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PUBLIC ROADS AND PRIVATE INTERESTS

An Inquiry Into the Erosion
of Public Goods

by

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WORKSHOP
IN
POLITICAL THEORY
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The purpose of this essay is to set up a problem and pose a question. The problem will be characterized as the "erosion" of public goods, and the question will be directed at specifying (a) the conditions of institutional failure which lead to the erosion of public goods and (b) possible institutional remedies. The paper will focus empirically upon the decision making dynamics of a situation, still unresolved, surrounding the provision of public roads in the Cumberland Mountain coal region of Eastern Kentucky. The analysis will build upon a formulation initially advanced by James Buchanan,¹ in which he attributes a number of public deficiencies to legal and political weaknesses, leading to the "erosion" (i.e., inefficient utilization) of public supplies, rather than to a fiscal weakness, in the sense of insufficient expenditure on public supplies. The plan of the essay is to shape this formal analysis to the Kentucky case, in order to clarify and extend the lessons of each.

Within the past four or five years, a problem has arisen in Eastern Kentucky in connection with the common, but unlawful, practice of using public roads for heavy-load coal hauls which exceed the weight-bearing capacity of the road surface. Characterized initially by a breakdown of law enforcement, the inexorable dynamic of institutional failure led finally to an administrative diversion of highway maintenance funds away from the troubled area. Remedies have been generally unavailable, except in isolated "crisis" situations where some vital community service is threatened. In short, despite a full display of official concern and public complaint, there has been no effective

resolution of the difficulty. Stories of deteriorating road conditions and their side effects continue to make front page news alongside accounts of the latest remedial efforts in the state's leading newspaper, The Courier-Journal in Louisville, after having been in the forefront of public attention for well over two years.

The main thrust of Buchanan's argument was to establish the significance of regulation as a necessary component of decision making arrangements for the provision and maintenance of common property facilities, such as streets and highways, in an open, public condition, equally available to a community of users. Vincent Ostrom, in subsequent work, has identified the erosion or degradation of public facilities with the impact of changing demands, where public organization does not include a capability to respond with modified regulations and supply schedules.² And, in a related theoretical development, Joseph Sax has shown that the erosion problem extends to any circumstance where public authorities may, for one reason or another, fail to claim a public interest when challenged either by private claims or by competing public claims.³

The cumulative effect of these theoretical developments is to indicate the general nature of the 'problem' which is exposed as an obstacle to mutually beneficial relationships in the manifest conditions of erosion. This general problem can perhaps be described as the maintenance and protection of public values,⁴ conceived as a fundamental task of social organization similar in scope and at least equal in weight to the protection of private property and persons.

The argument in this paper is structured on the following scheme: Section I identifies the pattern of benefits associated with a public good. Section II analyzes a 'road' as a "structure of events"⁵ with which any successful pattern of organization must agree. Section III notes the pattern of 'external effects' which flow from the provision of highways as a public good. Section IV reconstructs actual conditions of decision making in Eastern Kentucky, revealing a dynamic of institutional failure. And Section V considers the set of optimal conditions, in general, to sustain an appropriate pattern of benefits and, more specifically, to suggest possible remedies in the Kentucky mountain case.

I

Public Goods: The Pattern of Benefits

The term 'public good' refers to the pattern of benefits associated with an indivisible supply. A 'public' is the set of persons who have a demand for some such good which is indivisible in supply. The public-good 'problem' consists in the fragmentation of demand, in the sense that each individual member of the public receives only a fractional benefit in exchange for each "dollar" value he might contribute toward a common provision. The greater proportion of benefit provided by each individual contributor flows to others. No member of the public is able to exclude another from sharing in the fruits of his individual effort. If indeed a public good is provided, it is only by virtue of the reciprocal contributions of each individual.⁶

The only effective demand for this reciprocal class of goods is a coordinated demand. Only if each individual can be assured of the contributions of others, can he reasonably expect a full return from his own contribution; yet to the extent that each does expect others to contribute, he has an incentive to avoid making his own contribution. Any benefit he might add would flow predominately to others, whereas his own satisfaction is provided for largely from the efforts of others. Some means is therefore needed for coordinating the actions of individuals in such a way that demand is fully evinced. Otherwise, supply will fall short. Logically, coordination can take place either voluntarily or under some kind of additional constraint.

