

Conservation, "X-Inefficiency" and Efficient Use of Natural Resources*

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But in the related field of the exploitation of natural resources, prevalent opinion still is that the peculiar situation existing here requires governments to undertake far-reaching controls. . . . Few arguments have been used so widely and effectively to persuade the public of the "wastefulness of competition" and the desirability of a central direction of important economic activities as the alleged squandering of natural resources by private enterprise.¹

The early conservation movement in the United States was initiated by Theodore Roosevelt in 1908 when he called together a conference of state governors.² The premise of the conservation movement, sometimes pointed to as Roosevelt's most lasting achievement, was that natural resources are being used too rapidly and that political controls should be used to conserve the proper amount of resources for future generations. Increasingly, since the rise in energy prices associated with the OPEC oil embargo, the conservation of natural resources has been a topic of debate in the popular media as well as in academic circles. Now (as in Roosevelt's day) the conservation movement is closely related to international rivalry and concern about dependence of the U.S. on foreign resources (especially oil). Today, as during the initial conservation movement, the problem of inefficient resource use can be traced directly to current and past government policies.³

Political action to achieve "conservation" has taken many forms. The view held by Roosevelt and others that the market would lead to an overutilization of natural resources led to large quantities of forest, mineral, park and other lands being reserved from public disposal. New agencies such as the Forest Service, Grazing Service, Fish and Wildlife Service, and

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the Soil Conservation Service were established to develop long-term management programs on publicly held lands.⁴

Conservation efforts have been intensified during the past decade. For example, there was a concerted effort in the early 1970's to enact "comprehensive land use planning" at the federal level to solve "the most serious unresolved environmental problem in this country. . . ."⁵ The conservation of prime agricultural land (and open space) was a major goal of the proposed land use controls. The recent creation of the Department of Energy was motivated in large part by the idea that the market does not properly conserve oil, gas, coal and other energy sources.

Although recent work (discussed below) provides no evidence that there is a "conservation problem," there is, as Hayek suggests in the initial quote, a widespread view that the allocation of natural resources must not be left to the market. What, then, is the reason for the mistaken views? First, part of the misunderstanding derives from a view of conservation which is not economically meaningful. Conservation, as frequently used, means *not consuming* rather than the optimal rate of production and consumption over time. Rothbard stresses the point that conservation in the sense of merely preserving resources for future generations provides *no* guidance as to the optimal rate of resource use.⁶

A second source of misunderstanding derives from the view that the optimal rate of conservation (or use) by the resource owner can be objectively determined by a government agency or other outside analyst. This paper shows why conservation, like any other capital investment problem, is necessarily based on a subjective assessment of uncertain future conditions and, consequently, why no objective check on the efficiency of resource use is possible. The problem of identifying conservation problems related to the use of natural resources is shown to be but one aspect of the more general problem of identifying inefficient resource use.

The analysis stresses that resource management is a basic entrepreneurial function and that sound management cannot be determined independently of knowledge of other resources, estimates of future costs and benefits, and the goals of the resource owner. The implications of the analysis are then related to Leibenstein's widely discussed "X-inefficiency" concept and a dispute between Milton Friedman and Sir Dennis Robertson over the effects of poor farming methods. The findings are also related to the stress on marginal-efficiency rules (of conventional welfare economics) in resource allocation. The analysis demonstrates why the multiple user, multiple purpose view of natural resources is inconsistent with the individualist approach, and stresses the fact that the solution to environmental problems lies in defining and enforcing private property rights.

It is assumed throughout this paper that human action is purposeful and that welfare is defined in terms of the welfare of individuals. Furthermore, it is assumed that the individual decision-maker is the best judge of his own

welfare and that interpersonal welfare comparisons cannot be made. Thus, the costs and benefits perceived by the decision-maker are held to be the appropriate data in evaluating choice.⁷

Conservation Issues

In terms of usage, conservation is usually applied to natural resources. Although the conservation concept is widely misused, the conservation problem from an economic point of view is one of choosing among alternative temporal distributions of resource use.⁸ Thus, conservation involves investment and the proper timing of resource use and is similar to other resource-allocation problems.

The price system of the market is a mechanism for rationing scarce resources both at a given time and over time.⁹ It is in the owner's interest to exploit resources in such a way as to maximize the wealth or the present value of the resources involved. Conservation laws which restrict the use of resources forcibly shift resources to future production.¹⁰ Thus, forced conservation is likely to reduce the efficiency of resource use by distorting the pattern of resource use over time.

A key conservation argument holds that the unhampered market uses resources too rapidly.¹¹ However, there is no historical evidence that the market leads to over-utilization of natural resources. Alchian and Allen point out that there has instead been a historical tendency in the U.S. to *overestimate* future scarcity of natural resources.

In fact, for the past half century at least, people have overestimated future prices of natural resources. A study of prices of 15 natural resources 50 years ago (aluminum, bauxite, coal, copper, petroleum, gold, iron ore, lead, lime, magnesium, natural gas, nickel, silver, tin, and zinc) shows that every one was overvalued relative to their values at the present, so that people were *underconsuming* and *overconserving* those resources, relative to their values at the present time. Will the future be different?¹²

Despite the lack of evidence, many people today are convinced that there is a conservation problem. "In every generation, it seems, there are some who will arise to warn that we are plundering the planet, and others who claim its riches to be endless."¹³ A difference in outlook is understandable since there is no reason for different people to make the same assessment of uncertain future conditions. Most consumption of nonrenewable resources rests on an act of faith. We know that the future is unpredictable and will differ from the past. Yet, historical evidence underpins our faith that by the time a resource is exhausted something new will have been discovered which will satisfy the same need or compensate for what we no longer have so that we are, on the whole, as well off as before.¹⁴

Information and knowledge are key variables in decisions relating to the

use of natural resources just as they are in all other resource markets. A resource owner will be induced by the profit motive to use a resource if benefits exceed costs (as perceived by the decision-maker). The discount rate is a crucial element in any comparison of benefits and costs occurring over time. The following section discusses the relationship between the market rate of interest and the decision-maker's rate of time preference as these factors affect the conservation decision.

Rate of Time Preference

In making decisions related to the use of natural resources, the entrepreneur must assess the returns from resources in present as opposed to future use. An analysis of the decision relating to the inter-temporal pattern of resource use shows why this decision (like all other entrepreneurial decisions) is inherently subjective. It also reveals that a high rate of time preference relative to the market interest rate does not imply uneconomic resource use.

