with more traditional maxims. Second, in ongoing international collectivities the norm seems to be for the several epistemic communities to inform *different* activities, not to come into conflict with each other over the same ones.

International regimes

The construction and transformation of international regimes constitute the major focus of our case studies. The term "regime," as already indicated, refers to a set of mutual expectations, rules and regulations, plans, organizational energies and financial commitments, which have been accepted by a group of states. One example of a regime, as we are using the term, is the international system of

[25] Cf. Burkhart Holzner, *Reality Construction in Society* (Cambridge, Mass.: Schenkman, 1972). I owe this reference to Cheryl Christensen.

[26] Those by Johnson and Brenner.

safeguarding nuclear materials, involving national and international materials, accounting rules and practices, regulations about inspection, and obligations about submitting specified aspects of national behavior to the regime. Another is the World Weather Watch. The WWW "is" national weather bureaus doing what they had always done, doing some things they had never done, and doing some things differently than in the past, all in accordance with a collectively defined and agreed-to plan and implementation program. Yet a third example, from a different domain of behavior, is a set of international monetary arrangements, including rules and regulations about exchange rates and reserves, as well as mutual expectations about credit arrangements through swaps and loans.

International regimes may be further differentiated by the purposes they serve, the instrumentalities they use and the functions those instrumentalities actually perform. To illustrate the first two of these dimensions, consider the following matrix, in which the purposes of regimes are plotted in the columns and the instrumentalities in the rows. The three basic *purposes* are: (1) the acquisition of new capabilities, including research, development and hardware construction which, once produced, may be transferred to the national level; (2) making effective use of capabilities which already exist, including those in shipping and fisheries, nuclear energy production, weather observation and civil aviation; and (3) coping with the consequences of the use of capabilities, including the over-exploitation of fisheries resources, environmental pollution, safeguarding nuclear materials and subordinating separate science and technology policies to broader policy pursuits.

The four types of *instrumentalities* vary along the degree to which national behavior is integrated in the attempt to achieve a given purpose. A common framework simply pools national behavior. A collectivity is defined, created and maintained, but no particular ordering of national behavior is implied. A joint facility seeks to make the behavior of the members of a collectivity commensurable. That is, it harmonizes, standardizes, and effects comparability and compatibility. A common policy integrating national behavior goes further still and establishes a more precise system of ordering and scheduling of national behavior. The fourth and last instrumentality orders national behavior by eliminating autonomy of action altogether.

Specific examples from our case studies are entered into the cells of the matrix for illustrative purposes. The international organizations associated with the several regimes are indicated to ease identification of the regimes.

The *functions* that regimes actually perform will have to be visualized as the third dimension of the matrix. Three basic functions may be identified. The first of these is *informational.* The Long-Term and Expanded Programme of Oceanic Exploration and Research (LEPOR) is designed to produce information about oceanic dynamics, as the Global Atmospheric Research Program (GARP) is designed to produce information about atmospheric physics. Hence, they fall into this category. But so too does the NPT safeguarding regime! Its function is not to prevent the diversion of nuclear materials but to detect it and to report instances of diversion to the Security Council. This remains an informational function.

The Purposes of Regimes

		Acquiring a capability	*Making effective use of a capability*	*Coping with consequences of use of a capability*
The instrumentalities of regimes	A *Common Framework* for national behavior	LEPOR (IOC); GARP (WMO)	FAO-related network of fisheries conservation research	Maximum sustainable yield regimes in int'l fisheries
	A *Joint facility* coordinating national behavior	Euratom joint research program until 1967 (European Community)	Nuclear health & safety standards (IAEA)	Monitoring à la Earthwatch (UNEP) and IGOSS (IOC)
	A *common policy integrating* national behavior	INTELSAT; European Space Program (ESA)	World Weather Watch (WMO)	Safeguarding à la NPT Regime (IAEA)
	A *common policy substituted for* independent national behavior	Euratom ideal (European Community)	Upper air traffic control through Eurocontrol	Ultimate aim and possible consequence of CREST regime (European Community)

A second function is *managerial.* INTELSAT, for instance, manages an operational satellite system, much as the Eurocontrol regime manages the upper air space for several European countries and a few fisheries commissions manage the resource under their control. The distinguishing characteristic is that the regime makes allocative choices.

