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Lawyers and Ecomanagement

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LAWYERS AND ECOMANAGEMENT*

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As the title of my lecture perhaps indicates, I do propose to deal with environment and law, but not in the usual narrow, technical sense. Technical, black-letter environment law is very important. But the point which I shall try to develop is that, and how much, enviroment law—not to speak of its growth and refinement—depends on a broad frame of reference.

Consider, for instance, the widely known legal program dealing with the protection of Louisiana's coastal zone. It is so successful because it operates within the framework of a Sea Grant program. That program is designed to bring together all the scientific disciplines and socio-economic considerations which are needed to give a firm basis to the legal and institutional work. A fortiori, the already perceived tasks related to the human environment require participation of lawyers within a scientific, technological and philosophical framework which, I believe, one can safely say has no precedent in human history.

Fifteen years or so ago, the emancipation of nuclear energy for peaceful uses seemed to be a comparably extensive challenge to the legal profession. The University of Michigan Law School published in 1959 a volume of many hundreds of pages about "Atoms and the Law."[1] The University of Puerto Rico organized together with the United States Atomic Energy Commission and the Organization of American States a hemispheric symposium on the subject in 1959.[2] But the new nuclear law turned out to be a fairly homogeneous technical subject. It was more in need of regulatory development than of flights of juridical imagination. It blended easily with the existing corpus of legal concepts and practices. It has emerged as a major problem only in connection with the spiraling energy demand and the environmental impact of poorly designed and sited nuclear power plants.

Thus nuclear law became merely one facet of the new broad field which deals with rational—that means long-range, sustained, ecosystemic—management of the human environment. For this field with

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1. STASON ET AL., ATOMS AND THE LAW (1959), *reviewed*, Mayda, 30 REVISTA JURIDICA DE LA UNIV. DE PUERTO RICO 340 (1961).

2. *Atomic Energy and Law—An Interamerican Symposium* (J. Mayda ed. 1960).

its underlying theory and the needed methodology, I began to use several years ago the shorthand term "ecomanagement."[3]

My purpose here is to explain the concept and method of ecomanagement and to indicate the role of law and lawyers in this multidisciplinary task.[4] Within one short lecture, I can obviously only outline. More detailed writings are available.[5] In fact, much of this lecture is based on a report to the International Association of Legal Science on the theoretical underpinning and practical possibilities of an effort to add a socio-legal dimension to the ongoing "Man and the Biosphere" program organized by the UNESCO.[6]

What is the Question?

To move now as directly as possible to "the moment of truth," let me take cue from one of those wonderful epigrammatic formulas of which only poets are capable. This one is ascribed to Gertrude Stein lying on her deathbed. "So, what is the answer?" Miss Stein is reported to have asked the gathered friends. And, after a long silence, she corrected herself: "So, what is the question?"

Let us also start with the question. In its final implications it is quite Hamlet-like: Shall we or shall we not brake and eventually steady the converging exponential curves of pollution, population, and resource exhaustion, which threaten to damage irreparably the biosphere—the life support system for human race and civilization?

Translated in lapidary operational terms, the question is how to develop fast enough the necessary corrective and preventive technologies to stop the massive degradation of the biosphere; and, simultaneously, begin to devise and put in operation ecomanagement as a rational, future-oriented husbandry of the human environment.

The implications of this enterprise seem to merit the allusion to

3. Mayda, *Environment and Resources: A Public Policy Study* (Mimeo., June 1967), published as ENVIRONMENT AND RESOURCES: FROM CONSERVATION TO ECOMANAGEMENT (Rio Piedras 1968).

4. For the relative station of positive law in general, and environmental law in particular, see Appendix A, item 4.2324 *infra*. *Cf. also* Appendices B, C *infra* (words and portions emphasized by bold face).

5. Mayda, Does the Human Environment Need a Theory? (seminar paper presented Dec. 1, 1971, at the Woodrow Wilson International Center for Scholars, Washington D.C.) (to be published); Mayda, *Global Ecomanagement: Concept, Elements, Law, Institutions*, 5 WORLD LAW REVIEW 542, 620 (1972) (Proceedings, Belgrade Conference on World Peace Through Law 1971, where this paper was awarded first prize in the International Law Essay Contest.)

6. Mayda, The Role of Law and Lawyers in the Multidisciplinary Task of Management of the Human Environment: Theory, Methodology, Research Needs, Report to the Colloquium of the International Association of Legal Science, Brussels, 1972.

Shakespeare's tragic hero because any drastic enough corrective steps appear feasible only if accompanied by far-reaching changes in our values, thinking, and understanding; in fact a new empirical humanistic philosophy. The "shall we?" is, in fact, "will we—in time?"