The existence of a common interest in reciprocal action implies conceptual, if not actual, agreement among the set of individuals with respect to the valuation of a preferred state of affairs. In principle, all persons would be able to agree on a change which would leave each person better off. The irony that actual agreement would tend to produce an incentive to default poses the dilemma of voluntary, or cooperative, action. Although extremely important as a generator of values on a small scale, such as the household,⁷ voluntary reciprocity seems to have radical limits as the size of the relevant group expands. Market institutions, which rely upon voluntary agreements, cannot be expected to facilitate the wide-spread coordination of demand where the flow of benefits to individuals is fractional (except in the instance where separate incentives of a sufficient magnitude are also attached to each contribution and non-contributors excluded).⁸

Large scale reciprocity therefore requires political constraint, which need not imply any greater coercive capability than the enforcement of sanctions against those who attempt to act as 'freeriders' or as 'holdouts'. A 'freerider' is one who attempts to withhold his share of support from the provision of an indivisible good (from which he benefits) which is produced independently of his own efforts. All technically 'exchangeable' goods and services are necessarily subject to independent production by autonomous firms. A 'holdout', on the other hand, is an individual who refuses his consent to an agreement which would benefit all persons, himself included. In this case, the economic 'good' or value is sustained (i.e., produced) by the coordinate actions of different independent decision makers. Such a good is 'non-exchangeable' (i.e., reciprocal) because it is produced only through mutual behavior modifications. All public goods are members of this class at some level of analysis. Thus taxation is a device for overcoming the freerider problem; but the joint agreement to impose a tax is again subject to the holdout problem.⁹

Each individual may reasonably give his consent to the availability of public authority constituted to constrain the behavior of potential freeriders and holdouts. The larger the scale of effects, however, the smaller is each fractional benefit, and, correlatively, the greater is each person's incentive to hold
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out. It also becomes more difficult, in terms of time and effort, to exchange information, communicate ideas, and negotiate differences. The larger the scale, therefore, the more difficult it is to organize for the provision of a public good without some

prior rule of collective action which can be invoked. From this perspective, a political system can be conceived as a mixed bag of rules available to be drawn upon by individuals who attempt to fashion solutions to public problems as they arise.

Individual valuation is not limited to goods and services which can be supplied under conditions of market exchange. Included among those events for which persons have a value are many which require joint or coordinate action. These events are not subject to independent, individual control in either (1) possession (2) exchange, or (3) consumption.¹¹ Common pool resources, for example, are not subject to exclusive possession, yet they provide essential values to human civilization if regulated to yield greater benefits. In the absence of joint control (i.e., regulation), only the lowest level of common benefit will be provided as each individual responds to his individual incentive to get as much as he can for himself.¹² Voluntary restraint, without the assurance of like behavior from others, will contribute much more to an individual loss than to a common gain. To take another example, provision for wilderness and wildlife as individual values cannot be accomplished by parceling out a land area, unless severe restrictions are placed upon individual land-use. Neither the control of negative externalities, nor the provision of positive externalities, including pure collective consumption goods, will be fulfilled under market conditions.¹³ These public values must be pursued, however imperfectly, through the means afforded by a political system.

Political and economic transactions, however, are closely tied together in the infrastructure of community life. Specialized economic activities, essential to market economies, may threaten public values which are in turn essential to the maintenance of opportunities for exchange, upon which depend the ability to derive a benefit from specialization.¹⁴ Exchange opportunities are a product of complex public services and facilities, such as courts, police agencies, a common currency, and highways. The range of interdependency is different in each case. No one can calculate the relative efficiency of public and private uses of scarce resources (or of different public uses) except by reference to this infrastructure, composed of multitudinous limited and overlapping communities of interest. Efforts to conceive of general economic efficiency as a gross trade-off between public and private sectors will miss a whole host of decision points where efficiency could be improved. Political decision making, in other words, is no less dispersed than economic decision making.

The aim of collective action, within the theory of public goods, is limited to the provision of a joint benefit under the condition of individually fragmented demand. Solution of the freerider problem for the provision of an indivisible consumer good or service, however, may be insufficient to sustain the jointness of a flow of benefits as individuals begin to relate themselves to the available supply and to the behavior of other users. Taxation and expenditure are sufficient to sustain joint benefits only in the limiting case of a positive externality which is a purely collective consumption good, defined as a

structure of events such that each person's use or consumption does not subtract from the use or consumption of others.¹⁵ Most public supplies do not possess this characteristic and are therefore potentially subject to an 'erosion' of their preferred use-pattern.

II

Public Roads: The Structure of Events

In contrast to the simple collective consumption good, most public services and facilities are complex public goods, consisting of different sets of joint benefits, involving numerous points of collective action, implicating diverse structures of authority, and altogether comprising a series of distinct public problems, each of which requires a unique solution. Public roads happen to provide a rich illustration of this complexity. Collective action is needed in connection with four distinct sets of decisions: (1) land-use, (2) revenue, (3) supply schedules, and (4) the regulation of use-patterns. Although the four arenas of collective action are interrelated, in the sense that some practical problems may require joint action in two or more of the decision sets, each one poses a unique decision-making puzzle which is derived from a different attribute of the complex structure of events called a public road.