Time preference refers to the value placed on consumption in the near future relative to the more distant future.¹⁵ The fact that an entrepreneur's rate of time preference is high indicates that he is willing to forego a large amount of future income in order to obtain urgently needed income in the present. Hence, conservation in some cases may ostensibly appear to be socially beneficial although judged uneconomic by the resource owner. If, for example, a resource owner were unable to obtain a loan at the current interest rate, then he might exploit the resource in the sense of disinvesting where the *apparent cost* of conservation is less than the value of the resources saved. For example, if the value of a wood lot is increasing at say, 15 percent per year and the market interest rate is 10 percent, it appears to be "socially" desirable that the trees be left to grow. The opportunity cost of an additional year's tree growth is greater than the opportunity cost of capital.

If the owner knows that the rate of growth of timber value exceeds the market interest rate, however, he has an incentive not to cut the trees even though his rate of time preference is higher than the market rate of interest. If he is urgently in need of income in the present (i.e., has a high rate of time preference), he might borrow, using the timber as collateral, or sell his timber at the discounted value of its expected future yield. Thus, under competitive conditions, there is no reason why a high rate of time preference by the resource owner need imply uneconomic exploitation or disinvestment. If the owner can't borrow or sell his timber at the discounted value of its expected future yield (as perceived by him), however, he may be forced to cut the trees. In such cases where a landowner is unable to borrow money on the basis of the discounted value of the expected future yield, the problem is not the landowner's high rate of time preference but a difference of expectations concerning the present value of the timber stand. The following section demonstrates why expectations are likely to vary.

Expectations and Opportunity Cost

The preceding example involved a case where investment was economic based on anticipated costs and benefits of the resource owner. Disinvestment in land, forests, etc. is economic if the expected costs of conservation exceed the expected benefits when costs and benefits are properly discounted.

Although the distinction between economic and uneconomic disinvestment is clear in theory, there is no objective way for an outside observer to determine whether disinvestment in a particular resource situation is economic. Consider the forestry example cited above. It is observed that the farmer disinvests, *viz.*, he cuts the trees. This action indicates that the owner's perceived benefits exceeded the costs. Another observer may assess the situation differently. There is a great deal of uncertainty associated with both the costs and returns of not harvesting the trees. Even if it is known with a reasonable degree of certainty that the forest is physically growing at 15 percent per year, future timber prices are unknown.¹⁶ Thus, even if the physical quantity of timber is expected to increase by 15 percent, there is no assurance that returns will increase at the same rate. In reality, one can never be sure that the rate of growth in the value of a forest will exceed the market interest rate.¹⁷ Thus, there is no way for an outside observer to demonstrate that the action by the forest owner was uneconomic based on a comparison of costs and returns.

The cost of any activity is measured by the opportunities foregone. The cost of letting trees grow on land for one year, for example, is measured by the value of the best opportunity foregone as a result of keeping the land in timber. Thus, cost, as related to choice, is always subjective since it involves the value of foregone alternatives which can only be anticipated by the decision-maker at the moment of choice.¹⁸ This means that the cost of conservation to the resource owner can only be determined by the resource owner.

In the case of long-term conservation problems, there is a great deal of uncertainty about the magnitude of future costs and benefits. In view of these uncertainties, there is no reason why the outside observer and the resource owner should be expected to make the same estimate of the present value of costs and benefits associated with any particular conservation measure.¹⁹ This means that conservation, like all other entrepreneurial decisions, is inherently subjective and that the outside observer cannot objectively establish on the basis of a comparison of discounted costs and returns that the resource owner is failing to follow proper conservation practices.

Moreover, it is inappropriate to judge the efficacy of a proposed course of action on the basis of information not available to the decision-maker at the time the decision was made.²⁰ Shackle contrasts the subjectivist with the orthodox view of testing the efficacy of choice:

At what moment can a test of the efficacy of a proposed course of action be usefully applied? At the moment when that course is to be adopted or rejected. . . . The orthodox view is different. That view prescribes the application of some public standard after the event, when the "objective," publicly observable outcome of the action can be seen. A public standard is inappropriate because the conduct has not been chosen in view of circumstances of publicly agreed character, but of circumstances privately supposed by the individual. A standard only applicable after the event is plainly useless as a guide to choice.²¹

In the orthodox or conventional view which abstracts from uncertainties associated with time, there is *an* optimal level of conservation which can be objectively determined and is the same for all decision-makers. The policy problem in this view is to isolate the cases of uneconomic exploitation arising from "market failure" and take corrective action so that the costs to the resource owner are the same as the costs to society.

The conventional approach to conservation policy is subject to the crucial problem of central planning identified by Hayek forty years ago. Determining the optimal level of resource use requires more than a capacity for arithmetical calculations in discounting *given* costs and benefits. Decision-making activity related to conservation and all other investment decisions also requires subjective judgments by the entrepreneur.²² Future costs, benefits and interest rates are all uncertain and the entrepreneur's conservation decisions are thus necessarily rooted in uncertainty.

What are the implications? First, the fact that conservation decisions are innately subjective does not mean that there are no checks on inefficient resource use. Losses serve as an effective rein on entrepreneurs with poor foresight.²² If losses are large, the firm will likely be driven out of business regardless of its goals. Thus, success (to some extent) can be judged on results rather than motivation. If firms do not use resources efficiently, the firm is likely to be driven out of business regardless of its goals.²⁴ Furthermore, since competitive costs and returns can only be determined through the market, market results are the only objective way to test the efficacy of entrepreneurial activity.

Second, imposed conservation measures are likely to reduce the efficiency of resource use. In the case of nonrenewable resources, conservation efforts can distort the consumption pattern and thus cause too little of the resource to be used in the current time period (or too much to be conserved for later time periods). In the case of renewable resources, such as forests, conservation measures such as paper recycling will be counterproductive for people who desire large amounts of forests for esthetic values. Paper recycling and similar conservation measures will *reduce* the number of trees being grown. Thus, the more paper and other wood products used, the more trees will be produced, and the larger the forest acreage. Thus, people who derive benefits from seeing trees grow are working against their best interests when they discourage the use of forest products.²⁵

Third, the subjective nature of the entrepreneurial function has implications for success of governmental attempts to either mandate sound management or to identify inefficient resource use. A discussion of inherent problems in mandating sound management and in identifying examples of "X-inefficiency" follows.

