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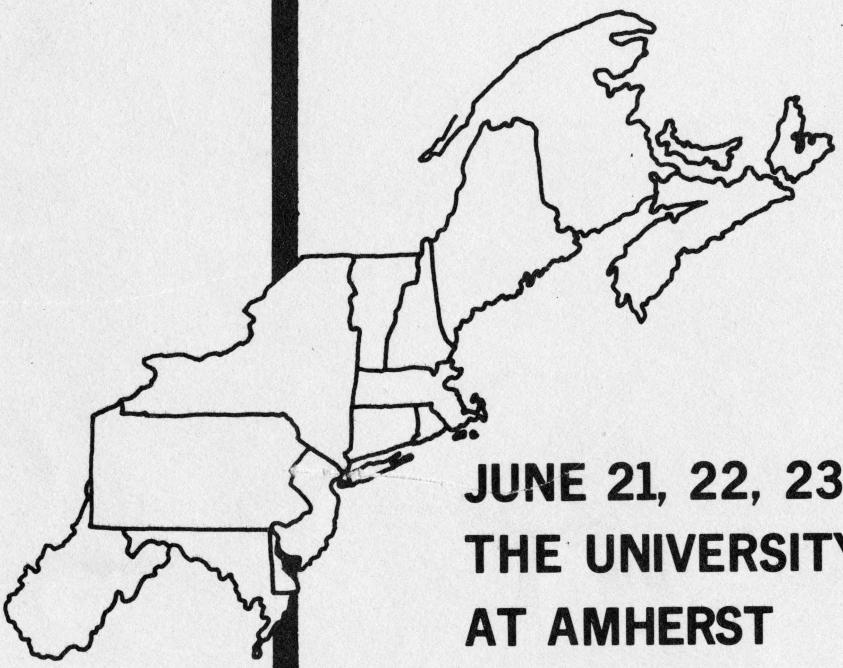

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PROPERTY AND ENVIRONMENT

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Our examination at this time of two ideas--property and the environment--is not entirely coincidental. The widespread concern for environmental issues has penetrated every crevice of our consciousness and the academic world has been in for its share of interest in our ecosystem. The subject of property, too, has benefited from rising interest although of a much smaller community of economists, [1], [16], [23], [26], [27], [28].

The ideas of both property and the environment share the quality of "systems"--one a system of rules, the other a system of physical qualities. There is little doubt that these systems bear upon one another and, if our concern for the environment extends to the rules governing our behavior, we will want to look at these ideas together.

In the paragraphs to follow, I propose that we examine property in terms of its economic function, express the environmental issue as externality problem, and then look at property as a set of rules in relation to other setsof rules. If we consider the multitude of rule systems, and the problem of complexity, property has much going for it. However, the property system needs extension and modification if it is to play a role in environmental improvement.

Nature of Property

Environmental issues are best served with a functional view of property.[2/] Demsetz, for example, states the function of property as "that of guiding incentives to achieve a greater internalization of externalities." These externalities, with which we deal later, arise when it costs too much, or there is some legal impediment, to negotiation among parties who receive benefits or bear costs.

1/ I appreciate the suggestions of Robert Boxley and William Anderson on an earlier draft.

2/ Property may be described in many ways including its origins, historic developments, modern legal structure, participants and creation as in for example: [3], [6], [14], [25], [29], [35], [37], [40], [49], [50].

Until Coase [16], Demsetz [26] [27] [28], Calabresi [13],[3] and others began in recent years to enquire into the nature of social costs, negotiation and transaction costs the property system was considered invariable or at least economically benign. The classical tradition of economics, while recognizing differences in wealth holding, did not concern itself with the property system as such. Now a substantial literature on the economics of property is beginning to emerge. Much of the literature is concerned with the way the property system distributes costs.

As a form of exchange system,[4] property enables parties to trade claims and obligations. The value of the promises traded will be a function not only of the expected quantum of benefits or burdens but also the confidence attached to the promise and the cost of dickering about it. The confidence attached to a

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3/ Calabresi, at 68, says "...if one assumes rationality, no transaction costs, and no legal impediments to bargaining, all misallocations of resources would be fully cured in the market by bargains. Far from being surprising, this statement is tautological."

4/ Boulding [8] describes an exchange system as "you do something that I want and I'll do something that you want" and contrasts it with threaf systems "you do something I want or I will do something you don't want" and integrative systems "you do something because of what you are and I am."