The third function that is logically possible is the *executive* function, but none exists in our sample. The Euratom ideal would have provided an example, as would Pardo's ideal of a seabed regime. The distinguishing characteristic of this function is that the regime effects a division of labor among its members in accordance with some normative order.

International organizations

International organizations are the most concrete of the three levels of institutionalization. Their "general environment" includes the principal actors and characteristics of world politics.[27] Their immediate task-environment, however, consists of the regimes they serve, as indicated in table 1. Thus, if we accept the above formulation of regimes, any international organization may be visualized as operating within a *three-dimensional policy space* whose axes are defined by the purposes, instrumentalities and functions of the regimes it serves. Only when we have located an organization in this policy space does it make sense to attempt to assess the "significance" of its task, for then we know what the task contributes to. Apart from this broader policy space, international organizational tasks are meaningless parts in an indeterminate whole.[28]

The tasks international organizations perform, within the policy spaces bounded by the purposes, instrumentalities and functions of regimes, are three. An organization may perform a *facilitative* task. By this I mean that planning for the regime is carried out within the organization but decision making and implementation are not. The latter are left to member states. IMCO in the context of preparing conventions is an example. A second possibility is that decision making as well as planning for the regime is carried out within the organization, with implementation still being left to members. The organization's task would then be termed *enabling.* The WMO in the context of the World Weather Watch is an illustrative case. Lastly, where all three activities, planning, decision making and implementation of the regime's decisions, are carried out within the organization, it is said to perform an *operational* task. The European Center for Nuclear Research (CERN) serves as an

[27] Robert W. Cox and Harold K. Jacobson (eds), *The Anatomy of Influence* (New Haven: Yale University Press, 1973), Ch. 1 and 2.

[28] Thus, my only quarrel with the otherwise exceedingly suggestive paper by Keohane and Nye, on "Transgovernmental Relations and International Organizations," is that insufficient attention is given to the many vectors that *systematically* bound the policy spaces within which transgovernmental relations and international organizations exist, and within which organizational tasks and consequences assume their meaning as well as significance.

example of this case, as does the IAEA in the context of its statutory safeguarding regime.

The question may be raised why it is necessary to develop these complex typologies when others are readily available and well known. Let me respond by way of an example. The most useful typology in this field was developed by Eugene Skolnikoff in his monograph, *The International Imperatives of Technology,* cited above. Why not use it? For one reason, because Skolnikoff did not intend it for the study of regimes but of what he calls the "functions" of international organizations. Why not extend it and apply it to regimes? Because we would, thereby, aggregate too many different factors that do not co-vary. Take as an illustration the international safeguarding regime. Applying Skolnikoff's typology, we would find that its "function" is not "service" as he meant it, nor "operational." It is either "norm-creation and allocation" or "rule-observance and settlement of disputes." In effect, it is a little of both. Now compare this classification with that produced by the typology developed above. The IAEA would be said to perform virtually an operational *task,* in a regime whose *purpose* is to cope with the consequences of the use of nuclear technology: whose *instrumentality* is a common policy concerning materials accounting and reporting, inspection, and submission of domestic nuclear complexes to the regime; and whose *function* is informational, that is, not to do anything itself with its findings, other than to verify them, but to report them to the Security Council. In sum, the typology of collective responses developed here is not an unnecessary duplication of the efforts of Skolnikoff and others; it disaggregates the dimensions of existing typologies in an attempt to apply them to a broader range of phenomena and to discover differences as well as patterns of association that would otherwise be blurred over.

Conclusion

The process of institutionalization is transformational; it channels behavior in one direction as opposed to all others that are theoretically and empirically possible. In the international system it is a collective response to the collective situations of states. Thus, instances of institutionalization are situation-specific. That is, they are specific to given sets of actors who stand in certain relations in the context of particular issues. Thus, like the collective situation, the collective response is negotiated. It represents agreement that certain aspects of national behavior will be institutionalized internationally. And, also like the collective situation, particular manifestations of collective responses are inherently unstable. Beyond a threshold, which we cannot yet specify, they will change as the situation is redefined. The concern of our empirical studies below is to discover just how particular regimes change in response to new collective situations. In the section that follows I want to suggest what some of the general patterns of association appear to be.