Mandating Sound Management and Identifying Inefficient Resource Use

The preceding analysis suggests a number of problems inherent in governmental attempts to mandate efficient resource use. First, Alchian points out a fundamental problem with the concept of profit maximization itself under real world conditions. Where foresight is uncertain, profit maximization is *meaningless* as a guide to specifiable action since "each possible action has a *distribution* of potential outcomes, only one of which will materialize if the action is taken and that outcome cannot be foreseen."²⁶

Second, as indicated above, management is subjective and decisions must be based on anticipated costs and returns. Thus, under real world conditions of uncertainty, there is no reason to expect estimates of costs and returns by the outside observer to coincide with those of the resource owner.

Third, efficient resource use cannot be determined for one resource independently of other resources. Thus, the optimal pattern of use for resource X cannot be determined independently of the anticipated costs and returns for complementary resources. For example, net returns will not be maximized by "a program of production designed to obtain the greatest net return from the land" (or another resource) unless the use made of land is compatible with the efficient use of all the landowner's resources.

Consider now the implications of these factors associated with the subjectivity of the entrepreneurial function in identifying inefficient resource use.

X-Inefficiency

Leibenstein has recently "reformulated micro theory" to identify cases where inputs are not used most effectively.

The X-inefficiency idea, in a narrow sense, is an extremely simple one. Suppose that certain inputs have been allocated to a firm. These inputs can be used with various degrees of effectiveness within the firm. The more effectively they are used the greater the output. When an input is not used effectively, the difference between the actual output and the maximum output attributable to that input is a measure of the degree of X-inefficiency.²⁷

Leibenstein attributes this difference between the actual and the maximum output to factors related to the allocation of managerial effort such as ignorance, inertia and custom. Though these factors may result in a reduced

level of output, such traits, as Stigler suggests, do not necessarily imply entrepreneurial inefficiency. The entrepreneur

does not seek to maximize the output of corn; he seeks to maximize utility, and surely other products including leisure and health as well as corn enter his utility function. When more of one goal is achieved at the cost of less of another goal, the increase in output due to (say) increased effort is not an increase in "efficiency"; it is a change in output.²⁸

The farmer can devote more time to corn production only by reducing time used for leisure or for other purposes. The reduction in leisure may be valued more highly by the farmer than the potential increase in corn income resulting from the use of additional time spend in corn production. There is no objective procedure by which an economist or other outside observer can weigh the costs and benefits of corn and other outputs and determine that the farmer could increase utility by producing more corn.

Leibenstein also cites lack of knowledge of alternative opportunities as an example of X-inefficiency.²⁹ A problem similar to that discussed above faces the outside observer in analyzing the costs and benefits of additional knowledge to the entrepreneur. The expected costs and benefits of acquiring knowledge are inherently subjective and cannot be measured by an outside observer. Depending upon particular circumstances, different entrepreneurs may rationally be expected to devote different amounts of resources to acquiring knowledge. Expected benefits of acquiring knowledge about production and marketing techniques (e.g., futures markets), for example, would be much different for a farmer near retirement than for a farmer planning to farm for another 20 or 30 years. Thus, since it is economic for farmers to devote different amounts of time in acquiring knowledge, the economist or other analyst cannot conclude that a farmer has "too little" knowledge even though that farmer has far less knowledge relative to most other farmers.

The implication is that objective information about specific resources is not sufficient to determine whether resources are being efficiently used. The soundness of resource use cannot be determined independently of the total resource situation, the entrepreneurial outlook concerning future prices and costs, and the attitude toward risk. All of these factors are subjective and will vary widely from one entrepreneur to another. The implication of this analysis is that there is no objective way to measure "X-inefficiency."³⁰

Friedman-Robertson Controversy

A dispute concerning the effects of "X-inefficiency" is contained in the recently published correspondence between Milton Friedman and Sir Dennis Robertson. The correspondence relates to the effect of British laws of the 1950's which provided for supervision over the use made of agricultural land by county agricultural committees. "The laws provided for sanc-

tions to assure that the land was used 'properly,' as judged by the county committees."³¹ The point of contention between Friedman and Robertson concerns the extent to which the landowner bears the cost when "land is badly used" (whether because the operator "likes leisure or to run his own affairs or out of sheer ignorance").³² Friedman argues that the landowner bears the cost of "poor farming" while Robertson holds that the cost is borne by other members of society as well.

The individualistic ethic which assumes that individuals act in their own interests as perceived by them casts the problem in a different light. As Stigler points out above, a farmer seeks to maximize utility and not necessarily net income from agricultural products. If Farmer Jones has information on both alternatives and is *forced* to substitute corn production for leisure by the county agricultural committee (or anyone else), he is obviously worse off. Farmer Jones produces more corn for "society" and makes more money income but the additional income has a lower value than the foregone leisure. In this case, there appears to be no sound economic basis for saying that "society" is better off as a result of the increased corn production if Jones is forced to substitute corn production for leisure.

The argument that land is "badly used" in this case where Jones deliberately chooses to produce less corn implies that welfare is defined in terms of a societal objective or standard that takes precedence over the goals of individuals. Consider the following example cited by Leibenstein:

A recent paper by Kenneth Shapiro and Jurgen Muller examines the choice of technique by farmers in Kenya. It demonstrates that in reality farmers do not use as much knowledge as is available to them, not only because of differences in costs but also because they do not *wish* to [emphasis in original copy] . . . Furthermore, it would be strange to argue that these real farmers are operating on their production frontier.³³

This purported example of "X-inefficiency" vividly illustrates the difference between the individualist and societal approaches. If farmers don't *choose* to use all the information available to them, what is the basis for concluding that they are inefficient? These farmers, like Farmer Jones above (and like tenured college professors who work 35 hour weeks), have made a choice based on their perceived costs and benefits.³⁴ If individuals are considered to be incapable of determining their own interests, the only conceivable authority (as Buchanan suggests) must be some individual or group that claims godlike qualities.

All approaches purporting to identify and measure inefficient managerial effort are inconsistent with the individualistic approach. Any standard used must be highly arbitrary.³⁵ There is no way the outside observer can have better data upon which individuals base their decisions than possessed by the individuals themselves. What, then, can be said about information problems as they relate to the management decisions?