(1) The land-use decisions in highway provision are collectively organized through the power of eminent domain. Highway systems exhibit a 'flow' characteristic somewhat analogous to river systems. The attribute of 'transportation flow' requires

continuity of the road surface and depends upon routing decisions often at variance with private wants concerning the disposition of property. If every property owner in a community is viewed as a potential holdout in the construction of highways, any voluntary contribution he might make, even above and beyond compensation at market value (as in the voluntary sacrifice of a private prerogative to refuse to sell), yields a flow of benefits predominately to others. Individual demands for "good transportation" are, at this point, fragmented. A public good exists as a possibility, if it can be captured through appropriate collective action which takes account of certain public values in order to limit the prerogatives of private ownership.

(2) Revenue generating decisions are also public, but on account of a different attribute of public roads: unlimited access. Exclusion in order to charge fees, at least for the vast majority of streets and roads, would entail very high opportunity costs, seriously degrading the value of the facility being provided. (Importantly, however, more selective exclusion may be economically feasible.) It follows that road charges, in general, entail a fractional benefit pattern and that the finance component of road provision must be treated as a public good. Without recourse to taxation, the financial system would collapse from the weight of freeriders. It is feasible, however, to specify the user-public more closely than would be possible through general taxation, by means of gasoline excise taxes.¹⁶ User taxes are discussed more fully in Section V.

(3) The collective organization of supply decisions derives logically from the attribute of 'indivisibility', which occurs whenever a single supply schedule is related to all the relevant demand schedules which, in the case of divisible goods, would make up a market demand.¹⁷ In the case of full indivisibility, it follows that each and every person in some community has an interest in decision making which pertains to the supply of a public good. If decisions were to be made on a rule of unanimous consent among all interested persons, however, the costs associated with decision making would be raised to a very high level.¹⁸ The high probability of the emergence of holdout strategies, as some persons try to obtain favored treatment, and the substantial investment required in communications and negotiation make it very unlikely that cooperative arrangements would succeed in supplying an indivisible good. For each individual, the voluntary surrender of a potential holdout position and sacrifice of some measure of direct participation in decision making involves a fractional benefit flow; supply decisions will therefore be made through political processes without reference to the willing consent of each individual.

(4) Once the questions of land-use, revenues, and supply schedules have been resolved, there remains a problem in the coordination of demands with respect to the regulation of different uses. The attribute of the structure of events which raises this problem is the characteristic known as a 'common property'. The common-property relationship exists, by definition, where "several individuals may make a separate and individual consumptive

use" of the good while the supply of the good is "indivisible and is shared in common."¹⁹ Once a common-property good has been made available, it will be subject to diverse demands. Separate individuals cannot be expected to have identical preferences regarding the pattern of joint uses to prevail.²⁰ In the absence of appropriate price-exclusion, individual preferences will be indicated by attempts to expand actual use. Except for the very generalized constraint imposed by gasoline excise taxes,²¹ each user will face a zero price as he expands his demands in relation to the demands of others who face the same limited supply. After some point, joint uses may become alternative uses as some users begin to exclude others; the prevailing pattern of joint uses is altered. If allowed to continue, those users who make the greatest (or most expansive) demands in relation to others will drive others out and become exclusive beneficiaries. To the extent that those who are excluded remain dependent upon the common provision, with the likelihood of having available only the poorest and most primitive--or most expensive--substitutes, they may be subjected to threatening conditions. The prevailing pattern of joint uses is then determined by those users who are able to generate the greatest social costs.²² As a joint undertaking in which individuals gain a mutual advantage at the marginal product level, the public road has failed. Jointness has not been sustained when the public 'good' begins to produce 'bads' for some members of the public.

III

External Effects from a Public Enterprise

Due to the lack of close substitutes, serious deficiencies in the provision of public goods may impose very high costs on other productive sectors of both private and public-service economies. The high level of dependency of other productive concerns on public roads has the effect of compounding the level of different public interests in the provision of highways as a public good, i.e., a 'good' which is jointly available to all members of the community. John Dewey has developed this dimension of public organization, and, fortuitously for this paper, chose public roads as an illustration:

An individual may make his own track in a forest; but highways are usually public concerns. Without roads which one is free to use at will, men might almost as well be castaways on a desert island. Means of transit and communication affect not only those who utilize them but all who are dependent in any way upon what is transported, whether as producers or consumers.²³

Dewey in effect asserts that public roads are an essential link in maintaining a whole host of other values. If a serious erosion takes place in the level of mutual advantage, then serious problems can be expected to arise in other sectors of community life. The extent of public concern from the point of view of external effects (external, that is, to the public enterprise) is limited to simple routine and regularity in provision and maintenance.²⁴ The inability to make routine and regular provision may, however, provoke crises in other public and private concerns. It should not be surprising, therefore, to find the decision making dynamic associated with the erosion of a public good to be punctuated with sporadic attempts at crisis management.