II Some patterns of association

In international organizations, as in other large public bureaucracies, much that happens is not the product of some rational actor maximizing his utility function. Here as elsewhere, organizational routines, standard operating procedures, and programmatic repertoires acquire a momentum of their own, influencing both the perceptions and the activities of individual actors. Moreover, each international organization builds up a specialized clientele and constituency among its members, giving it a measure of independence and permitting it a degree of deviation from attempted coordination and control, whether by the central foreign policy organs of states or by other international organizations. In a word, the "pulling and hauling" of bureaucratic politics also is as active in international organizations as elsewhere.[29]

While the exact mix of rational calculations, organizational processes, and bureaucratic politics may differ in the construction of international regimes, some combination of the three is likely to affect this process as well. In view of these complexities, it is not possible to predict the specific collective response to any given collective situation, although case studies can and do arrive at interesting and important empirical findings after the fact.[30]

At the same time, however, there appear to exist several interesting patterns of association which, while they by no means constitute predictive laws, do lend themselves, I believe, to a more general and paradigmatic interpretation. I briefly describe four such patterns.

The first concerns the "matching" of situation and response over time. Each of our case studies that spans a number of years (European R&D collaboration, international safeguarding, and fisheries management) demonstrates the changes that have taken place in the respective regimes as the collective situations to which they were a response have changed. Take, as an example, the case of R&D policy in the European Community. In the mid to late 1950s, the collective situation was defined by an exaggerated view of the type of policy interdependence which, in any case, remained external to the domestic policy core of most of the polities concerned. Moreover, the distribution of interdependence was highly asymmetrical, resulting not only from differential possession of capabilities but also from the very different objectives the major actors pursued. Indeed, for some the specific sector under consideration was incidental to larger, more symbolic objectives. The Euratom ideal emerged out of this setting. It consisted of a very intense form of collaboration, including a regime whose instrumentality was a common policy substituted for independent national behavior and having an executive function, as well as an international organization having an operational task. The ideal was never realized, and the history of Euratom is largely one of the destructuring of a regime

[29] Cf. Graham Allison, *Essence of Decision* (Boston: Little, Brown, 1971).
[30] See, in particular, the papers by Johnson and Brenner in this volume.

in keeping with the reformulation of the collective situation as perceived by national actors. This destructuring was complete by about 1968. By that time, a very different collective situation existed. The type of interdependence was of a lesser intensity than that claimed a decade before, but it was more closely connected to the domestic policy concerns of each of the member countries. That is, the R&D sector, and science and technology policy in general, were coming to be more closely linked with industrial policy, energy policy, general economic pursuits and, more recently still, environmental concerns. Moreover, this situation of interdependence was distributed more symmetrically among the major actors, both because capabilities were more equally accessible and because objectives were more commensurable. The collective response that has emerged from this changed situation is most succinctly expressed in the so-called Dahrendorf or CREST program of the Community. It includes a regime which is concerned with the larger policy issues to which science and technology are related, rather than with R&D alone, and which is basically informational in function. It also involves an organization, the Commission of the Community, which performs a facilitative task.[31]

The case of international safeguarding has a more "linear" history, with the type of interdependence becoming progressively more intense and its locus more closely connected to domestic policy concerns. The case of fisheries management demonstrates yet a third variant, one of technological innovations proceeding just rapidly enough to prevent the institutionalization of regimes that had been deemed necessary. In sum, the case studies suggest that situations and responses are not randomly associated. Although we cannot yet specify the relation more precisely, some magnitude of change in the first leads to some magnitude of change in the second.