No definitive statement of property as a rule system will be attempted here although some appreciation for scope of such employment can be gained by examining the juridical aspects of rights, duties, and liabilities contained in [39]. Hohfeld's scheme forms the basis of the American Law Institute's Restatement of Property, [3].

Among the features of any rule system as entry, options and restrictions, timing and order, powers or sanctions, penalties, and exits. For present purposes, examples of real property rules should suffice:

Entry: age qualification, credit, competence
Options and restrictions: land use regulation, leasehold, covenants, easement, mineral exploration
Timing and order: life estate, conditional transfer, descent, future interest
Powers and sanction: eviction, money damages, specific performance
Penalties: liens, foreclosure, eviction, damages
Exit: gift, sale, reservations, death

promise will in turn be a function of the likelihood of its enforcement. For a substantial portion of the goods and services in our commercial traffic we take for granted the enforcement of property rights and other terms of trade.

When the terms of exchange are widely understood, confidence in enforcement assumed, and costs of negotiation are slight, the market can operate smoothly with little overall attention to its own working. The decision making is decentralized and inexpensive. Where these qualities are not present, more resources must be devoted to organization and management and decision making will be more centralized.

It would seem to follow, then, that a property system to be effective requires clearly defined rights that can be negotiated and relatively few, unambiguous, and widely applicable rules for transacting and enforcing. Property, of course, is an inter-person relationship.5/ The rules which make up a property system arise out of the arithmetic of combinations.6/ A universe populated by only a handful of individuals could accomplish its inter-person relations by direct contract. Large numbers of people and large numbers of property objects require general rules.

These general rules as they constrain or limit the range of alternative actions by an individual are limiting and are in a sense a cost. Combined with the negotiative, administrative, and enforcement machinery they become a family of transaction or tertiary costs. We can think of them as costs of making the system work.7/

5/ An insightful article [48] contains an excellent example of the recitation: "Property rights are not relations between men and things. They are codified relations among men arising from the existence and pertaining to the use of things..."

Also, [1], page 130, "...it is silly to speak of a contrast or conflict between human rights and property rights. Property rights <u>are</u> human rights to the use of economic goods..."

6/ An approximation of growth of individual contracts, C, with respect to property objects would be $C\text{-}n!/r!(n\text{-}r)!$ for n contracting persons taken r at a time. The growth in C resulting from an increase in n is extremely rapid, and would soon become unmanageable for the persons involved. Thus, general rules are developed to cover classes of properties and situations.

7/ Aside from the negotiation costs which impinge directly on the parties involved, the community at large incurs some costs in providing a nexus of transaction for its members. Some transaction costs, therefore, are incorporated in the exchange process but other transaction costs are not assigned and are absorbed by the public at large. Organization of any multiple person activity is not costless. Whether the costs are assignable is an issue for our property system.

So far as environmental matters are concerned, the property system is best contrasted to a system of centralized control and decision making such as state planning, regulation, and investment. The property system implies decentralized decision making, assignment of costs and consequences, and exclusive participation in benefits of actions. Systems of centralized control imply specialized decision makers and non-assignment of benefits and costs.[8/]

Transaction, tertiary, or organization costs will be incurred whichever system is used. Just as friction-free mechanics appear to be only an ideal so a system without organization costs appears only an ideal. Neither property nor a regulatory system would appear to have any universal advantage. The economic choice of use of property or some alternative would depend on both total transaction costs and the equitability of their distribution.

It is by no means clear when one considers the costs of legislation, administration, and adjudication that the costs of regulation for environmental control will be less than the transaction costs of a property system and there is doubt whether the assignment of costs will be more equitable.

The issue of property versus centralized control in environmental management is not so much either/or as how much of each. Perhaps the greatest advantage of a property system is that it frees bureaucracy from involving itself in decisions it does not need to make. The citizen-participants collectively face fewer rules and can make cheaper transactions. The major problem in developing an effective property system in relation to the environment is the articulation of negotiable interests out of what currently appear common properties.[9/]

8/ Using Calabresi's rule for liability (incidence costs should fall on the cheapest cost avoider) Michelman shows that bringing private nuisance actions against pollution enmitters may not provide cheapest cost avoidance. Calabresi's recommendation for rule design is to centralize rule application for specific deterrence (collective, regulatory action) and decentralize rule application for general deterrence (e.g., market, see [41]).