Information Problems

Information and management are inextricably linked. Furthermore, conservation and management decisions require subjective judgments by the resource owner. The implications of these facts in monitoring resource management practices do not appear to be widely recognized. The widespread use of marginal efficiency conditions as welfare norms in conventional economic theory is a case in point.

Marginal Efficiency Conditions

The market operates on the basis of profit incentives. Moreover, entrepreneurial success hinges on how effectively profit opportunities are discovered and exploited. The entrepreneur is given data on neither costs nor returns associated with different alternatives. Thus, entrepreneurial choices relating to conservation and resource management are based on opportunities for gain as perceived by the entrepreneur. The implications of the fact that decision-making is rooted in uncertainty involving choice among thoughts or expectations, and not from among actual known outcomes, has been repeatedly stressed by Schackle.

Conventional economics is not about choice, but about acting according to necessity. Economic man obeys the *dictates* of reason, follows the *logic of choice*. To call his conduct choice is surely a misuse of words, when we suppose that to him the ends amongst which he can select, and the criteria of selection, are given, and the means to each end are known The escape we have suggested consists not in abandonment of rationality, not in abandonment of the adoption of the means which will lead to the selected end, but in abandonment of the postulate that the available ends are given.³⁶

Emphasis in the standard economic theory of the firm is placed on marginal efficiency conditions of resource use assuming that the necessary information is available or can be readily obtained. There is a consensus among economists, for example, that a resource is optimally used when its value of the marginal product is the same in all uses. But, as Hayek states, information about marginal efficiency conditions of this kind

. . . is emphatically *not* the economic problem which society faces. . . . The reason for this is that the "data" from which the economic calculus starts are never for the whole society "given" to a single mind which could work out the implications and can never be so given. The economic problem of society is thus not merely a problem of how to allocate "given" resources—if "given" is taken to mean given to a single mind which deliberately solves the problem set by these "data". It is rather a problem of how to secure the best use of resources known to any of the members of society, for ends whose relative importance only these individuals know. Or, to put it briefly, it is a problem of the utilization of knowledge which is not given to anyone in its totality.³⁷

It might be contended that the conclusion (of the final sentence) is as much an argument for state intervention as not. Such a conclusion, however, fails to take account of the significance of the "market socialism" debate of the 1930's concerning the possibility of rational economic planning in the absence of market information provided through the price system. *Given* information on preferences, resources, and production functions, rational central economic planning is possible. These data are, of course, not given and no procedure has been found by which the necessary data or information can be obtained for central planners to simulate a competitive market.³⁸

Market prices act to coordinate the separate actions of different people so that the relevant information is transmitted to all. Moreover, the competitive market process not only mobilizes existing knowledge; it also provides incentives for the discovery of new opportunities to improve the efficiency of resource use.³⁹

What are the implications for the use of marginal efficiency conditions to monitor resource use? As previously indicated, data relevant to decisions affecting resource use must incorporate information on future as well as current conditions. For example, intelligent decisions concerning the optimal rate of use of natural resources require estimates of future costs and prices. Yet, forecasts of future technological and economic developments are highly subjective. Consequently, as indicated above, there may be little or no relationship between the costs and benefits estimated by the outside observer and the evaluations that individuals place on alternatives in actual choice situations.⁴⁰ Marginal efficiency conditions are of little use in monitoring the efficiency of resource use if the data upon which choice by individual decision-makers is based is distinct from any data that can be objectively called upon by external observers.⁴¹

The use of marginal efficiency conditions as a policy norm has received a great deal of attention during the past decade in the case of "spillovers."

Spillovers or External Effects

When there are beneficial or undesirable side effects associated with the use of a privately owned resource, all of the effects are not reflected in costs borne by the resource owner. The pollution of streams from building activity, firm wastes, and fertilizer runoff are common examples of water-related spillovers. Industrial plants, autos and many other economic activities have contributed toward air pollution.

A common approach is to view land and other natural resources as multiple-purpose, multiple-user, natural assets which, for efficient use, must be managed through the collective choice mechanism.⁴² Under this approach, taxes, subsidies, pollution permits and other procedures are proposed as ways of internalizing externalities through the marginal efficiency conditions of welfare economics.

The marginal efficiency conditions are useful to individual entrepreneurs in the context of a logic of choice (as shown below). The use of marginal efficiency rules as they apply to aggregate resource use, however, is inconsistent with the individualistic approach. Consider the much stressed efficiency rule of theoretical welfare economics that a per unit tax equal to the difference between marginal private costs and marginal social costs will "internalize the externality" or bring about an "optimal level" of spillover. This approach suffers from several critical shortcomings.

First, problems posed to the outside observer in estimating firm costs as they motivate choice, although not recognized by many economists, are well known to economists of the subjectivist tradition.⁴³ "Social costs" may be viewed as the sum of all (private) costs associated with a particular activity.⁴⁴ Thus, since "social costs," like private costs, are subjective, problems confronted in measuring "social costs" can't be overcome merely by devoting more resources to data collection.

Second, there is an implicit interpersonal comparison concealed in the concept of "social cost." Even if it were possible to determine the spillover costs incurred by Jones and Smith, there is an implicit assumption in adding these costs together that a dollar of cost to Jones is equal to a dollar of cost to Smith.⁴⁵ The individualistic approach, of course, does not permit such interpersonal utility comparisons.

Third, the cost-benefit approach to determining the optimal amount of pollution is inconsistent with private property rights in the market. The idea that efficient resource use can be determined independently of the structure of property rights is based on "a grand illusion," *viz.*, that one can have markets without divisible and transferable property rights.⁴⁶ If there is a known policy that individual property rights for a particular asset must yield to the "common good," the market for that asset would be similar to that for "common property" resources where users have no incentive to properly husband resources.

What are the implications for marginal efficiency conditions? The marginal efficiency conditions of welfare economics are impeccable as logical constructs and provide useful guides to individual decision-makers at the firm level.⁴⁷ However, as lodestars of public policy, the use of these conditions suffers from the problems noted above. The emphasis is placed on the logical construct with little attention devoted to information problems or to the implications for property rights. In conventional welfare economics, alternative solutions to spillover problems focus, to a considerable extent, on advantages and disadvantages of alternative "internalization" procedures as though the necessary data are "given."⁴⁸

All spillover problems involve cases where property rights are not clearly identified and enforced. The problem in such cases is not "market failure" but the failure of the legal system to provide necessary conditions for the market to operate. In this sense, then, spillover problems may be viewed as "government failure" and not "market failure."