The second pattern concerns the form that a proposed regime would take. In the case of meteorology, for example, proposals were made as early as 1873 to establish an international institute whose task would be to collect, analyze, and disseminate observations. Each was rejected. Why? Weiss suggests one reason: "Not until the 1960s did revolutionary technological developments and increasing appreciation of the importance of meteorology provide a hospitable terrain for the introduction of the World Weather Watch and the Global Atmospheric Research Program."[32] She is undoubtedly correct, but there seems to have been a second reason as well. Every previous proposal, into the 1950s, would have established an international institute that would have duplicated the activities of at least some national meteorological services, and, therefore, competed with them for limited resources. The design of the WWW, however, promised to create a global system of observation, analysis and dissemination of data, by so transforming the activities of national services that they would come to *constitute* a global system. In other

[31] This brief description does not adequately portray the full complexity of the case. Cf. Nau's paper, below, for an in-depth analysis. On Crest, cf., John Walsh, "In a Hard Year in Brussels, Things Look Up for Science," *Science,* 184 (May 31, 1974): pp. 962–67.

[32] In her paper, below.

words, a combination of new situation *and* the discovery of a new form of response seems to have made the WWW desirable. Pendley and Scheinman make essentially the same point in the context of international safeguarding, when they argue that a compromise between "centralization and decentralization" in the structure of the regime made its acceptance possible. Levy comes to the same conclusion in discussing INTELSAT. In sum, it may be that a more problematical situation by itself does not necessarily lead to a new international regime; if an appropriate form of regime is not developed it may be foregone altogether, the new situation notwithstanding.

Changes in the component parts of collective responses suggest yet another interesting set of associations. For example, the pre-NPT safeguarding regime of the IAEA was limited to those specific nuclear materials and technologies which a member country received through international assistance. In the situations to which it did apply, the IAEA had unprecedented authority of inspection. The post-NPT regime, on the other hand, is applicable to entire domestic nuclear industries. Yet it requires signature and ratification of the NPT as well as separate negotiations of a safeguarding arrangement to be operative and, when operative, the IAEA simply verifies that national *self*-inspection meets certain standards. To cite another example, in the history of European Community technology policy, the number of activities the regime has concerned itself with has varied inversely with the function of the regime and the task of the Commission. In international fisheries regimes, the structure and applicability of regulations, voting procedures and the tasks of commissions exhibit enormously complex relations over time. The pattern seems to be that when a regime and/or international organization change in response to the emergence of a new collective situation, those changes are rarely if ever unidirectional. More often than not, they tend in several contradictory directions simultaneously.

Lastly, the frequency distribution of cases is itself suggestive. Were we to plot the distribution of all international regimes active in scientific and technological domains in the matrix of table 1, we would find, I believe, that they cluster in the upper left portion. The clustering would be more striking still were we to add the third dimension to the matrix. There exist very few cases at the extremes of any of the axes, and there is none, to my knowledge, at the extremes of all three. Those coming closest are the exceptions that make the case, for they are qualified examples only. The Eurocontrol regime, which manages the upper air space, comes as close as any, but it is not applicable in practice to two of its members, France and the UK. At the same time, however, two additional patterns are discernible in the distribution of cases. The first is a tendency, increasingly frequent, for science and technology to become more closely integrated into broader domestic policy pursuits. This has the consequence of bringing the locus of policy interdependencies closer to the domestic policy core of countries. The second—partially following from the first—is the tendency of collective situations increasingly to call for responses to cope with the consequences of using technological capabilities. This too has the consequence of making regimes more politically salient.

That these patterns of association are general is clear; they do not represent a specific actor's strategy that he seeks to implement in any particular instance, but an after-the-fact reconstruction of the aggregate of relations. What is more, these patterns lend themselves to a paradigmatic interpretation. The complex matching of situation and response, the problem of defining an "appropriate" response, and the contradictory as well as complementary tendencies exhibited by the distribution of cases, suggest an image of international order. This image does not fall along a centralization-decentralization axis; it does not portray a shift from states to some "higher" entity; and it does not lead us to expect the emergence of a set of relations characterized by the expression, "sovereignty at bay." Instead, the domestic and international realms may be seen as two components of a larger and ever-increasing public domain, and international organization as the derivative of the shift from private to public power domestically. What is suggested is an image of a whole that maintains the integrity of its parts.