9/ In discussing property as a system we can distinguish three possible types of inadequacies--it performs its present activities inefficiently, it performs unnecessary activities, it does not perform activities that it should. To the extent that negotiable environmental interests have not been articulated the property system suffers a type 3 inadequacy. Inadequacies of the first two types, by contrast, are illustrated by our present procedures for land titling, recording, and insuring. They have been discussed in detail; e.g. [17], [32], [43], [46], and [47].

The Environment

The environmental approach may add a touch of irony to the concept of property. When everything is related to everything else, who can say what is a possession and what is a possessor? Those who are committed to a shrewish demanding plot of suburban greenery may fully appreciate the real meaning of being property as well as owning property. When the "rights" of the obligated exceed the rights of the obligator, it is hard to hold fast our conventional ideas of property and power.

This is not mere whimsy. The obligations of property holders, called "stewardship" in an earlier day, are demands for behavior that may appear as losses in a short run economic sense.10/ Obligations concerning the use of property are a recognition that one's behavior affects other people and things. As Allison Dunham put it: "A student of land law or land economics need not study international relations to know that what happens on one portion of the earth's surface affects or is dependent upon what happens on other portions of the surface of the earth." [31].

Patterns of behavior on one portion of the earth's surface bring about expectations of persons on other portions and the expectations are congealed into rights.11/ Ownership of property implies obligations. Can we then not say that a property object has "rights" in its owner?

The environmentalist movement has given us a healthy respect for "side effects." After a decade of objective-oriented policy making,12/ we have come to appreciate a somewhat broader framework of systems. Drawing on concepts developed from ecology, the environmentalists have accepted systems with less rigid boundaries between objectives, resources, and constraints.

The impact of this ecological viewpoint has been accompanied by serious questioning of the quality of life and well being. Boulding [9] [10] and, later

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10/ On stewardship see, for example, Genesis 2:15 N.: "The Lord God took the man and put him in the Garden of Eden to till it and care for it." M. Harris and J. Ackerman [38] discuss stewardship as a basis for land reform. Harris also treates stewardship as a broad ethical force in [36]. Burl Back recommends more attention to the ethical dimensions of our work. In his notes [5], Back states, "I believe excursions into normative aspects of a subject assist in properly distinguishing it from the positive aspects and in making our scientific work more relevant..."

11/ The way in which expectations develop into rights is shown in [50].

12/ For some shortfalls in PPB, for example, see [21].

Galbraith [33] and others helped to crystallize the uneasiness we felt about our criteria of well being.13/

But recognizing issues of environmental quality indicates primarily that we are dissatisfied with our measures of well-being. Already we have set out to quantify what we first called quality. From physical quantification, we may proceed toward valuation.14/ From valuation we may have a basis for choosing among objectives that carry costs. Quantities, values, prices, and exchange are elements in a market to "internalize externalities" which Demsetz [26], [27], [28] said was the function of the property system.15/

Externalities

The environment concept most likely to be useful for the property issue is that of external economy or diseconomy.16/ The externality and environment ideas dwell naturally together because both focus on connections with, rather than separations of, people, processes, and property.

13/ Near the close of the 60's, the Department of HEW, under instructions of the President, took a major step toward social indicators when it issued [45]. Reference to two significant documents [18] and [44] is taken to represent not origins or forward looks at environmental questions but, as reports to the President, landmarks of arrival of public sentiment. I have profited greatly by an unpublished critique of [44] by W. D. Anderson. Anderson's well-documented report covers not only the Goals Staff Report but much of the significant literature relating to the report.

14/ The U.S. Environmental Protection Agency, for example, sets an allowable limit of 9 parts per million of carbon monoxide in the air, although current city levels exceed these standards by 3 to 4 times. See, for other examples, [56].

15/ See also [19]. He says, for example at 792, "We can now reformulate the water problem and blame its complexity not on nature and the laws of fluids, but on man and his failure to devise property rights to the use of natural water systems."

16/ The early history of the externality concept seemed to concentrate most on allocative efficiency. Later, perhaps from advances in ideas on public goods, the externality concept reflected increasing concern for distribution and well-being issues. An excellent discussion of the extensive literature on externalities is contained in [42], [52], and [54]. Mishan [42] says: "The priority given to allocative aspects in real economic problems cannot, I think, be justified; certainly not be recourse to welfare economics. The more "affluent" a society becomes, the less important is allocative merit narrowly conceived."