Any lingering doubt as to whether lawyers really have in this context a role more significant than other educated citizens can be, I believe, quickly dispelled if I explain the meaning of the term technology as I used it a moment ago. Technology means the sum total of applied knowledge, equipment, procedures, institutions. In this sense the term includes not only the so-called hard technologies—machines, instruments, and the engineering know-how that goes with them. It also includes soft, social technologies. The principal among them are policy and decision making, planning, government, law, education, the study and molding of public opinion and social consensus.[7]

At least four of these—policy making, government, law, public opinion and consensus—are well established provinces of activity and responsibility of lawyers as counsel, advocates, and judges. The question of doubt turns into a call to new duty within well established classifications.

But it is not just a bit more of the same. Let us take a brief flight over the territory of facts.

What are the Facts?

The most important elements of the degradation of the biosphere have been most recently summarized in the Declaration on the Human Environment, adopted in Stockholm on 16 June 1972:

> dangerous levels of pollution in water, air, earth and living beings; major and undesirable disturbances of the ecological balance of the biosphere; destruction and depletion of irreplaceable resources; and gross deficiencies harmful to the physical, mental and social health of man, in the man-made environment; . . . .[8]

This inventory is sufficiently impressive even if it conspicuously leaves out population growth—perhaps because this is the theme of another United Nations conference in 1974. Nor is any of the categories in the Stockholm manifesto new as such. For instance:
—Man and his domesticated animals have always been the source of some pollution. The "bloody" waters of the Nile, described in the

7. These social technologies are spelled out in greater detail in Appendix A, items 4.22, 4.23, 5.2, 5.3. *infra.*

8. Declaration on the Human Environment, para. 3 (Stockholm, June 16, 1972).

Book of Exodus, were most likely an early case of eutrophication (overloading of water with organic matter)—the cause of Lake Erie having aged some 10,000 years in the last fifty years. Air pollution from heating in medieval London brought into force draconic royal ordinances.

—Disturbances to regional ecosystems speeded up the demise of big empires and important cultures. The Sumerian and the classical Greek were among them.

—Since man discovered and learned how to use the nonrenewable resources—metal ores, fossil fuels, and the like—he has always tried to exploit them as if there was no tomorrow.

—Most man-made environments in history, especially the cities, have at least during some period harmed individual and social welfare rather than fostered it.

There are, however, new factors and dimensions.

First, the substantive content of the various categories of human onslaught on the environment has changed. Many new chemicals and materials, which are noxious and can not be absorbed in the ecosystems by natural organic processes (they are, in technical language, nonbiodegradable), have been and are being introduced in the environment. Urban air pollution is now principally caused not by home and factory chimneys, but by automobiles—in Los Angeles more than 90 per cent.

Second, industrial mass production technologies require and facilitate extraction of nonrenewable resources on an unprecedented massive scale.

Third, medical and food production technologies have rapidly more than doubled human life span, sharply cut infant mortality, and caused the so-called population explosion.

Fourth and principally, all these phenomena have been growing exponentially and have had cumulative effects—the really better term is synergistic, because the quantity of the effect is frequently bigger than the sum total of the contributing causes.

In synthesis, one can assert that the quantitative changes in the environmental impact have been so big that they changed the quality of the problem.

The last proposition, as well as the one about the inherent and aggravating factor of synergism, deserves further illumination. The focus is on the role of modern technology.

The Role of Technology

At least four features of modern technology need to be singled out.

One. Technology tends to disturb rather than to enhance ecological balance. The recent British "Blueprint for survival" expressed it by saying that the technospehre can only grow to the detriment of the ecosphere, because it destroys natural controls which must then be replaced by further technological ones.[9] Pesticides and artificial fertilizers create the need for more pesticides and artificial fertilizers. Mechanical aerators must be installed in dying bodies of water to restart the natural purifying cycle. Many people have survived the New York smogs only by keeping inside electrically airconditioned rooms.

Two. Technological economy as a whole (production, consumption, employment, inflation, urbanization, capital management, etc.) has a built-in acceleration which is only partly explained by population growth. The acceleration factor seems to apply universally, to planned and market economies alike, probably because their performance is motivated and measured by similar quantitative standards.

Three. All technological economies have the same exploitative attitude toward the so-called common property resources: air, water, natural ecosystems, ambiental esthetics, tranquility. These are considered free. Their use and degradation in the process of production and waste disposal has not figured as a cost factor. For example, a chemical factory would price its products without considering what the economists now call the externalities—in this particular case the costs of the air and water pollution the industry causes. Or, to give just one more example from among the thousands available, oil tankers would routinely wash out their holds at sea free of charge, instead of doing it for cost at a disposal station in port.

Four. The extraordinary growth and proliferation of the hard technology has not only weakened or destroyed some ecological controls, but has also undermined whatever social controls exist. This has come from the superspecialization which modern technology requires; and from the antihumanism which predominates in the educational systems and in the social ethos of the contemporary technoculture.