III Technology, international authority and the future

The incremental adjustment of international regimes to new collective situations, and of international organizations to new regimes, has generated a characteristic mode of international organization which Brown and Fabian term "functional eclecticism."[33] This mode has the advantage, they point out, of being experimental, ad-hoc, and of learning by trial and error. It therefore avoids the paralysis that comes from the inevitable failure to implement grand institutional designs. At the same time, functional eclecticism bears certain costs. It institutionalizes specialized interests. The only legitimate claimants it recognizes are those most immediately and materially affected by the consequences of policy choices. Those concerned with second and third-order consequences have to fight for recognition and impact and—witness the difficulties of the United Nations Environment Program in its relations with the IOC, as related by Brenner, below—they rarely succeed. In sum, functional eclecticism takes the public domain to be the sum total of specialized interests and distributes public authority accordingly. Its own inevitable consequence is the subversion of long-term collective interests.

As an alternative for future international governance, Brown and Fabian propose a new structure of international authority which they call "mutual accountability." By this they mean a structure of authority within which specialized interests, pursuing specialized objectives, are accountable not simply to their immediate constituencies, as they are now, but to one another and to the community of nations as a whole. Accepting the spirit of their suggestion, I want, in this final section, to take up their proposal where they leave it off. On the basis of the studies in this volume and the theoretical interpretation I have given them, I want

[33] Below.

to propose a formulation of the structure of international authority which differs from that we normally have in mind, and to suggest an international organizational strategy which runs counter to many now pursued.

Authority is widely conceived to exist in the context of formal super and subordinate relations, as denoting the power of one to command and the duty of another to obey. The obvious inference, which all too few resist, is that international authority can, therefore, exist in very limited circumstances only. For the international system is inhabited by formal equals. Hence, international authority can exist only to the extent that formally equal relationships become formally unequal. That is, the indicator for the emergence of international authority is often taken to be a shift in authority from states to some higher level, or the creation of some structure within which states are governed from "above." One instance of this is the process of supra-national integration: Here is the quintessential case of the emergence of international authority so conceived. Indeed, in his recent delimitation of the domain of political science as the study of authority patterns, Harry Eckstein *excludes* from the study of politics the most basic of international relationships: those between relative equals. Supra-national integration is one of the few aspects of international relations that Eckstein considers to be "political!"[34]

If the image of international order adduced in the previous section has any validity, then it is unlikely that this hierarchical manifestation of authority will emerge in the international political order. But is the *concept* of authority necessarily synonymous with this particular *manifestation*? And, if not, how ought we to conceive of international authority?

What we are confronted with in the literature is a *fusion* of the idea of authority with the particular structure in which it has historically been expressed in the highly bureaucratized and legalistic Western societies. The context for which the rational-legal Weberian notion of authority was developed was, of course, one of unequal distribution of formal authority among layers of superordinates and subordinates in bureaucratic settings. It is usually depicted by the ideal-type of hierarchy or pyramid.[35] If we are to adequately portray international authority, however, a separation of concept and manifestation must first be effected.

The seminal works of Chester Barnard and Peter Blau suggest an alternative. In his reformulation of the Weberian concept, Blau argues that Weber's exposition includes three fundamental criteria for the existence of authority. First, and citing Weber directly, authority is distinguished from other forms of *power* by a "certain minimum of voluntary submission,"[36] by an obedience which is voluntary rather than stimulated by coercion. Second, authority is distinguished from other means

[34] "Authority Patterns: A Structural Basis for Political Inquiry," *American Political Science Review*, 67 (1973): pp. 1142–62.

[35] Max Weber, "Bureaucracy," in H. Gerth and C. Wright Mills, *From Max Weber: Essays in Sociology* (New York: Oxford University Press, 1946).

[36] Peter Blau, "Critical Remarks on Weber's Theory of Authority," *American Political Science Review*, 57 (1963): pp. 305–16; the citation is from p. 306.

of *persuasion* by the a priori suspension of judgment on the part of subordinates, without having to be convinced that the superordinate is correct. Lastly, authority is distinguished from other means of *control* by the presence of a belief system which socially legitimates the exercise of control by the superior and makes it illegitimate to refuse his commands.[37] Weber tends to assume the presence of *some* form of authority as given, and does not elaborate at length the processes whereby legitimate authority develops from other forms of power, persuasion, and control. This is unfortunate for the student of international authority, since the processes by means of which authority emerges is of central concern to him. Blau's analysis, however, and the work of Barnard before him, go a long way toward supplying the missing links. Blau reviews the many and various instruments of power, persuasion, and control available to a superordinate, but argues that *legitimate* authority will develop only to the extent that the superordinate is perceived as furthering the common interests of subordinates to remain under his control. This common interest will be expressed in shared loyalty to the superior, Blau continues, "and in group norms *making compliance* with his directives *an obligation enforced by the subordinates themselves.*"[38] The defining attribute of the concept of authority that Blau proposes, therefore, is:[39]