Externalities associated with the environment are largely technological,[17] i.e., some physical connection exists between the unintended or incidental effects of some action and its direct or purposeful effects. Power generation may cause an unintentional rise in a stream's temperature. Building construction may create an unintentional obstruction of view. Dog walking creates unintentional pedestrian hazards. Externalities are of interest to us because they impinge on different persons or properties. If the effects of one action affect the opportunities for some other action that might be taken by the same firm, the decision process is relatively simple. If, however, the actions of one person affect the wealth or well-being of another, we have transfers and a social issue. If these costs are assignable and negotiable, and if transaction costs[18] do not exceed anticipated benefits, they can be managed under property rules. If an externality problem cannot be solved under property rules then some collective measure must be undertaken and a decision must be made by someone other than the parties affected.

The issue in externalities associated with environmental spillovers is articulating (identifying or describing if you prefer) a right, privilege, liability, or duty in a negotiable form, [20]. The externality of environmental spillovers, just as property, is a relationship between claimants. As a matter of public policy, we are concerned about the rules by which these claims are identified, exercised, and enforced. The legal dimension deals with procedures and protections. The economic dimension is one of transaction cost.[19]

17/ Distinctions between technological and pecuniary externalities, generally attributed to J. Viner, [57] appear to be of limited usefulness in the discussion of environmental spillovers. In fact, pecuniary externalities appear to be nothing more than the disequilibrating forces of the market so they do not call for any special treatment.

18/ Transaction costs are the costs of negotiating, including enforcement. In the case of property transaction, costs include collecting pertinent information, time, and other opportunity cost of negotiators, excluding others from bargaining or benefits therefrom, and perhaps most difficult of all, deciding exactly what is being negotiated.

19/ I have deliberately excluded the usual allocative questions such as the resource combinations with and without, or output estimates from, various classes of pesticides; the costs of alternative sewage disposal schemes; the placement of power generating plants. Such approaches to the environmental problem may be interesting but are tangential to the property question.

The economic objective of institutional formation, or reformation, is to reduce the costs of negotiating either between individual, between individuals and governments, between governments or among all parties. Rules to prevent or indemnify environmental spillovers should be compared in terms of transaction costs.

In public choice, transaction costs may appear as items in government budgets and also in less tangible forms such as hearings and public meetings, voluntary effort, judicial or political action, and delays in performance. Zoning hearings, staff preparation, and meetings of county supervisors, for example, are major users of local government decision resources. Yet most of these costs do not appear as costs to the parties involved in the action. Land-owners seeking to obtain the benefits of a higher valued land use will prefer the costs of zoning litigation to the absorption of the full external costs of land use change not because the former are less but because many of the zoning costs are shifted to a public.

Access to the System: Who Can Enter and How

A broad interpretation of transaction costs encompasses the trade-offs under our constitution between the operational efficiency of government and the protection of individual rights. Obviously government cannot intervene in every environmental relationship among citizens. Benefits from such interventions would be far less than the costs incurred by government. Rules such as standing to sue, for example, prevent the clogging of judicial functions with suits stemming from the vast potential of claims of citizens on government. These rules seem to acknowledge that judicial resources are not unlimited and that certain requirements must be met to qualify for entry into the courts.20/

20/ A critical decision of an organized public is the choice of a set of rules to accomplish certain objectives. The issue in the text above has been framed in economic terms; i.e., that government must apply its resources to problems of only the highest priority. The decision can also be framed in legal or political terms, namely authority or spheres of capacity available to the differing units of government. Basic powers of the Federal and State governments as expressed in the 10th Amendment are: "The powers not delegated to the United States by the Constitution nor prohibited by it to the States are reserved to the States respectively, or to the people." Thus the 10th Amendment forms the basis for much of State authority in land use regulation and a variety of other environmental authorities. In general, with respect to natural resources, the Federal Government operates with commerce, war, tax, and navigation powers; States and local governments by police power and direct taxation. Eminent domain is a presumed not declared power which rests with all levels of government and can be exercised or delegated. The so-called spending power is the dominant power of the Federal Government for affecting resource use and coupled with the income tax, for distributing benefits and costs.