These comments suggest that the key responsibility of government in spillover problems is to define and protect property rights. The liability approach involves an effort to fully define property rights, thereby defining spillovers as either (1) an invasion of property rights or (2) a risk which the offended property owner bore when the property was acquired.⁴⁹

Bjornseth and Burt (pp. 1 and 4) point out how current spillover problems relating to natural resources can be traced to the lack of enforcement of private property rights:

Historically, legal problems with pollution and externalities began to occur when courts refused to protect individual property rights, favoring instead the supposed common good which was said to result from allowing a railroad to set fire to adjoining property with its steam locomotives, or from allowing a factory to pollute urban air. When courts ceased to defend the individual property owner against such incursions, the familiar "public goods" problem began to take on serious proportions. More and more people used the unowned and undefended air and water as pollution sinks.⁵⁰

Managing natural resources through the regulatory approach involving taxes, subsidies, etc. assumes that resources belong to whoever can make best use of these resources regardless of any previous assignment of property rights. The alternative to viewing a natural resource as property which must be regulated for the "higher good" is as indicated above, to convert it into securely protected private property.⁵¹

There are, of course, formidable problems in developing a logical system of well-defined property rights based on the trespass model (especially for air). However, it has been shown that the alternative of regulating and managing natural resources to achieve marginal efficiency conditions is fraught with theoretical as well as practical difficulties. Buchanan in reviewing Posner's *Economic Analysis of Law* reveals in a graphic *reductio ad absurdum* the implications of an unlimited adherence to the "efficiency criterion":

For ordinary crimes — theft and rape, for example — he [Posner] is somewhat reluctantly willing to allow unconditional legal deterrence independently of "maximum value" on the grounds that potential transactions costs between criminal and victim are low. Hence, freely negotiated exchange or market allocation can be presumed to be an effective substitute for litigation: That is to say, if the benefits secured by the potential rapist exceed the losses suffered by the victim, mutual gains from exchange should exist and such trades should take place. Posner is trapped into this argument, which to me approaches absurdity, because of his insistence on the relatively unlimited applicability of the maximum value or efficiency criterion. He seems quite unwilling to acknowledge that law is to be enforced because it is the law, sometimes quite independently of external economic considerations.⁵²

It is unrealistic to expect that property rights conflicts can be eliminated. Wicksell, as a way of avoiding conflicts, proposed that all collective deci-

sions be made *unanimously*. However, the selection of an institutional arrangement, if made on any basis other than the rule of unanimity, conflicts with the individualist approach. Within the limits of prevailing rules, each interest group attempts to improve its own position and there is generally no way to reach consensus.⁵³ Buchanan and Tullock adopted conceptual unanimity as a criterion in examining the logical foundations of constitutional democracy. They summarize the implications of the continuous struggle of special interest groups as follows:

Ultimately the hope for some "improvement" must lie in the mutual consent of the special interests themselves for constitutional changes which will act so as to reduce the excessive costs that discriminatory legislation imposes on all groups over time. It is in seeking such changes in the organizational rules themselves that genuinely enlightened self interests of these groups may be expressed.⁵⁴

Recent work by Buchanan, Hayek, Nozick, and Rawls represents a resurgence of interest in these basic constitutional problems and issues.⁵⁵

Conclusions and Implications

The principles of conservation in the use of land and other natural resources are no different in theory from those of other resources. Conservation is an investment problem and should be judged by precisely the same criteria as all other investments.

Under competitive conditions the owner has an incentive to properly use land and other natural resources and, where property rights are clearly defined and enforced, the owner is induced to properly conserve resources even when his rate of time preference is higher than the market interest rate. Incentives to use natural resources may be distorted, however, when the owner has a high rate of time preference and resource markets do not operate smoothly, or if, as in the case of spillovers, markets do not exist.

Sound management and conservation practices can be determined only by comparing the expected (properly discounted) costs and benefits which are based on expectations and, consequently, uncertain. Thus, evaluations of resource use by the entrepreneur and by an outside observer are likely to be quite different. The economist can provide information helpful to the decision-maker in assessing alternatives, but costs and benefits of a resource as they affect the entrepreneurial choice can never be determined by an outside observer. The economist has no objective procedure (aside from the survivor principle) to identify inefficient resource use.⁵⁶

More attention should be devoted to information problems in analyzing conservation and other natural resource issues. The most important economic problems in achieving efficient resource use involve the coordination of existing knowledge and the discovery of new opportunities by market participants. Acceptance of this view implies a shift in the focus of attention

by the economic analyst from the idealized model of "perfect competition" to the market as a process of entrepreneurship motivated by an incentive mechanism to bring about the most useful employment of resources.

The presence of "market failure", in the sense that real world markets do not conform to the criteria and standards of the idealized competitive model of theoretical welfare economics, offers no *prima facie* case for government action. Whether current resource markets can be improved depends upon whether there is an alternative institutional arrangement better able to cope with resource problems. When real world political institutions are measured against any idealized polity we have "public failure."⁵⁷ Thus, the choice between market and non-market approaches to the use of natural resources can be intelligently made only after markets as they actually operate are compared with government regulation as political institutions functioning in the real world.⁵⁸ Such policy decisions cannot be properly arrived at without an understanding of the information problems inherent in all economic regulation.

NOTES

1. F.A. Hayek, *The Constitution of Liberty* (Chicago: The Univ. of Chicago Press, 1960), pp. 367-368.
2. A.C. Bunce, *Economics of Soil Conservation* (Ames, Iowa: The Iowa State College Press, 1942), p. 1.
3. "Moreover, the conservation movement . . . was in itself largely a nationalistic device popularized with much fanfare and publicity by Roosevelt and his friend Gifford Pinchot, Chief of the United States Forest Service. After a century in which rapid exhaustion of the resources of the West was encouraged in every way the United States suddenly faced the prospect of potential exhaustion at a time when it was actively engaging in international rivalry with the other great powers of the world." A.A. Ekirch, Jr., *The Decline of American Liberalism* (West Hanover, MA: Atheneum, 1966), p. 175. For a discussion of the way government policies have caused our present energy problems see J. Clayburn LaForce, "White House Crude," *The American Spectator* (May 1978).
4. Raleigh Barlowe, *Land Resource Economics—The Economics of Real Property*, Second Ed. (Englewood Cliffs, NJ: Prentice-Hall, 1972), p. 567.