> that structural constraints rooted in the collectivity of subordinates rather than instruments of power or influence wielded by the superior himself enforce compliance with his directives. To discharge its joint obligations to the superior, the group of subordinates is under pressure to make compliance with his directives part of the common norms, which are internalized by its members, and which are socially enforced by them against potential deviants.

Barnard had carried this line of reasoning toward a still more radical conclusion, by separating the idea of authority from super and subordinate relations altogether. First, he maintained, the concept of authority has no meaning apart from a specific order of relations that was voluntarily created or entered into: "authority is always concerned with something *within* a definitely organized system."[40] Moreover, he continued, within such an order of relations the cutting edge of authority is subjective, that is, residing in the individual actor to whom 'an order" is addressed. Is the "order" compatible with that actor's understanding of the purpose of the collectivity? Is it consistent with his individual interests as a member of that collectivity? If so, an inducement to the actor to accept the authority of the collectivity exists: "The existence of a net inducement is the only

[37] Ibid. pp. 306–7.
[38] Ibid. p. 312, emphases added.
[39] Ibid.
[40] Chester I. Barnard, *The Functions of the Executive* (Cambridge, Mass.: Harvard University Press, 1938), p. 172.

reason for accepting *any* order as having authority."[41] Lastly, and most crucially, for Barnard authority does not *become* objective and externalized as a result of routinization or some other means of institutionalization. It *remains* with the individual actor: "no absolute or external authority can compel the necessary effort beyond a minimum insufficient to maintain efficient or effective organization performance. . . . Authority lies always with him to whom it applies."[42]

Adopting this perspective allows us to construct a very different conception of authority than that requiring formal subordination. We would argue that, to the extent that collective interests of several national actors are furthered by an international regime, a sense of joint obligation within that regime may emerge. To the extent that joint obligation emerges, norms of compliance may follow. And, to the extent that norms of compliance follow and are *incorporated into the determinants of national behavior,* and hence become part of the bases of national political choice, the institutionalization of authority within that particular regime has taken place. But it is incorrect to argue that the regime, therefore, acts as a superordinate vis-à-vis its member states. Why? Because the institutionalization of authority takes place *at the level of the state,* as norms of compliance to the collectivity come to be incorporated into the determinants of national behavior, and because jurisdiction is *not transferred* to some other entity but is *exercised collectively* by states. Thus, international authority may be conceived as a *trans-ordinate* structure, in contradistinction to super and subordinate structures.[43] But its definition would have nothing at all to do with its manifestation:

> Authority is another name for the willingness and capacity of individuals to submit to the necessities of cooperative systems. Authority arises from the technological and social limitations of cooperative systems on the one hand, and of individuals on the other. Hence the status of authority in a society is the measure both of the development of individuals and of the technological and social conditions of the society.[44]

If our aim is to facilitate the creation of systems of "mutual accountability," what organizational strategies can we deduce from this conceptualization of the form and substance of international authority? The first step, clearly, is to somehow

[41] Ibid., p. 166.

[42] Ibid., pp. 182–3.

[43] A related discussion has preoccupied students of international law for some time. The resolution of their debate to which I hold has been ably argued by Richard A. Falk, "International Jurisdiction: Horizontal and Vertical Conceptions of Legal Order," in Falk (ed), *The Role of Domestic Law in the International Legal Order* (Syracuse: Syracuse University Press 1964), and Gidon Gittlieb, "The Nature of International Law: Toward a Second Concept of Law," in Cyril Black and Richard Falk (eds). For an earlier discussion of the structure of international organization, depicted along the above lines, see my paper "The Structure of International Organization: Contingency, Complexity and Post-Modern Form," *Papers, Peace Research Society (International),* 18 (1971), pp. 73–91.