The presence of widespread external effects from a public enterprise means that the principal cost component of 'erosion' may not lie in the waste of tax resources. In the Eastern Kentucky case, the Department of Highways has acted to minimize this direct loss: repairs are not usually attempted on coal haul roads, and highway resurfacing funds have been redirected elsewhere. The lack of close substitutes implies, however, that external diseconomies will result from the Highway Department's prudent action. Each user will face, in addition to his out-of-pocket costs as a taxpayer, a range of opportunity costs should the public good not be provided; whereas, loss (or theft) of a private good available on the market is presumably limited to the out-of-pocket cost of that good. In addition to foregoing the alternative uses of public funds allocated to roads which are allowed to deteriorate, each user-taxpayer must also endure the cost of "doing without".

IV

The Dynamic of Institutional Failure

The expansion of strip and auger mining throughout the Appalachian coal field brought a heavier reliance upon trucking, in place of the rail spur, for coal hauls. Previously, only smaller "deep mines" had used trucks. The advent of surface mining, facilitated by a leap in machine capabilities for earth removal, coincided with the introduction of bigger, more powerful vehicles for hauling. The result was a greatly magnified increase in demand upon the public road system.

Kentucky highways are subject to regulation by means of misdemeanor procedures. Decision makers, in this process, are limited to a choice between (a) application of criminal sanctions and (b) forbearance. The misdemeanors which have been invoked against coal haulers, though not in general successfully applied, are (1) violations of weight restrictions on particular state-maintained highways, (2) coal littering, and (3) violation of the Kentucky 96 inch vehicle width limit. Complaints by highway users involve all three misdemeanors. Each is relevant to the determination of the prevailing pattern of uses, and the satisfaction of individual preferences. Coal litter is considered by some to be unsightly as well as dangerous to other vehicles. The brute size of coal trucks, and their excessive loading, is certainly a cost-factor in the maintenance of highway safety. Probably the most severe social costs of trucking, however, flow from the repetitive nature of the haul and the consequent rapid deterioration of the road surface from the impact of unlawfully heavy loads.

The logic of the situation can be reconstructed in the following terms: (1) Haulers, most of whom function independently of mine operators, are paid at a rate proportional to the size of their haul, thus creating a continuous incentive to make each load as great as possible. In addition, drivers, often merely an employee of the hauler, are directly responsible for misdemeanors even though haulers' incentives provide the motivation for a violation. (2) As haulers began to invest in bigger and stronger trucks, stretching their carrying capacity well beyond

that of the highway, enforcement officers of the Kentucky Department of Motor Transportation responded with citation "raids", between long intervals of no surveillance. (3) Violators were cited to locally elected (non-professional) magistrates²⁵ who for the most part refused to apply the lawful sanction, resorting to a procedure known as "filing away" the citations to avoid disposition of the cases. (4) As the roads deteriorated, district officers of the Kentucky Highway Department began to discontinue maintenance of coal haul roads in response to accelerating costs.

Tonnage limitations in relation to coal hauls have collapsed under these conditions, leaving haulers free to load their trucks as they will. Fully loaded coal trucks commonly weigh in excess of fifty tons, at least fourteen tons above the legal maximum on any Kentucky highway. Most mountain highways carry much lower tonnage limitations.

This study began with an inquiry into the discretion of jurors in the application of criminal sanctions. In March, 1971, five "hung" juries effectively blocked disposition of a set of indictments in Perry County Circuit Court, Hazard, against seventy-eight coal truck drivers for vehicle width misdemeanors cited by State Police. Although somewhat peripheral to the problem of excessive loading, the width regulation is pertinent to the maintenance of preferred use-patterns and involves calculations which contain clues for understanding the situation in wider context.

In July, 1971, this writer conducted interviews with 28 of the 30 jurors who sat in these cases. In resisting a routine

conviction, jurors clearly acted with discretion on matters of law rather than confining themselves to a determination of fact. Repeatedly in the interviews, resisting jurors invoked two moral principles to justify their decision: (1) the accused were "just trying to make a living" and (2) illegal vehicles should not be licensed to operate on the highway. In the first place, many of the defendants were mere drivers who acted on instructions from their employers. Beyond this consideration, however, many jurors did not consider "illegal" coal hauling to be "criminal" under the circumstances. Given the haulers' incentives--to haul as much as possible--and the lack of constraint--especially the opportunity created by the licensing of trucks--many jurors were unwilling to apply criminal penalties. Sanctions were recognized as more than likely a gratuitous cost which would be imposed on drivers and haulers without a significant improvement in road conditions as long as the incentives and constraints remained the same.

The juror response in these cases leads to a hypothesis that the forbearance of magistrates is likewise based on a presumption of official inability to compel performance, i.e., to modify the structure of constraints significantly. The situation is complicated, however, by the existence of a single office within the structure of local government in Kentucky, possessed of sufficient authority and political "clout" to impose constraints which match the incentives. The "County Judge" essentially combines legislative, executive, and judicial powers in the same hands. Most of these powerful elected public officials,

however, have chosen not to intervene in the coal haul question, for whatever reason. One can only speculate at this point the extent to which this heavy hand of inertia might inhibit the behavior of low level magistrates. Newspaper accounts suggest that those few County Judges who have intervened tend to come into conflict with state officials who may seek a different remedy.