Technology, and the equally superspecialized sciences which feed it, are not the only sources of this condition in which sound generalists are either not produced or not respected. Ortega y Gasset wrote more than a generation ago about the "modern barbarians," the narrow technicians in law and in other professions.[10] The fragmentation and alienation in the world of knowledge parallel these

9. New York Times, Feb. 5, 1972.

10. J. ORTEGA Y GASSET, LA REBELIÓN DE LAS MASAS (Madrid, 1930).

states in the society at large. They share the underlying philosophical reductionism—the dead end of classical thought whose most respectful origin is the Aristotelian mode of dichotomy. One facet of this reductionism, particularly relevant to our topic, is the Bible-fed justification for the mastery of man over nature.

But when all this philosophy and more are listed and reflected upon, the conclusion still appears the same: modern technology has been the catalyst which precipitated the crisis. It gave to the *homo economicus* the means to overexploit his environment. And it has fostered an essentially antihumanistic educational system which has fomented and facilitated this overexploitation. The symptoms of this antihumanism range from overspecialization and the lack of philosophical equipment to "conceive the complete fact," to insensitivity to such man-made attacks on physical and psychological well-being as noise, traffic stresses, visual pollution, and the like.

The Syndrome of Technoculture

What have been the principal effects of this technoculture and its reductionist philosophical constitution?

For one, the world has been ill prepared to understand and to accept the fact that we are facing, with regard to the biosphere, something more than a set of separate technical problems and engineering tasks which will cost so much money. The mean delay in perception was probably not more than some fifteen years—around 1970 rather than the mid-1950s, plus or minus two or three years, ranging from biologists[11] to urban planners, and from the scientific avantgarde to news analysts. And yet, it seemed obvious at first analysis that environmental problems must be seen in interrelated clusters and that they represent a syndrome,[12] rather than to speak several years later of "second-generation environmental problems," the first generation being the pollution of air, water and land.[13] By the same token, a generalist, raised on classics and conventional mathematics, science and civil law—the very opposite of technoculture—arrived on the first try and straight at the conception of modeled ecomanagement;[14] in a recent distinguished gathering of ecolo-

11. UNESCO: International Co-ordinating Council of the Programme on Man and the Biosphere (MAB), 1st Sess., Final report (Paris 1972).

12. Mayda, Does the Human Environment Need a Theory? (seminar paper presented Dec. 1, 1971, at the Woodrow Wilson International Center for Scholars, Washington, D.C.) (to be published).

13. Hill, *Second-generation Environment Issues*, New York Times, Feb. 16, 1973.

14. Mayda, Does the Human Environment Need a Theory? (seminar paper presented Dec. 1, 1971, at the Woodrow Wilson International Center for Scholars, Washington, D.C.) (to be published).

gists, technologists, social scientists, planners, architects and systems analysts, only two of eight panels reached the germane concepts of "whole system model" and "ecosystem management," without systematic elaboration and with no cross-reference.[15]

Although seven, or even fifteen years, might seem short in the time frame of history, the delay in unified perception and conceptualization has been crucial and, due to the inherent synergism, disproportionately damaging.

Looking at environmental problems in isolation, without the framework of interrelated causes and effects, had the inevitable result of making them appear smaller in size and impact. This has been probably the principal cause of the sluggish response even to the separate problems by the politicians, the technocrats (for example, planners), the bureaucrats, and the public.

Another effect has been single-track or microframe planning. The classical example of this is the Aswan Dam. It controls the floods. But it has also severely increased in the Nile valley the parasitic disease schistostomiasis. It has cut the flow of organic matter into the delta and the Mediterranean, and drastically affected the rich fisheries there. And, because of lag in economic development tied with the dam, only a fraction of the electricity the dam generates is of use. Some of these counterproductive side effects were foreseen by ecologists and other observers. But when the Russian engineering director of the project was asked about them, he gave a typical answer: This is not my problem. My job is to build the dam.

By far the most damaging effect of the technoculture has been the long delay in recognizing how closely linked and interdependent are the ecological, the human and the social factors. This point is of particular importance as a bridge to my subsequent arguments, since the principle of dynamic interdependence must also control the methodology of our dealing with these problems on the level of government and law.

Let us consider at least these factors and linkages.

—Technological economy as we know it, not only tends to destroy the biosphere; it also aggravates the disparity between the rich and the poor. This law does not operate only on the country level. There is a "north-south" axis between the rich and the poor also inside the developing poor countries.

—The poor are also becoming more numerous more rapidly. It is a

15. F. Stearns et al., The Ecology of American Cities, in Proceedings of the Institute of Ecology's workshop on Urban Ecosystems, (Austin, Texas, March 1973) (to be published).

well documented demographic fact that the poorer a social group, the faster it breeds.

—The new agricultural technology, the so-called "green revolution," has had some amazing results. But it requires great amounts of chemical fertilizers and pesticides. It will further increase this source of ecological disturbance and pollution.

—Moreover, the new agriculture is technology-intensive, not labor-intensive. It can not offer sufficient employment to the rapidly growing rural population. Unemployed rural population goes to cities. Many cities the world around are already overstrained and not viable as civilized human environments.

—To create employment for this new population will require massive development of new industries, that means further strains on the biosphere—raw materials, power production, general pollution—even if we take into account improved prevention techniques.