The individual, on the other hand, needs a mechanism or procedure by which he may have his claims honored or grievances redressed. The procedure he and others with similar claims use will have an important bearing on how transaction costs are generated and who will bear them.

Recently, the criteria for "standing to sue"--the qualifications to bring suit in a court of law--have been opened for re-examination. Largely because of increased environmental awareness courts have been forced to cope with actions to protect scenic, historic, and recreation areas.[21/]

Until recently,[22/] standing required that the plaintiff show that he has a direct economic interest or that he is clearly representative of a group with such interest. Thus environmental cases which involved aesthetic nonmonetary interests or which involved a widely dispersed interest would be very difficult to enter into a court.

In Scenic Hudson vs. Federal Power Commission,[23/] the court expanded the bases on which environmental cases could be entered allowing "aesthetic, conservational, and recreational" values to constitute an interest. And in Citizens Committee for the Hudson Valley vs. Volpe[24/] the Court allowed standing

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21/ Sax provides historical background of court role, [53].

22/ Flast vs. Cohen, 392 U.S. 83 (1968). A case challenging use of Federal funds to finance subjects and purchase textbooks in sectarian schools. Issue was whether taxpayer had standing in light of previous decision, Frothingham vs. Mellon 262 U.S. 447 (1923), preventing taxpayer from challenging constitutionality of a Federal statute. In the Flast case, Chief Justice Warren for the court stated that it was necessary only that the taxpayers "demonstrate the necessary stake as taxpayers in the outcome of the litigation" and the extent of individual stake was not at issue as he said it was in the controversial Frothingham.

23/ Scenic Hudson Preservation Conference vs. Federal Power Commission 354 F. 2nd 608 (2d Cir. 1965). The conference and others sought to prevent FPC licensing of the Storm King Mountain project by Consolidated Edison and Commission challenged plaintiffs on ground they had no standing because of a lack of economic injury.

24/ Citizens Committee for the Hudson Valley vs. Volpe, 425 F. 2d 97 (2d cir 1970). Citizens sought administrative procedures act review of a Corps of Engineers permit to land fill on the Hudson River. Defendants claimed plaintiffs lacked standing because of direct (Citizens Committee and Sierra Club claimed no economic harm) or economic interest but the court in allowing standing said: "the public interest in environmental resources--an interest created by statutes affecting the issuance of this permit--is a legally protected interest affording these plaintiffs, as responsible representatives of the public, standing to obtain judicial review..."

to both the Citizens Committee and the Sierra Club neither of which could show direct economic interest.

Although the bases for standing have been considerably extended, substantial grounds for controversy exist. Legal interest in Scenic Hudson was established by authorities contained in legislation[25/] and the recognition of aesthetic or conservation values did not remove the requirement that a plaintiff must show a substantive injury even if not economic.[26/]

The issue of standing in environmental problems is by no means settled, even though courts have liberalized the bases on which petitioners can claim injury. To some extent, the fancy legal footwork required for immediate action on pressing environment problems is due to a lack of a definable property interest. If meaningful rights in the environment had been specified in Scenic Hudson, for example, the court would not have had to reach out to legislative authority to show standing. One of the strongest arguments for identifying environmental property rights might be the reduction or elimination of legal actions.

Our legal processes can be flexible, responsible, and at times, extremely imaginative. For tactical victories in courtroom[27/] or legislature, however, we may be paying an immense price in litigation, controversy, resource reallocation, delay, and organizational complexity.

Public Good: The Open Space Case

Several features of our natural environment have the qualities of a public good. Open space, for example, may be so situated that it provides satisfaction

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25/ The Federal Power Act 16. U.S.C. 803.

26/ Association of Data Processing Service Organization, Inc. vs. Camp. 397 U.S. 150 (1970). Although the petitioner claimed and was granted standing on grounds of economic interest, the court specifically mentioned "non-economic values and stated: "We mention these non-economic values to emphasize that standing may stem from them as well as from economic injury on which petitioner relies here." See also Barlow vs. Collins 397 U.S. 159. (1970).

27/ The advocacy system affords little promise in the development of improved institutions. The object of the advocacy game is to win battles not build systems.

to a large number of people at no assignable cost to the individual. If open space is a public good,[28] how is it to be supplied and maintained, how will it be financed, and, how is access to it to be controlled? Answers to these questions may be similar for other public goods.