Mises contrasts the conservation problem in the U.S. and Europe as follows: "Until the last decades of the nineteenth century there was always a geographic zone open to newcomers—the frontier. Neither the existence of the frontier nor its passing was peculiar to America. What characterizes American conditions is the fact that at the time the frontier disappeared ideological and institutional factors impeded the adjustment of the methods of land utilization to the change in the data.

"In the central and western areas of continental Europe, where the institution of private property had been rapidly established for many centuries, things were different. There was no question of soil erosion of formerly cultivated land. There was no problem of forest devastation. . . . The owners of the forests were impelled to conservation by their own selfish interests." Ludwig von Mises, *Human Action*, Revised ed. (Chicago: Henry Regnery Co., 1963), p. 657.

5. Morris K. Udall, "Land Use: Why We Need Federal Legislation" in *No Land is an Island* (San Francisco: Institute for Contemporary Studies, 1975), p. 59.
6. "Then there is the common argument that anytime a natural resource is used, anytime a tree is chopped down, we are depriving future generations of its use. And yet this argument proves far too much. For if we are to be prohibited from felling a tree because some

- future generation is deprived of doing so, then this future generation, when it becomes 'present' also cannot use the tree for fear of its future generations, and so on to prove that the resource can never be used by man at all." Murray N. Rothbard, "Conservation in the Free Market," in *Egalitarianism as a Revolt Against Nature and Other Essays* (Washington, D.C.: Libertarian Review Press, 1974), p. 111.
7. "It is morally justifiable, and indeed morally necessary, to proceed on the 'as if' presumption that individuals, by their membership in the human species, are capable of acting in their own interest, which they alone can ultimately define. Empirical observations of human error, evaluated *ex post*, can never provide a basis for supplanting this 'as if' presumption, because there exists no acceptable alternative. If persons are considered to be incapable of defining and furthering their own interests, who is to define such interests and promote them? . . . [T]he only conceivable authority must be some selected individual or group of individuals, some man who presumes to be god, or some group that claims god-like qualities." James M. Buchanan, *Freedom in Constitutional Contract—Perspective of a Political Economist* (College Station, Texas: Texas A & M Univ. Press, 1977), p. 15.
 8. Soil conservation, for example, has been defined (even by economists) to mean the maintenance or improvement of soils. "Conservation, as applied to land in a physical sense, means the maintenance of the present level of productivity or our soil under the given state of the arts . . ." A.C. Bunce, "Time Preference and Conservation," *Journal of Farm Economics*, 22 (1940): 536.
 9. E.C. Pasour, Jr., "Austerity, Waste, and Need," *The Intercollegiate Review* (Winter-Spring 1978): 79-85.
 10. "In short, the State decides that the present generation must be made to allocate its resources more to the future than it wishes to do; for this service the State is held up as being 'farseeing' compared to 'short-sighted' free individuals." Murray N. Rothbard, *Power and Market: Government and the Economy* (Menlo Park, CA.: Institute for Humane Studies, Inc., 1970).
 11. It is often contended that the market will not properly conserve "exhaustible" or "non-renewable" natural resources such as oil, natural gas, and coal where there is presumed to be a fixed stock. The supply curve for these resources, however, is not perfectly inelastic. As price increases, the quantity produced will increase. When it is realized that production responds to price increases, the idea of the stock of oil, coal, and other natural resources becomes very imprecise. Much of the concern about the current energy "crisis" is due to the failure to recognize this seemingly elementary point. However, public understanding has been clouded by public officials who proclaim that increases in price will have no important effects on production. "I know of no examples throughout history where any civilization suddenly 'ran out' of this or that mineral. The 'one-horse shay' concept of natural resource deterioration must be discarded. Deterioration in the quality or quantity of natural resources does not come about suddenly, but rather gradually." J.W. Milliman, "Can People Be Trusted with Natural Resources?" *Land Economics* 38 (1962): 203.
 12. A.A. Alchian and W.R. Allen, *Exchange and Production: Competition, Coordination, and Control*, Second Ed. (Belmont, Ca.: Wadsworth, 1977), p. 159. Also see Gerhard Anders, W.P. Gramm and S.C. Maurice, *Does Resource Conservation Pay?* (Los Angeles, Ca.: International Institute for Economic Research, 1978).
 13. Scott Gordon, "Economics and the Conservation Question," *Journal of Law and Economics* (1948): 111.
 14. "We are constantly using up resources on the mere probability that our knowledge of available resources will increase—indefinitely—and this knowledge does increase in part because we are using up what is available at a fast rate. Indeed, if we are to make full use of the available resources, we must act on the assumption that it will continue to increase, even if some of our particular expectations are found to be disappointed. Industrial development would have been greatly retarded if sixty or eighty years ago the warning of the conservationists about the threatening exhaustion of the supply of coal had been heeded; and the internal combustion engine would never have revolutionized transport if its use had been limited to the then known supplies of oil (during the first few decades of the era of the automobile and the airplane the known resources of oil at the current rate of use