[44] Barnard, 184.

unhitch functionally specific and isolated regimes from the narrow constituencies which now govern them. Denying them independent budgetary and decision-making powers would be one obvious instrument toward that end. Then fora could be created within which different functionally specific interests are forced to confront one another, to collectively calculate trade-offs and to make crucial choices affecting the welfare of the broader community. Would clusters of mutual obligations and norms of compliance emerge from such a setting? Would "peer group" pressure facilitate "mutual accountability?" On Barnard's analysis, a prior step is necessary. As he maintained, authority has no meaning apart from a given order of relations. It follows that a *new* system of authority has no meaning apart from a *new* order of relations. Thus, the fora we would want to create should facilitate the emergence of such an order of relations. But how?

There exist two alternative strategies. Both involve rejecting the market structure as the arbiter of international public choice. And both involve the rejection of functional eclecticism as the organizational strategy that follows from market rationality. The first, adopted by Brown and Fabian, is to rely on the holism of natural systems as the instrument of legitimating a new order of relations. Brown and Fabian provide us with a cognitive road map reflecting physical connectivities in natural systems, on the basis of which to pursue comprehensive management of the oceans, outer space and the atmosphere. Fundamental problems attend this alternative, however. Take the Law of the Sea Conference as a case in point. As Haas elaborates, the only common element of the various issues on the agenda of the LOS is salt water.[45] Salt water did not prove to be an efficacious energizer of policy, however, and the LOS is near paralysis. To the extent that it will succeed, success will be due to its falling back on the functional eclecticism mode of organization which, however, will vitiate any gains toward mutual accountability. There is no reason to believe that outer space and the atmosphere will be more accomodating. Thus, for reasons which Haas convincingly demonstrates, attempting to subordinate international politics to the holism of natural systems is not likely to prove the best means toward the end of mutual accountability.[46]

The second alternative is to look to emerging configurations of policy interdependence as the basis for defining new orders of relations.[47] One would expect, if one takes this path, that mutual accountability, if it is to exist at all, will emerge from the social rather than the natural milieu of polities. One would assume, moreover, that peer pressure, joint obligations, norms of compliance and structures of international authority are not likely to be energized by the oceans, outer space or the atmosphere, but by direct political bargaining and bartering over the nexus

[45] Below. See, especially, his table 1, which demonstrates the virtually infinite number of political interpretations and inferences one can derive from the same physical or technological fact.

[46] See, in this connection, "The Cocoyoc Declaration," in the Appendix of this volume.

[47] This strategy is applied to international governance of selected scientific and technological fields by Ruggie and Haas, in "Environmental and Resource Independencies: Organizing for the Evolution of Regimes," prepared for the Commission on the Organization of the Government for the Conduct of Foreign Policy, to be published in its compendium of papers.

of policy bundles with which the community of nations is grappling–food, energy and population; energy, money and trade; trade, money and redistribution; redistribution, pollution abatement and food; and so forth. Each of these policy bundles criss-crosses natural systems with many complex policy networks; and yet each demands that functional eclecticism be abandoned for more holistic social choices.

There exists no magic formula by which to institutionalize mutual accountability, but the international system today provides numerous outlets for the strategy just enunciated. The negotiations over the Lomé Convention between the European Community and 46 less developed countries provided such an opportunity.[48] Discussions about barter deals of manufactured goods, commodities and natural resources, as proposed in several quarters, could constitute another. The inability of the OECD countries to engage the oil producing states on questions relating to petroleum alone offers a third example. From the perspective here developed, each of these may be viewed as a "surmising forum," to borrow de Jouvenel's apt term,[49] through which to investigate the viability of each proposed policy nexus and to discover and define the viability of new orders of relations. Whether we are the "loyal opposition" or the "new majority party,"[50] we need not approach these fora in fear, resentment or revenge. We can choose to treat them as opportunities for the purpose of creating instruments of international collective governance that will be appropriate to the last quarter of this century.

[48] For a report on the Lomé Convention, see *The Economist,* 8–14 February 1975.
[49] Bertrand de Jouvenel, *The Art of Conjecture* (New York: Basic Books, 1967).
[50] I take these terms from Daniel P. Moynihan, "The United States in Opposition," *Commentary,* March 1975.