Toward Policy Development

Even this compressed sequence of generalizations is, I hope, sufficient to lead us to a number of analytical openings:

One, we are facing problems which do not need to be dramatized beyond the presentation of the full knowledge and evidence available today.

Two, these problems amount to much more than the relatively clear cut issues of air or water pollution.

Three, to tackle these problems represents, in the words of UNESCO's report *Man and the Biosphere*, a "gigantic task of interdisciplinary research."[16]

Four, the nonlegal environmental community—I quote from a working document for the 1972 U. N. Conference on the Human Environment in Stockholm—correctly expects us to develop a "solid legal and institutional framework . . . not only designed to prescribe regulatory or remedial actions, but to define the proper scope of (future) activities . . . ."[17] In other words, environmental law is expected to be not only normative in the usual technical sense (what is), but also in the other sense in which the word normative is used—what ought to be (standards, policy).

I identified and defined this task and the methodology adequate to it in 1967 as nothing less than *a process of continuous organic*

16. UNESCO: International Co-ordinating Council of the Programme on Man and the Biosphere (MAB), 1st Sess., Final report (Paris 1972).

17. U.N. Conference on the Human Environment. Consolidated document on the U.N. system and the human environment. U.N. Doc. A/CONF. 48/12 at 188 (Dec. 17, 1971).

progression from scientific and technological knowledge to policies for governmental action. I postulated that such policy development required the adaptation of all the available hardware and software of systems analysis *and* synthesis.[18]

Policy development is the crucial (and weak) link in the system and process of ecomanagement. The word is not new, but the meaning, function and techniques are new. Statesmen, law makers and other decision makers have always "made" policy, just like Monsieur Jourdain always spoke in prose. But, more often than not, policy has been derived from very soft data—imagined national interests, political impressions or expedients, economic fictions, special interest, or at best, educated hunches and mental models—all manipulated in a haphazard and opportunistic fashion. Where the guesses which prevailed were less than educated—for instance, the sequences which led to the Yalta Agreements about Eastern Europe, or to the escalated United States involvement in Viet-Nam—millions of people were made to suffer grievously.

The crucial differences between that policy "making" and the contemporary policy science lie in the sources and the quality of the policy data; the methodology of processing them; and the operational direction from policy to decision, which is in principle a one-way street.

The organic mode, here discussed in connection with ecomanagement but applicable in general, is characterized by rational, orderly progression from data to policy to decision (and then to implementation and enforcement, which is one source of data for policy change).[19] The elements of "policy" are ordered statements of goals and means, and reasoned alternative options. By "reasoned" I mean options which indicate the probable results of the available choices in various time frames. Such a policy analysis may also show decisional blind spots—that is, attractive options which lack of data or techniques make unsafe in the longer run.

These are all practical tools which must be developed and perfected if public decision makers are to be asked to abandon the traditional uses and abuses of policy.

The Role of Lawyers

The development of the policy link as the transmission process

18. Mayda, *Environment and Resources: A Public Policy Study* (Mimeog., June 1967), published as ENVIRONMENT AND RESOURCES: FROM CONSERVATION TO ECOMANAGEMENT (Rio Piedras 1968).

19. A schematic representation is in Appendix C *infra.*

on which the quantity and quality of environmental law depends is a joint task of several disciplines. To fully participate in this task is a particularly important function facing contemporary lawyers.[20] Although it may still sound like a new and narrow specialty, I should say that this task is not one for a small specialized elite, but for all lawyers. Let me pick up this point for a moment before I return to the policy process.

The obvious fact is that besides the new specialty in policy oriented generalization and synthesis for ecomanagement, lawyers are also 1) citizens, 2) practitioners in non-environmental law fields, and 3) practitioners in environment law. What does this lead to?

It is not necessary to belabor the importance of an informed bar as a group of citizens with influence on public affairs which is far disproportionate to their numbers. But the policy process for ecomanagement is a concept which has to be sold to governments on all levels. The ratio of lawyers in various branches of government makes it doubly important that they understand the concept well and therefore advocate it effectively—in the face of all kinds of environmental backlashes and the perfectly normal tendency of special interests to pooh-pooh the matter.

The substantial changes in values and techniques which effective ecomanagement will require, will also affect numerous traditional disciplines of law. Think for instance of the impact of the new concept of land use (limitations on private development of private land); or of the multiple possible uses of taxes as disincentives—from family planning to the switch from virgin materials to recycled materials.

The growth of an environment law bar is also very necessary. In fact, this new field shows again that law at its best is a wonderful empirical instrument which can be handled with imagination and skill in unprecedented fact situations. Until systematic environment law is developed, lawyers must make do with what there is. If necessary they may even have to polish up some quite rusty normative tools.