- would have been exhausted in ten years). Though it is important that in all these matters the opinion of the experts about the physical facts should be heard, the result in most instances would have been very detrimental if they had had the power to enforce their views on policy". Hayek, *Constitution of Liberty*, pp. 369-370.
15. The market interest rate reflects individual rates of time preference. Some economists hold that the "social rate" of time preference is lower than the market interest rate. As Solow says, however, it is "far from certain. . . that our private decisions in the market give less weight to the far future than we would soberly like. . . ." Robert M. Solow, "What Do We Owe to the Future?," *Nebraska Journal of Economics and Business* 13 (1974): 15. Observers as disparate in view toward government intervention as Arrow and Hayek are also skeptical of the contention that the community should devote a larger proportion of its resources to provide for the future than would result from the separate decisions by individuals: "The argument for a social rate of time preference distinct from individual rates is basically a matter of value judgment. Its validity and its importance. . . are both subject to considerable dispute." K.J. Arrow, "Criteria for Social Investment," Ch. 22 in *Economics of the Environment*, 2nd ed., ed. Robert and Nancy S. Dorfman (New York: W.W. Norton & Co., 1977), p. 420. "If valid, this contention would indeed justify central planning of most economic activity. There is, however, nothing to support it but the arbitrary judgment of those who maintain it." Hayek, *Constitution of Liberty*, p. 370.
 16. The physical growth in a forest is also uncertain in the real world due to insects, weather, fire and other unanticipated occurrences.
 17. "This does not mean to say that any particular observer cannot make an estimate of the damage or benefits accruing from any action, but rather that this estimate will necessarily embody elements of his own evaluation and will depend upon his own perceptions and assumptions of what is appropriate. Different individuals will, therefore, make different estimates, and no objective check on efficiency is possible." S.C. Littlechild, "The Problem of Social Cost," pp. 77-93, in *New Directions in Austrian Economics*, ed. Louis M. Spadaro (Kansas City: Sheed Andrews and McMeel, Inc., 1978), p. 88.
 18. J.M. Buchanan, *Cost and Choice* (Chicago: Markham Pub. Co., 1969).
 19. Shackle points out why expectations and the associated uncertainty are inherent in any investment decision relating to capital equipment. Precisely the same issues are involved in conservation investment decisions. "The question for the businessman deliberating whether or not to acquire a specified piece of equipment is how the value of its services, reduced to terms of cash in hand, compares with the expense of acquiring it. The services will be rendered in future years and their value in each of those years is conjectural. The value, whatever it may prove in any future year to be, will not be received until that year has become 'the present.' Thus, the earnings of the tool must be guessed at and then the results of that guessing must each be discounted. . . . When the total discounted value of any given series of conjectural sums, to be earned by the tool in future years, has been reckoned, that total can be compared with the cost of acquisition. But that total, being based on conjectures, is itself a conjecture." G.L.S. Shackle, *Epistemics and Economics: A Critique of Economic Doctrines* (London: Cambridge Univ. Press, 1972), pp. 18-19.
 20. *Ibid.*, pp. 66 and 123; see also William D. Burt, "Corporate Environmental Mismanagement?," *Environmental Alternatives*, Vol. 5, No. 1 (Winter 1979): 11-13.
 21. "A further point is that the correctness of the decision cannot be determined by subsequent events. If a businessman undertakes to do something which entails certain risks, he considers that the chance of gain is worth the risk he runs, and whether ultimately he succeeds or fails has no relevance to this preference." Quote from pp. 104-105 in R.H. Coase, "Business Organization and the Accountant" pp. 97-132 in J.M. Buchanan and G.F. Thirlby, eds., *LSE Essays on Cost* (London: Weidenfeld and Nicholson, 1973).
 22. Hayek, *Constitution of Liberty*, p. 198. "The standard theory assumes that the firm confronts definitely known and given cost and revenue possibilities. For the theory of the firm, therefore, to maximize profits does not mean to discover an opportunity for pure gain; it means merely to perform the mathematical calculations required to exhaust the *already-perceived* opportunity for gain that the given revenue and cost curves might present. The urge of would-be entrepreneurs to grasp profit, by contrast, is the force, which *itself*

- reveals the existence of gaps between costs and revenues." Israel M. Kirzner, *The Perils of Regulation: A Market-Process Approach*, LEC Occasional Paper (Coral Gables, FL: Law and Economics Center, 1978), p. 10.
23. "It is ironic that the 'plight of the Okies' in the 1930's, widely publicized as a plea for conservation laws and the result of 'cruel capitalism' actually resulted from the fact that bad entrepreneurs (the Okies) farmed land which was valueless and submarginal. Forced 'conservation' investment on this submarginal land or government subsidization of the 'Okies' would have aggravated a dislocation that the market quickly eliminated." Rothbard, *Power and Market*, p. 203.
 24. A.A. Alchian, "Uncertainty, Evolution, and Economic Theory," *Journal of Political Economy*, 58 (June, 1950): 211-221.
 25. Michael R. Darby, "Paper Recycling and the Stock of Trees," *Journal of Political Economy* 81 (1973): 1253-1255.
 26. Alchian, "Uncertainty," p. 212.
 27. H. Leibenstein, *General X-Efficiency Theory and Economic Development* (New York: Oxford University Press, 1978).
 28. G.J. Stigler, "The Existence of X-Efficiency," *American Econ. Review*, 66 (1976): 213.
 29. "The extent to which different individuals will have knowledge of superior opportunities elsewhere will differ markedly between individuals. . . . An individual may have access to knowledge of superior opportunities and for a variety of reasons may not be motivated to obtain the necessary information. Where the latter is the case, this fits our overall concept of X-inefficiency due to motivational factors." Leibenstein, *General X-Efficiency*, p. 81.
 30. The contention that inefficiency cannot be objectively measured does not mean that there is no economic error or scope for entrepreneurial improvement in the real world. Kirzner contrasts the implications of the conventional view of the market in equilibrium with the Austrian view that the market is in a state of disequilibrium. The latter view places crucial emphasis on the entrepreneurial function, whereas the former view assumes away error and allows no scope for entrepreneurship. "At each instant, because the market is in a state of disequilibrium, genuine allocative inefficiencies remain yet to be removed simply because entrepreneurs have not yet noticed the profit opportunities represented by these inefficiencies. At each instant available technological improvements (in some sense already at hand) remain to be exploited; they remain untapped because entrepreneurs have not yet noticed the profit opportunities embedded in these possibilities." Israel M. Kirzner, "Economics and Error," in *New Directions in Austrian Economics*, ed. L.M. Spadaro (Kansas City: Sheed Andrews and McMeel, Inc., 1978), p. 74. However, recognition of the fact that error or scope for entrepreneurial activity is typically present in real world markets does nothing to lessen the problems associated with attempts to empirically measure the extent of the inefficiency since entrepreneurial activity is always shrouded in subjective expectations.
 31. Milton Friedman, "A Milton Friedman - Sir Dennis Robertson Correspondence," *Journal of Pol. Econ.*, 81 (1973): 1033.
 32. *Ibid.*,: 1034.
 33. Harvey Leibenstein, "X-Inefficiency Xists - Reply to an Xorcist," *American Econ. Review* 68 (1978): 208.
 34. Martin finds a similar problem in the growing literature on protection and X-inefficiency. "The empirical studies are misleading on this point. They argue that protection increases X-inefficiency by permitting managers to indulge their preferences for a 'quiet life,' but they fail to consider the welfare valuation of foregone leisure." John P. Martin, "X-Inefficiency, Managerial Effort and Protection," Vol. 45, No. 179, *Economica* (August 1978): 282.
 35. Rothbard, *Power and Market*, p. 49.
 36. G.L.S. Shackle, *Decision, Order and Time in Human Affairs*, 2nd ed., (London: Cambridge Univ. Press, 1969), pp. 272-273.
 37. F.A. Hayek, "The Use of Knowledge in Society," *Amer. Econ. Review* 35 (1945): 519-530. Reprinted in *Individualism and Economic Order* (Chicago: Univ. of Chicago Press, 1948), pp. 77-78.
 38. "It cannot be denied that there are some facts concerning probable future developments which the government is more likely to know than most of the individual owners of natural

resources. . . . There will always exist, however, an even greater store of knowledge of special circumstances that ought to be taken into account in decisions about specific resources which only the individual owners will possess and which can never be concentrated within a single authority. . . . We can bring together all the knowledge that is relevant to particular problems only by dispersing downward the generic knowledge available to the government, not by centralizing all the special knowledge possessed by individuals." Hayek, *Constitution of Liberty*, p. 371.