The idea of public goods is perhaps most useful when interpreted in terms of individual behavior. A public good, by economic definition, is indivisible. It cannot be separately assigned to an individual.[29] An individual, in other words, is unable to exclude others from benefiting from the existence or use of a public good.

Although not without precedent,[30] Samuelson aroused interest in public goods among theoreticians with his article on the Pure Theory of Public Expenditure in 1954, [52]. Since that time scholarly contributions have been substantial [16], [22], [55] and the original dichotomy of public and private has been modified to degrees of publicness. Buchanan [12] relates degree of indivisibility to the size of interacting group. His scheme supplements the divisibility ranking with ranges over which the divisibilities are relevant. These ranges depend on the size of the interacting group. Open space for a private club, for example, is indivisible--hence public--within the club membership but is divisible as to non-members. National parks, on the other hand, are indivisible over the whole population. Divisibility, in short, is a function of group size.[31]

28/ Some features of open space make it an extremely interesting example of a public good. Open space either can be produced and purchased directly or can be obtained by control or taxation. Although the various methods may produce similar allocations, the distributional effects may differ.

29/ A private good is one in which the separate x_i quantities are summed to the total X. A public good is one in which the $x_i = X$. The category of goods of interest here will be mixed public-private: $x_i < X < \mathcal{E} x_i$.

30/ Both Samuelson and Buchanan cite Sax, Wicksell, Lindahl, Musgrave, and Bowen as antecedents. Samuelson's article contributed most as a rigorous statement of public and private goods.

31/ If the decision group corresponds exactly to the benefit group, there would seem to be little difference between the Samuelson and Buchanan interpretation of public good. In fact, they rarely will be the same in the case of public goods. Herein, seems to lie the value for policy purposes of the Buchanan extension of the public goods idea.

The divisibility features of open space are, in part, a function of their use. Some forms of open space such as the large forest are well suited for separation, other forms of open space such as road right of way may be largely for vision relief. Some open space may serve both purposes. To the extent that open space is to provide separation or exclusion, it may compete with clear unobstructed vision. Whether open space is a public or private good, will depend on its function and, as Buchanan would say, it also will depend to whom the space is open.

Allison Dunham [30] in his recommendations for private devices[32] for preservation of open spaces assumed that the publicness of private open spaces did not compete with the exclusionary purposes.[33] For this range of conditions, there appear to be no serious problems of distribution. However, private activity can intrude on public open space and, conversely, public activity can affect private open space.[34] If we deal solely with the public good dimensions, there are a number of measures[35] such as public purchase, land use regulations, easements, covenants, leases, etc., which may be used to acquire and manage open space. Advantages and disadvantages of these measures are sketched in the appendix table.

A public interest does not exist apart from the individuals holding it. Many of the policy issues involve decisions by individuals who find themselves associated with two competing publics such as landowners and motorists or taxpayers and recreationists.

32/ He says at 6, "The legal techniques available for private preservation of open space include easements, covenant running with the land, right of reentry for condition broken, and possibilities of reverter.." Title is transferred to a not-for-profit corporation which can "then transfer to government agencies and others for open space purposes and reserve to itself the private right of enforcement."

33/ The public-private competition dealt with by Dunham, in fact, was in private resistance to public non-open space uses.

34/ I recognize a definitional solution to the open space public good relationship by asserting that no private space is open, and conversely all open space is defined as a public good. This, however, seems to circumvent the problem of restricted access to areas held for privacy, or private activity in areas which generate publicly viewable vistas.

35/ These measures have been thoroughly examined in [2], [4], [34] and [51].

Outcome in the public-decision processes will be influenced by the real or imagined effects on individuals more or less identified with several publics. Actions taken by communities or governments will be the outcome of individual identifications with various publics. Models of environmental decision making that assume some overall public interest are not likely to be useful.

Publicness and privateness of goods are by no means hard, fast, and final categories. The role of property in environmental management will depend on circumstances which are always changing. For example, we now sell access to formerly free national parks.

Property rules become significant when identifiable, intense (i.e., valuable) interests can be associated with specific individuals. As these interests become diffuse and less intense, they take on publicness. Open space nicely illustrates degrees of intensity; open space in residence is often associated directly with an owner or renter; open space in a private club is shared with relatively few; in a community recreation area with larger group, in a national park with a very large group.