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20. A recent major survey of principal research trends in the social and human sciences, prepared for the UNESCO notes somewhat wistfully what appears to be a marginal and ambiguous role of law within ecomanagement and other emerging multidisciplinary fields. V. Knapp, *Science Juridique,* UNESCO: Etude internationale sur les tendances principales de la recherche dans le domaine des sciences sociales et humaines 142 (deuxieme partie 1972). But this implies viewing law in its narrowest sense—in fact too narrow even for the purpose of any contemporary "purely" legal uses—although this has been apparently the first reaction of some academic lawyers called to contribute to the analysis of environmental problems and means of dealing with them. *Cf., e.g.,* MASS. INST. OF TECHNOLOGY, *Man's Impact on the Global Environment* (1970).

Here are three examples from recent practice in the United States:

—In the *Standard Oil* case (1966),[21] a provision in the Rivers and Harbors Act of 1899 was used to convict the company of illegal discharge of aviation gasoline into St. John River. The act prohibits the depositing of "any refuse matter of any kind or description" into navigable waters. Originally it aimed, of course, at potential threats to navigation. Since this decision, the 1899 law has served as a major environmental protection instrument.

—In the *Mineral King* case (1972),[22] decided by a sharply divided U. S. Supreme Court on a narrow technical interpretation of the petitioners' standing to sue, Justice Douglas argues in a dissenting opinion in favor of the new notion that ecosystems should be given a legal personality (such as ships and corporations have) for the purpose of defense against destruction. Another dissenting justice, Blackmun, advocates "imaginative expansion of our traditional concept of standing . . . to litigate environmental issues." There can be little doubt that these dissenting opinions will, like many earlier ones in other areas, sooner or later make the law through legislation or through majority decisions.

—An Ohio trial court issued in May 1972 a permanent injunction against a metal plating concern in Cleveland which was discharging daily some 40,000 gallons of cyanide and chromic acids into the Cuyahoga River. The injunction was based on a state law which prohibits public nuisances. The law was passed more than 100 years ago to discourage prostitution—of women, not of the biosphere.[23]

Although these and similar instances exemplify the admirable intuitive empiricism of lawyers, the positive law in all these cases is bursting at the seams. The common-law process of environment law making is obviously only an emergency input. Major pieces of legislation, like the National Environmental Protection Act of 1970 are closer to the model. But I have given earlier examples which show that we face a syndrome which is not only environmental in the narrow sense. It has strong, even decisive, human and social ingredients. This is still another way in which to link it with law as a tool of social engineering in the sense of problem solution. But as the purely environmental, that is pollution, problems can not be solved on narrow technical ground, neither will the most brilliant advocacy, nor even major, but piecemeal, legislation do.

21. United States v. Standard Oil Co., 384 U.S. 224 (1966).

22. Sierra Club v. Morton, 405 U.S. 727 (1972).

23. New York Times, May 28, 1972.

Are Lawyers Equipped?

Let me repeat that the development and maintenance of the policy framework for ecomanagement is a multidisciplinary task of natural and social scientists, hard and soft technologists, including systems analysts and planners, and policy scientists including policy-oriented lawyers.

Policy orientation requires from lawyers a quantum jump in legal theory and practice which is comparable to, but is more extensive than, the jump from the 19th-century exegesis of the codes to the 20th-century sociological law.

For this jump we are partly well equipped, partly under-equipped. As a profession we are particularly weak in the philosophical underpinning for policy thinking (posture, orientation). A typical lawyer the world over is rule oriented. This is what he was taught in school. This is what most practice is about. Even when he acts as counsellor, his advice, no matter how imaginative, is bound by positive law. Policy, the "ought to be," has been expelled from law by Austin and Kelsen, the dominant influences on the legal "science" in the last 150 years. Law has been supposed to be law, not some -ology.

As I have already said, the policy ingredient, though often hidden behind whatever semantics or taboos characterized a particular era or system, was always present in the legislative and judicial practice. But there is a great difference between the incidental and the conscious, the systematic. The difference is not in the operational vocabulary. The difference is in the available theory.

Environmental policy and law are not outside the rule that the quality and utility of practice in any discipline depends on the theory which supports it. Where would the various industrial, medical and other technologies be without their basic experimental/quantitative sciences? Law *is* a social *technology*, but jurisprudence is not yet an empirical scientific discipline. The germinal ideas of Jhering, Holmes, Gény, Ehrlich, Dewey, have laid foundations for it beginning more than 100 years ago.[24] But the tradition of speculative philosophy, which dominated jurisprudence for well over 2000 years, has been a great obstacle.[25] As a consequence, law does not yet have a theoretical matrix comprehensive enough to accommodate with ease

24. Mayda, François Gény and Modern Jurisprudence (1969 Bailey Lectures, Louisiana State University Law School). (Expected date of publication: 1975).

25. Mayda, *Teoria de derecho: Un ensayo sobre la definición*, 34 REVISTA DEL COLEGIO DE ABOGADAS (P.R.) 85 (1973). This article is the translation of an expository note in the planned volume FRANÇOIS GÉNY AND MODERN JURISPRUDENCE.

the new demands and stresses. Nor can it give us in a sufficiently instant form some ready conceptual and methodological tools to perceive and to deal with the new problems related to ecomanagement.