The dynamic of institutional failure has been generated by the step-by-step failure of different remedial efforts. Following the introduction of larger trucks, which had been duly licensed, an effort was made to enforce the misdemeanors through police surveillance and citation to magistrate's court. It is important to note that all police efforts, except those which may have been directed by a county judge, were undertaken by state officials whose jurisdiction is much larger than the extent of the problem area. As the situation worsened, attempts were made to exercise influence with the office of County Judge, who chose in general to respond to a different set of influences. In Perry County, the County Attorney (a separately elected official) acted upon over-width citations which had been "filed away" in magistrate's court, obtained Grand Jury indictments and brought the cases before Circuit Court (not county court) only to be thwarted by the reluctance of jurors to return convictions.

On July 21, 1971, The Courier-Journal reported underway a cooperative "experiment" by three state agencies designed to obtain compensation from coal operators for road damage from

unlawful hauls. The Natural Resources Department agreed-to require a list of roads to be used for hauling from every mining applicant, withholding permits from those it determined to be potentially unlawful haulers until "special permits" had been issued by the Highway Department. The latter agency would require operators to post a performance bond equal to the value of the roadway to be used, as a guarantee of their written pledge to pay all necessary maintenance costs to keep the road in "good condition". The Department of Motor Transportation, in keeping with their traditional assignment, would see-to the enforcement of the special permit provisions.

This joint effort was an administrative attempt to abandon weight restriction (although the ceiling limit on all Kentucky roads would remain nominally in effect) in favor of pricing the use of roads for hauling coal, sufficient to cover added maintenance costs. The licensing authority of the Natural Resources Commission was to be relied upon to provide the necessary constraint for "packaging" the coal-haul use of public roads, excluding those users who do not pay for the service. Operators and haulers would be obliged to adapt their behavior to this price.

This remedy was deficient in at least five respects. (1) No provision was made for present operators: How were they to be prevented from rendering the bonding procedure nugatory? (2) No public procedures were established for determining the changing condition of roadways or for deciding upon an appropriate schedule of repairs. (3) No provision was made for modification of supply

schedules in order to accommodate heavier use-patterns if economically feasible. (4) No new procedure was established to enforce the ceiling weight limit, which retains relevance to highway safety even if maintenance costs are taken into account. (5) The entire arrangement rested upon administrative discretion without the added stability and integrity afforded by legislative sanction.

The failure of this initial bonding effort became apparent in early November of the same year, when an announcement by the Highway Department signaled the arrival of a more advanced stage of the erosion process: all roads traveled by overweight coal trucks were eliminated, by administrative fiat, from the state's highway re-surfacing program.

The consistent strategy of the Highway Department can be interpreted as an effort to minimize out-of-pocket costs. This strategy is supported by the social pattern of those external costs which flow from erosion. The more immediate external effects borne by road users and those dependent on their use affect only a few persons severely. Broader effects are either less immediate or less severe. If immediate severe effects are limited to a minority, there will be no great public outcry. The cost minimizing approach followed by the Highway Department is therefore a predictable response to the short-term interests of a majority.

The only interruptions in the dynamic of institutional failure have come as a response to situations which threatened to advance the erosion to a further stage: the abandonment of general community facilities and enterprises as roads become

impassable to vehicles other than large, high-powered trucks. For example, during the winter of 1970-71, a private clinic and hospital in Perry County was forced to discontinue its ambulance service and give serious thought to closing down before relief was obtained through a court injunction sought by the Highway Department on instruction of the Governor, after frantic appeals from local citizens, against the mine operator whose coal hauls had destroyed several miles of state highway which provided the hospital's only access. Hauling ceased until an out-of-court settlement recovered the cost of re-surfacing from the operator. The clinic was saved, at least for the while; but this response merely prevented the erosion dynamic from advancing to a more critical stage in one case. Similar crises have been reported involving the operation of schools and other public service agencies. Crisis management can be expected to continue as long as more efficient remedies are out of reach.

At present, two independent approaches are being sustained in pursuit of a remedy. (1) The Kentucky Attorney-General, a separately elected official, has been granted injunctions against further violations of load limits by Perry County Circuit Court. (2) The Highway Department is again proceeding with a modified bonding plan, with apparent support from segments of the coal industry. These two efforts would appear to be on a collision course, with the outcome depending in part on a judicial determination of the Highway Department's authority to issue "special permits". The same objections to the bonding plan hold; and the theory of public goods would suggest that "cooperation" from

independent firms in the coal industry is not a feasible means of implementation. The injunction procedure, on the other hand, offers the possibility of providing a forum for the negotiation of an equitable remedy should the judge interpret his position as one which allows some deviation from the letter of the law in the interest of equity.