The assignability of interest is, in large part, a function of intensity (value) of interest by individuals. As interests become diffuse, publicness increases. As interests become more diffuse, more resources are devoted to organization, collective management, and non-market decision making. Decisions are in a sense "referred" upward to some centralized authority. Each level of referral requires a new set of decision makers, additional communication, losses of information, and increasing competition with other objectives. Primary transaction costs are not necessarily saved; they are transformed into tertiary costs of collective decision making.

The doctrinaire assumption of pure publicness in open space or other environmental management can lead to more regulation and greater expenditure than might be needed for efficient allocations, effective financing, and desirable distribution. A more careful and imaginative articulation of property rights could enhance negotiation and exchange among private interest holders. Accordingly, the problems of allocating, financing, and distributing public goods would be reduced.[36/]

36/ By expressing reservations about the unmitigated blessings of collective decision making, I did not intend to join what Boulding [7] called "our lunatic fringe who virtually deny the existence of public goods and public bads and think that all things can be done by private bargains between smoky railroads and rational dairy farmers." But another boundary of lunacy says that because a decision is made on higher authority, it is better. Our current generation of environmentalists is in greater danger of the latter lunacy.

Rules and Information

We have discussed two of the multitude of institutional issues that might arise from environmental control. We expressed the first issue of standing to sue as a question of entering a rule system for redress of some damage or harm done. We expressed the second issue of public goods in terms of the manner (group and divisibility) in which one participates in the benefits of public goods.

We return now to the question "Why property?" What reason would an organized society have for preferring or not preferring property rules as against other rules such as regulation and taxation for representing public interest? The advantages of property rules run primarily to decentralization of decision making and the direct assignment, through individual negotiation, of benefits and burdens.

In examining the relative merits of alternative sets of rules, criteria such as short time effectiveness, political feasibility, and administrative manageability and economy undoubtedly are used to judge a separate program or activity. As many programs are added together, however, and the whole effect of hundreds or thousands of public actions to subsidize, penalize, control, and manipulate are considered, the impact of complexity should enter our evaluations of rule systems. To put it in environmental terms, rules designed for some specific purpose may have organizational side effects such as complexity. For example, a proliferation of building rules, each designed to solve some specific problem, may become so complex that nothing is built. The counter forces of local government's regulation, taxation, and investment may impose contradictory behaviors on a landowner. As programs for environmental management increase, the citizen may require an ecological ombudsman to interpret the system for him.

When our rule makers are beset with a single mission such as passing a law or winning a case in court, they are not so likely to attend to the effect of their rules on the summation of rules facing individuals. Just as a stream can absorb a finite quantity of waste, so an institutional process can receive additional rules up to a point beyond which further instructions become non-functional or dysfunctional.

The argument for property is that it permits negotiation and a direct means for individual to express priorities without involving public choice procedures. To the extent that decision making can be decentralized to those affected, added strength is accorded to the remaining public choice areas.

Although the rules for holding and transferring property contain many antiquated and redundant features,[37] they are generally workable. Furthermore, when a property right can be articulated, the market will provide the nexus for negotiation.[38] The issue, then, seems to be how property rights are articulated and how property is publicly "displayed".[39] Our current system of rights display such as those found in the musty volumes of local recording offices are wholly inadequate to the task of articulating environmental property. Even the simplest query such as a status of easements over a large number of parcels is typically impossible or very expensive to obtain. This is due in part to ancient methods of information processing, failures to reorganize local government, and clumsy legal procedures.

Mostly, however, property is a semantic problem. It is a semantic problem to be solved largely by the law. The sticks in the bundles of rights now stored in the warehouse of escheat, easement, fee simple, covenant, estate and so on need to be reassembled and modified with what are now rights to, or immunities from, qualitative features of the environment. The problem of property in the environment (where else can it be?) is finding a way of expressing it.

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37/ For example, rules of prescription, dower, and courtesy.

38/ Negotiation in leasing as cogently discussed by Cheung and Boxley [15] and [11] provides an excellent example of decision making by parties to a contract.