In all fairness it must be said that law has not been the only underdeveloped social science. Geny's "*données*," postulated at the turn of the century, were in fact policy data.[26] But only about fifty years later did social sciences begin to produce a meaningful and usable data base in any systematic fashion. The specific "policy science," cast in a form compatible with our computer technology, has reached the maturity evidenced by the publication of a separate international journal only in 1970. Hence, contrary to possible impressions, law is this time not so much behind the other disciplines—neither in the search for synthesis and theory, nor in the endeavor to develop the new type of a specialist capable to participate in the design of multidisciplinary projects and methods, and to work effectively in teams with other specialists.

Entering this new arena of ecomanagement, lawyers have also some special and valuable professional qualities for their job. Among them are:

—The cultivated talent for the "art of the relevant"—that is the capacity to synthesize new data, recognize and order the issues important to decide or to act upon, and to express them in the language of government and law.

—The dialectic adversary abilities which should probably be more effectively made part of the search for the best options.[27]

—Experience in, and feel for, empirical policy making which is a good base for developing the new systematic policy orientation.

—The intimate casuistic knowledge of the inner workings of the political government puts lawyers in the position of a natural interface between policy knowledge and political decision. Although systematic policy formulation must always be firmly planted on the ground, it should not be a priori stifled by worrying about the politics of implementation. Policy making is not a substitution for the political decision. The two ought to be clearly functionally separated. But when it comes to concrete policy recommendations to the decision makers, it can do no harm if the favored option is presented in rhetoric sensitive to the political problems of getting a law enacted, a budget passed, a mechanism of enforcement set up. This does not mean that the chosen best policy recommendation should be compro-

26. Mayda, François Gény and Modern Jurisprudence (1969 Bailey Lectures, Louisiana State University Law School). (Expected date of publication: 1975).

27. Yarmolinsky, *Responsible Law-making in a Technically Specialized Society*, in LAW IN CHANGING AMERICA 104-105 (G. Hazard ed. 1968).

mised. It suggests the probability that a statement of the problem and of the solution, which takes into account the perspective and the action frame of the political decision maker, can only help to promote the policy goal.

—Finally, lawyers are typically not only social engineers—case-by-case problem solvers; they are also, at their best, social architects—the generalists-designers of new societal orders.

It is only with reference to these specifications that it may be even suggested that policy-trained lawyers are possibly better overall equipped for the policy development and transmission tasks than planners, economists or other social scientists (with the exception of some political scientists). This is not saying that the inputs of all these disciplines are not equally needed on the social science side of ecomanagement teams. It is saying that lawyers must not sit and wait until they are asked to write new laws.

APPENDIX A

ENVIRONMENTAL POLICY & MANAGEMENT (ECOMANAGEMENT)

Preliminary synopsis of elements*

1. *Ecosystems*

1.1 Biosphere
1.11 Natural ecosystems
1.12 Man-made ecosystems

1.2 Study of biosphere
1.21 Life sciences
1.22 Earth sciences
1.23 Physical sciences
1.24 human/social sciences
1.25 Aquatic ecology
1.26 Terrestrial ecology
1.27 Human ecology

2. *Resources*

2.1 Biophysical
2.11 Atmospheric
2.12 Hydrological
2.121 Marine
2.122 Estuarine
2.123 Fresh Water
2.13 Land
2.131 Space
2.132 Soil
2.133 Subsoil

2.2 Other environmental
2.21 Wilderness (incl. wildlife)
2.22 Scenic
2.221 Natural esthetics
2.23 Recreational
2.231 Parks
2.232 Sports facilities (natural)

2.3 Human
2.31 Population dynamics
2.32 Individual/productive
2.33 Social
2.34 Cultural
2.341 Tradition
2.342 Education
2.343 Modernity
2.344 Value systems and subsystems (see 5.1)

2.4 Technological
2.41 Technologies ("hard")
2.411 Production/construction
2.412 Service
2.413 Prevention
2.42 Infrastructure systems
2.421 Power
2.422 Transportation
2.423 Communication
2.43 Social technologies ("soft") (see 4.22, 4.23)

3. *Environmental deterioration*

3.1 By media
3.11 Air
3.12 Fresh water
3.13 Ocean
3.14 Land

3.2 By matter
3.21 Chemical
3.22 Thermal
3.23 Radiation
3.24 Artificial noise
3.25 Waste
3.251 Gaseous
3.252 Liquid
3.253 Solid

3.3 By origin
3.31 Agriculture
3.32 Mining
3.33 Industry
3.34 Human settlements
3.341 Population density

3.4 Systemic & synergistic effects
3.41 Systems

3.411 Urban
3.412 Rural
3.42 Syndromes
3.421 Environmental
3.422 Social/societal

4. *Elements of ecomanagement*

4.1 Established fields
4.11 Natural resources
4.111 Rehabilitation
4.112 Conservation
4.113 Development
4.12 Human resources: Health
4.121 Public
4.122 Industrial
4.123 Environmental
4.124 Sanitary engineering
4.13 Environmental esthetics
4.131 Architecture
4.132 Landscaping