V

Regulation: The Protection of Joint Uses

Once supplied to a community, a public road takes on the characteristic of a regulated common property. Use-patterns are governed by reference to "rules of the road." These rules are instituted to modify and/or exclude certain potential uses and behaviors. In general, all users are made better off by adhering to rules of the road because each user calculates the cost of his exposure to the ill effect of others' behaviors as greater than the benefit attached to his reciprocal liberty to engage in similar behavior. Yet, political constraint is required because the 'good' created by adherence to rules of the road is a reciprocal good over a large and indefinite number of persons. The flow of benefits from individual restraint is fractional.²⁶

The same considerations which lead to a reliance upon political processes in making supply decisions, discussed in Section II, apply as well to rule-making. Once enacted, rules and regulations do not become self-enforcing.²⁷ The choice of rules is necessarily linked with a choice of enforcement mechanisms. High enforcement costs may preclude the application of certain rules.

Rules of the road, and the misdemeanor procedures which provide means of enforcement, are competent to handle the situation where external effects among users exhibit reciprocity. The common property structure, however, also allows the possibility of unilateral effects between users.²⁸ In the presence of unilateral effects, such as the effects of coal hauls on other users, persons on opposite sides of the question may have different preferences with respect to the pattern of joint uses to prevail. In this circumstance, a somewhat different meaning is attached to the concept of a use-pattern which is 'jointly preferred'.

Any physical facility can be put to a wide variety of independent uses; but no resource or facility can jointly satisfy all possible demands which might be placed upon it. A public good can never be all things possible to all person; yet, each and every person in a community has an interest in the public good. The 'preferred' pattern of joint use can be described, in general, as one which takes each person's interest into account while at the same time limiting the costs which each can impose upon others. The specific form of this use-pattern cannot be determined apart from the outcomes of particular decision making processes. If, however, we accept the proposition that each person is the best judge of his own interest,²⁹ it follows that the only acceptable standard of 'preferredness' is common agreement. A decision rule of unanimous consent will nevertheless fail to sustain agreement in the public-good context, and may instead produce only rancor and division. The problem becomes

one of institutional design: how to devise a set of rules which will bias political processes in favor of commonly acceptable solutions to social preference problems.

The appropriate base rule for such a system of regulation in relation to public roads is the assignment of a liberty, such that anyone may use, subject to restrictions (duties of omission) which no one may exceed.³⁰ The purpose of this liberty-rule is to create, as an institutional base for any further actions, a condition of openness, i.e., a radical bias for the inclusion of all potential users. (The technical difficulties with exclusion for an economic purpose does not preclude the possibility of arbitrary exclusion by means of a restrictive licensing procedure backed by administrative sanction; openness is, therefore, a matter of policy.) The anyone rule as a liberty provides each user with an effective means of making his individual claim upon the common supply: actual use. It will be impossible, with this rule, to close the public good arbitrarily to new demands. Openness is insufficient, however, to assert the interests of non-expansive users in relation to new and expansive uses which arise.

To sum up the argument at this point--given an "open society," public facilities will be subject to the impact of changing demands. The sufficiency of a structure of supply and regulation will be limited by the congruency of the structure of demands. New demands or new levels of demand, brought on by changing conditions and shifting interests, may overload enforcement procedures, thus unraveling the texture of working agreement with respect to existing rules and supply policies. If rules become

inappropriate and enforcement begins to break down as demands exceed limits relative to the available supply, a new institutional arrangement will be needed. New rules and new types of regulatory mechanisms, as well as a new administrative apparatus for determining supply schedules in relation to specialized demands, may be required to restore the public good to a jointly preferred pattern of use. Otherwise, the erosion of the public good will take on increasingly serious proportions.

Buchanan, in his statement of the problem, argued that the legal relationships which establish the terms and conditions of joint use assign something akin to shares of ownership in the common property. Thus the liberty of any person to use a facility can be interpreted as assigning a lawful share in the public good. He went on to posit two polar responses for dealing with different actions or uses: (1) total prohibition and (2) total allowance. This choice corresponds to the decision making capability of a magistrate charged with the enforcement of misdemeanors. Between these two regulatory extremes lies a spectrum of possible ordered relationships which offer an opportunity analogous to gains from trade. Buchanan cites the argument advanced by R.H. Coase³¹ that given any distribution of property rights, neglecting transaction costs, the opportunity for trade between rightful owners under conditions of perfect competition will produce an efficient allocation of resources. For Buchanan's purpose, a much weaker version of the Coase theorem is sufficient: in the absence of trade, no possible assignment of property titles can result in an efficient outcome.

Inefficiencies in public provision can occur at either end of the regulatory spectrum: strict prohibition can produce public 'bads' as well as can unrestricted liberty. Strict enforcement of rules under conditions of changing demands may exclude potentially efficient users, in the event that such users could cover the costs of increasing the supply (such as the carrying capacity of roads) so as to sustain the jointness of the public good. Failure to modify supply in response to a demand which is backed by the willingness and the ability to pay must also be viewed as an inefficiency. Social cost must be understood strictly in the sense of an uncompensated externality; if compensation is possible, it is inefficient to prevent it. Public goods may, accordingly, suffer from 'closure', i.e., the arbitrary exclusion of potentially efficient users, rather than erosion, depending upon whether enforcement procedures are strengthened or weakened under the impact of changing demands where the social cost is compensable.