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APPENDIX: METHODS FOR GUIDING LAND USE FOR OPEN SPACE

	Advantage	Disadvantage
Free Market	The free unrestricted market will provide open space because of (1) natural economic advantages in clustering complementary economic activity, or (2) the collective interests of a group in preserving an open area. Requirements for Public funds are minimal and public administration is not needed. There is no basis for special consideration or exception by government agency. Only landowners participate in land use decisions.	Land uses may benefit some persons at the expense of others either through acquisition of unearned benefits or transfer of costs (financial, esthetic, psychological). The market allows no voice of affected citizens except as purchases of services, many of which have no effective market. Many decisions are taken which are either irreversible at great cost later.
Purchase of interest: Voluntary Purchase of fee interest Condemnation fee interest Voluntary, less-than-fee Condemnation, less-than fee Leasing	Voluntary purchase of fee interest is simple. It provides all needed control. Legal processes to protect individual rights are minimal. Because transactions are voluntary, compensation is presumed equitable. With fee interest, the public agency has fullest option on land use. Permits resale of unwanted interests such as agricultural operations.	Public cost under purchase is high. Citizen participation is limited to landowner because public hearings are not needed. With ownership in perpetuity, the commitment to land use may be difficult to reverse. Public ownership may prevent active community participation.
	Less-than-fee interest purchase permits acquisition by the public of right for particular uses thus permitting private exploitation of remaining uses. May allow easier negotiation. Greater flexibility and reversibility is permitted by less-than-fee.	Public acquisition of development rights may be tantamount to acquiring the fee interest without full rights. Some uncertainty may arise concerning occupancy and remaining uses.
	Purchase under eminent domain has main advantages to public as an ultimate control device to prevent individuals or groups from holding out against the public interest. Device is available to several levels of governments. May be used to acquire either fee or less-than-fee interests such as scenic easements or utility rights of way.	May involve costly, lengthy due process litigation. Has not been used for assembly of extensive areas of open space. Open space at particular locations may be difficult to justify as being in the public interest. Local governments may be reluctant to use because of political reasons.

	Leasing of fee or less-than-fee interests permit acquisition of rights at lower cost. It has greater administrative flexibility. May avoid large treasury outlays or bonded indebtedness. California-type plans permit entering into agreement to conserve open space areas for specified periods.	Lacks permanence and may be subject to political reversal or renegotiation. May create uncertainty in planning.
Grants Agricultural commodity subsidy Land use subsidy Cost sharing Special services subsidy Public investment	Grants may take many forms such as direct payment for performance, sharing of costs, providing special services at no or low fee, and investment. As a subsidy, it is within spending power authority of the Federal Government. Has usually the least opposition. Some of the main Federal activities relate to water projects, highways, mass transit airports, and utilities. Title 7 (by HUD) has been confined mainly to urban areas. Agricultural programs could be designed to support scenic aspects of agriculture, provide grants for moving undesired forms of agriculture and sharing costs of public access.	Grants may be costly and tend to perpetuate themselves. Land improvements accruing to owners tend to be capitalized into value making subsequent purchase more costly. Agricultural programs have been heavily production oriented.
Taxation Income tax Expense allowances Rapid depreciation Tax-free income Property tax	Income tax may influence land use through expense allowance, rapid depreciation or tax-free income. Allowances on income tax are politically desirable because they are less visible. Donation deductions are form of subsidy within existing administrative machinery.	Open space through agriculture would require changes in present tax law because income tax pertains more to depreciation structures. Subsidization through tax relief makes complicated income tax laws more complicated. Donations work to the advantage primarily of the well-to-do.
	The property tax is potentially a powerful tool in land use control. Site valuation for land tax would tend to reduce speculative values, and would tend to concentrate development, thus reducing the tendency toward sprawl. Most effective use is in conjunction with other measures to schedule development.	Local officials often are politically constrained in use of property tax. Open space is often a poor producer of revenue-oriented governments. Much of local revenue goes into schools and welfare.
Land use controls Zoning Rent restrictions Sewer and water permits	Land use controls such as zoning, building codes, and subdivision restrictions can prohibit undesired construction. Sewer and water permit restrictions can be similarly employed. Public cost is less than subsidy or grant. May involve community participation. Is most effective as part of long range comprehensive plan.	Most controls are subject to limits of police power hence tend more toward prevention rather than positive incentives. Not as useful for creation of space as for preserving. Can be used in discriminatory manner often for revenue purposes by local governments. Can result in litigation. Not always resistant to influence of special interest.