4.2 New technologies & systems
4.21 Technical
4.211 Data: flow (sources see 1.2)
4.2111 Collection
4.2112 Processing
4.212 Systems analysis
4.2121 Hardware
4.2122 Software
4.213 Environmental engineering

4.22 Decisional (macroplanning)
4.221 Data: sources
4.2211 Sociology
4.2212 Behavioral sciences
4.2213 Axiology
4.2214 Economics
4.22141 Econometrics
4.22142 Labor economics
4.22143 Consumer economics
4.22144 Welfare economics
4.222 Data: evaluation/synthesis
4.2221 Technology assessment
4.2222 Benefit-cost analysis
4.2223 Systems synthesis
4.2224 Modeling
4.22241 Mathematical methods
4.2242 Empirical methods
4.2225 Policy development

4.23 Executive
4.231 (Micro) planning
4.2311 Physical
4.2312 Economic
4.2313 Social
4.23131 Population
4.23132 Consumerism
4.23133 Poverty
4.2314 Integrated/systems
4.23141 Urban
4.23142 Rural
4.23143 Regional
4.23144 Global
4.23145 Quality-of-life

4.232 Institutions & processes
4.2321 Theory & design
4.2322 Interest groups
4.23221 Environmental advocacy
4.2323 Decisional process
4.23231 Executive
4.23232 Legislative
4.23233 Regulatory
4.2324 Law (positive, environmental)
4.2325 Budget
4.2326 Enforcement
4.23261 Executive (Police)
4.23262 Administrative
4.23263 Judicial
4.2327 Integrated administrative process (PPBS)

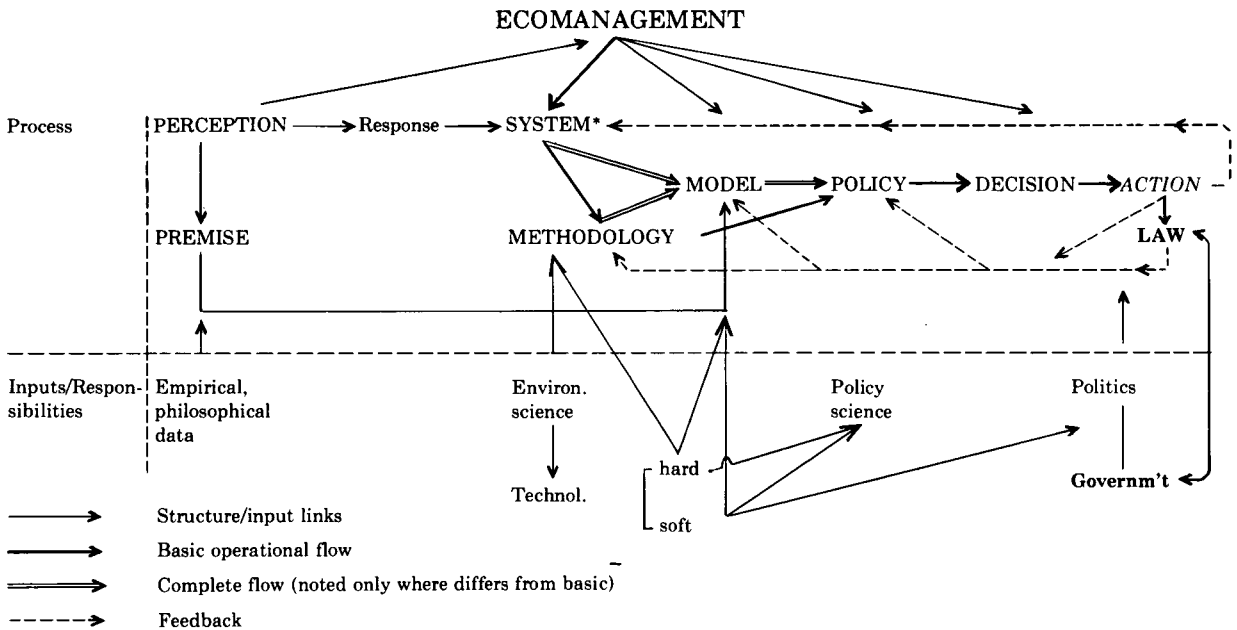
5. *Social bases for ecomanagement*

5.1 Value systems
5.11 Cultural anthropology
5.12 History
5.13 Philosophy
5.131 Axiology
5.132 Environmental ethos
5.133 Socio-economic ethos
5.14 Art