Given a structure of regulation which allows for only a "yes" or "no" response by officials--full restriction or no restriction--optimal regulation, producing neither the inefficiencies of erosion or closure, may be impossible. The inability to develop a more sensitive regulator, which could proportion supply and demand more closely, means in economic terms the inability to price discrete units or degrees of use. A user price requires the user to regulate his own behavior as a function of marginal cost at the same time that it generates revenue needed to modify facilities, if the demand is truly economic in the sense that users can cover the full replacement cost of additional use.³³

Common property facilities provide public goods or joint benefits only within limits; for uses which do not exceed the limites of jointness, price exclusion is itself inefficient. If within the general constraint supplied by a gasoline excise tax (limiting reciprocal congestion), and subject to "rules of the road" agreeable to each individual taking only his own interest into account, it is true that one person's lawful use does not subtract from lawful use by others, then efficiency (and equity) requirements are fully met over this range of activity. It is this range of mutual productivity--this region of joint benefits--which is supported by gasoline taxes in the public road case, and which is the object of EROSION by the more expansive, unilateral demand of coal hauls. Erosion is an analog of 'shortage', in relation to exchangeable goods, and 'congestion', in the common property case where external effects among users are reciprocal. The difference is that erosion relates not to the exchange-value of a commodity, nor to the shared use-values of a common property, but to the distinctive institutional or organizational value of a bounded region of efficiency and jointness, which must be treated as a preferred economic condition to be protected in future transactions. To do otherwise is to assume that transaction costs in the real world are never greater than zero. If we pause to consider that the purpose of an economic system is to enhance our mutual productivity, then it is clear that a region of joint benefits must be treated as a scarce resource.

For persistent demands in excess of common limits, price exclusion may therefore become a necessary condition of efficient provision. Whereas occasional demands beyond the limits of joint use (which each user may share but which are uneconomic, i.e., produce incompensable social costs) can be treated as misdemeanors, persistent demands treated as criminal acts will generate high enforcement costs, as well as mis-allocation if the demand is economic. Price exclusion shifts enforcement to the less costly task of "gate-keeping," organized through licensing procedures rather than misdemeanors.

In the case of public roads, and the demand for coal hauls, a mixed strategy combining user charges and weight restriction seems to be appropriate. A user price can be assigned on the basis of ton-miles or axle-miles, and the gross receipts of haulers publicly monitored.³⁴ Highways must be built, however, within certain weight tolerances, which must be based upon expected uses. If the amount of the user charge is set at a level sufficient to cover the cost of supplying a more durable road surface, it may be expedient to limit the carrying capacity of trucks to a level agreed to by haulers. If on-the-road vehicles are limited in carrying capacity by means of restrictive licensing, enforcement costs are confined to gate-keeping. An upper ceiling as required by highway safety could be similarly administered.

The appropriate level of public service from a particular highway, which forms the basis for calculating the cost of modification to accommodate coal hauls, is not a matter for detailed

analysis in this paper. An assumption is made that decision making processes for highway investment have worked smoothly, so that the level of service prior to the introduction of coal hauls represents a proper criterion for further adjustments. It is important to note, however, that the general requirements for an optimal proportioning of joint and alternative uses implies a right in the person of the coal hauler to have his interests taken into account and to realize his own marginal benefit from the joint undertaking.

Where institutions are inappropriate to sustain jointness, and the erosion of public goods occurs, it is necessary to have recourse to a second order of decision making to provide remedies and modify the institutional infrastructure. Higher level administrators, legislatures, courts, and procedures for constitution making can all function in this capacity. If a region of jointness, or public good, is recognized as a public property in which any person has an interest, then courts of equity may provide an appropriate forum in which individual persons can make their case for an equitable remedy in relation to the interests of others. Joseph Sax has developed this argument in connection with a wide range of environmental issues.³⁵

John R. Commons made the assertion that "all value is expectancy."³⁶ Private persons are able to develop mutually productive relationships only when private property titles are relatively secure. Without the institution of private property, fully divisible commodities would be equally as subject to "erosion"

as public goods are. If persons in their public capacity are to be able to develop public values, they must be reasonably assured of protection in future transactions. Given the magnitude of external effects from public enterprise, the inhibition of public investment affects the full range of values in the future of an entire community.

FOOTNOTES

¹ Buchanan (6).

² V. Ostrom (21), pp. 62, 63.

³ Sax (28) (29).

⁴ The term 'value' refers, in this context, to a 'preferred event.' See the discussion by Lasswell and Kaplan (15), p. 16.

⁵ The "structure of events" is a concept developed in the work of Vincent Ostrom (20) (21) in order to distinguish among various physical constraints on human organization.