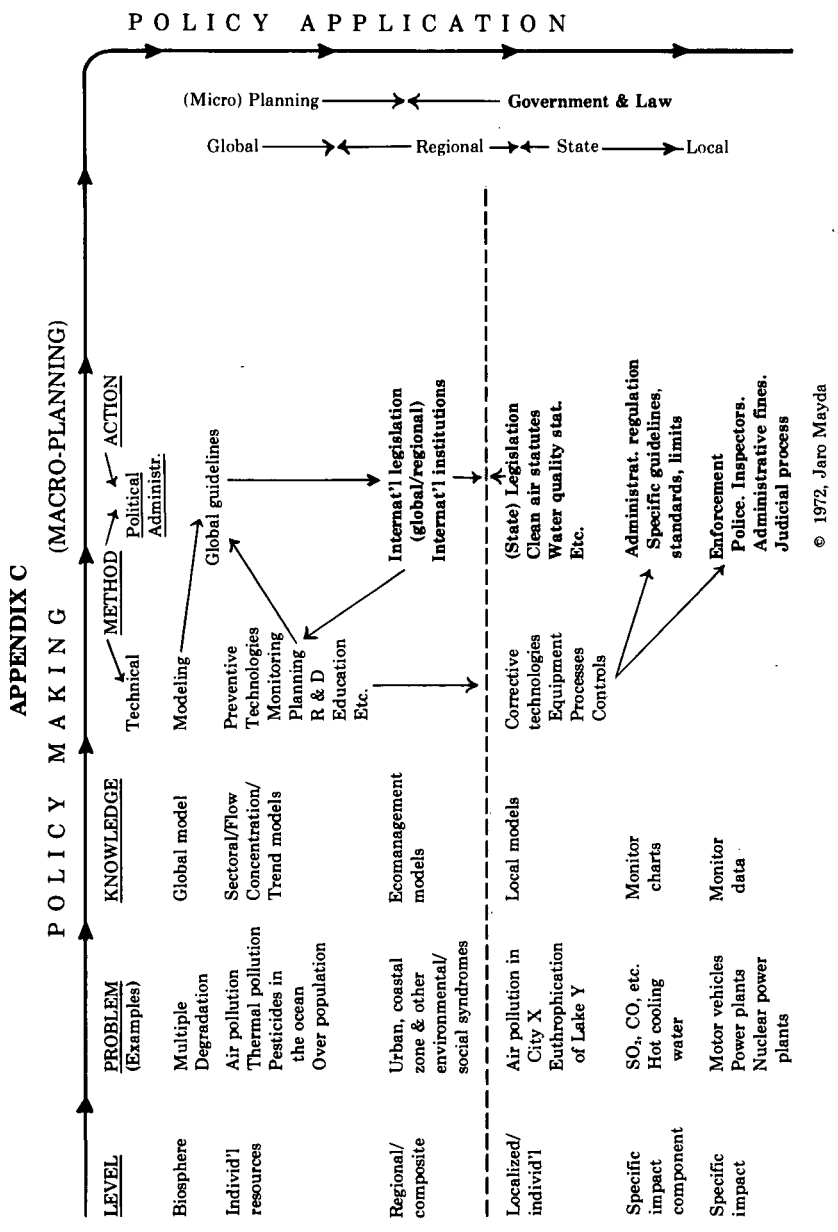
5.2 Educational technologies
5.21 Primary
5.22 Secondary
5.23 College
5.24 University/Graduate
5.25 Special/technical
5.26 Extension
5.27 Continuing
5.28 Mass media
5.29 Publication & dissemination
5.291 Professional
5.292 Popularizing

5.3 Public opinion & consensus

APPENDIX B



* "System" means here the total of available data. This system consists of at least the following *categories of data*: Technical. Decisional (includes Policy). Executive. Institutional (includes Law). Cultural/axiological. These categories include, in a varying mix, all relevant *forms of knowledge*: measurable data, probable hypotheses, educated intuition, and other projections of experience. Cf. Appendix A, Class 4.0 (principally Category 4.2) and several items in Category 5.1.


APPENDIX C
POLICY MAKING (MACRO-PLANNING)
POLICY APPLICATION
(Micro) Planning
Government & Law
Global
Regional
State
Local
LEVEL
PROBLEM (Examples)
KNOWLEDGE
METHOD
Technical
Political
Administr.
ACTION
Biosphere
Multiple Degradation
Global model
Modeling
Global guidelines
Individ'l resources
Air pollution
Thermal pollution
Pesticides in the ocean
Over population
Sectoral/Flow Concentration/ Trend models
Preventive Technologies
Monitoring
Planning
R & D
Education
Etc.
Internat'l legislation (global/regional)
Internat'l institutions
Regional/ composite
Urban, coastal zone & other environmental/ social syndromes
Ecomanagement models
Localized/ individ'l
Air pollution in City X
Euthrophication of Lake Y
Local models
Corrective technologies
Equipment
Processes
Controls
(State) Legislation
Clean air statutes
Water quality stat.
Etc.
Specific impact component
SO_x, CO, etc.
Hot cooling water
Monitor charts
Administrat. regulation
Specific guidelines, standards, limits
Specific impact
Motor vehicles
Power plants
Nuclear power plants
Monitor data
Enforcement
Police. Inspectors.
Administrative fines.
Judicial process
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