⁶ Boulding (3) distinguishes 'reciprocity' from 'exchange'. In exchange, "I give you something if and only if you give me something." In reciprocity, I give you something with the expectation that you will give me something. Pp. 116, 117.

⁷ Ibid., pp. 110-116.

⁸ Olson (17), p. 51.

⁹ Voluntary contributions to support a public enterprise--whether or not collective consumption is involved--depend upon the reciprocal contributions of others who are beneficiaries: freeriders would be looked upon by contributors as the recipients of a transfer payment. From the point of view of the free-rider, his lack of contribution is spread over such a great number of persons that it would not be felt by anyone, including himself; the greater proportion of the benefit for which he would be willing and able to pay his fair share of the tax burden is provided for him by the contributions of others.

¹⁰ The ease with which a public good can be provided is a function not only of the size of the fraction but also of the relative value assigned to the public good by the different individuals. If a public good takes on a very high order of priority, the value of the fraction may be sufficiently magnified to overcome the reverse impact of a very large number of persons included in the scale of effects. In this circumstance, persons may undertake voluntary action to supplement efforts which have been collectively sanctioned.

¹¹ V. Ostrom (21), p. 53.

¹² See especially V. Ostrom (24).

¹³ Coase (10) has shown that under very limited conditions an external diseconomy involving a small number of parties can be corrected by voluntary exchange. See also Buchanan (5).

¹⁴ This relationship was pointed out to me by Vincent Ostrom.

¹⁵ This concept is identical to the "pure public good" as defined by Samuelson (27), p. 387.

¹⁶ Buchanan (7) discusses the limits of the gasoline excise tax as a pricing device, p. 522.

¹⁷ Multiple sources of supply are either technically or (as in the case of public roads) economically infeasible. Different public entrepreneurs may of course seek to modify the supply schedule in accordance with the interests of different constituencies. This approach to the problem of indivisibility avoids the difficulty of treating a collective consumption good, such as a movie theatre, as the basis for public organization. See Musgrave (16), p. 10, for this discussion.

¹⁸ The concept of decision making costs is developed in Buchanan and Tullock (8), pp. 68, 69.

¹⁹ V. Ostrom (20), Chapter 1, under the subheading "Conditions of Institutional Weaknesses and Institutional Failures."

²⁰ Certain "rules of the road," however, are based upon a presumptive identity of preference among separate users; see Section V, pp. 20 and 24.

²¹ The gasoline excise tax is a very broad constraint on road congestion, in the sense of limiting (by price exclusion) the total number of miles traveled on all highways. The tax does not discriminate, however, according to location or time, both highly significant in the matter of congestion. In terms of load usage, heavy vehicles are more efficient producers per gallon of gasoline than passenger cars, so that a uniform gasoline tax will not constrain the weight component of a use-pattern. See Buchanan (7), p. 522.

²² To argue that this pattern creates a property right in the hauler entitling him to compensation for any modification is equivalent to an argument for the "right of the strongest." For an assessment of this position, see J.J. Rousseau (26), pp. 6, 7.

²³ Dewey (13), p. 60.

²⁴ One of the values which Dewey considers as a candidate for public concern, in his "search for the public," is the regularity or routineness of enterprises which impinge greatly upon persons and activities other than those directly concerned; however, I believe that he somewhat confuses this issue with the peculiar suitability of any routine operation for government provision. The range of costs which are significant here are those ill effects suffered by some persons due to a disruption in public service to others. See Dewey (13), pp. 57-62.

²⁵ Some of the citations would have been made to county court, presided over by the County Judge. See pp. 15, 16, in the text.

²⁶ It seems reasonable to assume, for example, that all persons have preferences that others obey speed limits, and that each person is willing to subject himself to potential sanction in order to modify others' behavior. In this case, external effects among users are reciprocal. Buchanan (6) confines his conception of 'erosion' to this congestion-type situation (see pp. 66 and 68). Certain rules of the road, such as the convention of driving on the right and the practice of observing "stop" signs, are enforced by "natural sanctions," in which case no fractional benefit problem arises.

²⁷ This proposition is basic to the necessary condition of inequality in government which poses the fundamental problem of democratic organization. See V. Ostrom (21), p. 63 and (23), especially chapter 7.

²⁸ Turvey (30) develops a classification of external effects based upon a similar distinction between reciprocal and "uni-directional" relationships, pp. 48, 49.

²⁹ V. Ostrom (23) advances this proposition as a point of departure for reasoning about the basic rules for the design of political institutions, p. 45.

³⁰ This usage of 'liberty' is intended to be consistent with the paradigm of legal relationships set forth in Commons (11), pp. 83-100.

³¹ Coase (10).

³² Buchanan (6), pp. 61-63.

³³ Buchanan (7) discusses the logic of user prices, pp. 506-509.

³⁴ Ibid., p. 524.

³⁵ Sax (28) (29).

³⁶ Commons (11), p. 25.

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