39. "The competitive market process is needed not only to mobilize existing knowledge, but also to generate awareness of opportunities the very existence of which until now have been known to no one at all. The entrepreneurial process, moreover, disseminates existing information through the market. The process itself is a continual one of the discovery of opportunities." Kirzner, *Perils of Regulation*, pp. 9-10.
40. J.M. Buchanan, "Is Economics the Science of Choice?," in *Roads to Freedom—Essays in Honour of Friedrich A. von Hayek*, ed. E. Streissler (New York: A.M. Kelley, 1969), p. 64.
41. "Welfare economists, new and old, have generally assumed omniscience in the observer, although the assumption is rarely made explicit, and even more rarely are its implications examined. . . . The omniscience assumption seems wholly unacceptable. Utility is measurable, ordinally or cardinally, only to the individual decision-maker. It is a *subjectively* quantifiable magnitude. . . . To the individual decision-maker the concept of an 'efficiency criterion' is a useful one, but to the independent observer the pitfalls of omniscience must be carefully avoided." J.M. Buchanan, "Positive Economics, Welfare Economy, and Political Economy," 2 *Journal of Law and Economics* (1959): 126 and 137.
42. E.G. Dolan, "Environmental Policy and Property Rights," Ch. 11 in *Property in a Humane Economy*, ed. S.L. Blumenfeld (LaSalle, Ill.: Open Court, 1974).
43. E.C. Pasour, Jr., "Cost and Choice—Austrian vs. Conventional Views," *Journal of Libertarian Studies*, 2, no. 4 (Winter 1978): 327-336.
44. Littlechild contends that the sum of costs to everyone in (say) waste disposal is not the social cost since ". . . indeed, an action by one person cannot impose costs on others." "The Problem of Social Cost," p. 89. However, all affected parties may experience a loss of opportunities as a result of the spillover. The value of the foregone opportunity is the cost to the individual. Thus, one person can impose an activity on others which involves a cost to the affected parties.
45. A similar implicit interpersonal comparison of utilities is involved in the use of market data to estimate spillover costs. A comparison of market values of housing near an airport with housing values away from the airport, for example, has been suggested as a way to determine the spillover cost associated with the airport. Summing up the reduction in property values for all the affected properties implicitly assumes that a one dollar reduction in value has the same value for all property owners. The definition of property rights is antecedent to the establishment of liability and the identification of spillover problems.
46. G. Warren Nutter, "Markets Without Property: A Grand Illusion," in *Money, The Market and the State*, ed. N. Beadles and L. Drewry (Athens, Ga.: Univ. of Georgia Press, 1968), pp. 137-145.
47. "There should be no doubts about the usefulness of a 'logic of choice'. . . . If a potential chooser is made aware of the principle in its full import, he will weigh alternatives more carefully, he will think in marginal terms, he will make evaluations of opportunity costs, and finally, he will search more diligently for genuine alternatives. . . . Instructing the decision-maker as to how he should choose may produce 'better' choices as evaluated by his own standards." J.M. Buchanan, "Is Economics the Science of Choice?," pp. 48-49.
48. Consider the following prescription from a recent publication describing alternative approaches to spillover problems: "A surcharge is a tax upon an activity for using a resource below cost. When based upon the level of spillover cost, it makes the producer aware of the total cost of his actions and improved resource allocation. If drainage of agricultural land creates a spillover cost, to the fishery, a surcharge could be set equal to the damage caused by each acre drained." L.E. Danielson, "Economic Tradeoffs: Farmland and Fisheries," *Tar Heel Economist* (1977), p. 2.
49. R.L. Bjornseth and W.D. Burt, "Balanced National Growth—What is It?" *AREA Bulletin* 4 (1978): 2 and 4.
50. R.A. Posner is a forceful advocate both of the view that spillover problems are bilateral in

nature and for the use of the economic efficiency criterion in solving externality problems. "We have avoided the term (externalities) because it is misleading. It suggests that the correct solution in the sparks case is to impose liability on the railroad for spark damage, whereas in fact there is no presumption in economic theory that the railroad rather than the farmer should be made to bear the cost of spark damage. If the joint value of railroading and farming would be maximized by the discontinuance of crop protection, the substitution of a more fire-resistant crop, or the removal of the crop to some distance from the railroad right-of-way, then imposition of liability on the railroad would produce an inefficient result (assuming, of course, prohibitive transactions costs)." R.A. Posner, *Economic Analysis of Law* (Boston: Little Brown & Co., 1972), p. 30.

51. Littlechild shows how the property rights approach can be used to handle the common spillover problem where use of nitrate fertilizers by farmers pollutes the neighboring water supply. "Meade's recommendation is a tax per gallon of pollution or the auction of licenses to pollute up to a given amount per month. But there is a better policy. If the farmers were held legally liable for damages caused by their nitrates, they would have to take these damages into account without any other government intervention." S.C. Littlechild, *The Fallacy of the Mixed Economy*, Hobart Paper 80 (London: The Institute of Economic Affairs, 1978), p. 62.
52. Buchanan, *Constitutional Contract*, p. 42.
53. Buchanan suggests that the role of the economist should be as an arbitrator not maximizer and that his task is to provide an "understanding of the processes within which the divergent behavioral plans of persons are integrated and reconciled." James M. Buchanan, "Methods and Morals in Economics: The Ayres-Knight Discussion," in *Science and Ceremony, The Institutional Economics of C.E. Ayres*, ed. W. Breit and W.P. Culbertson, Jr. (Austin: Univ. of Texas Press, 1976), p. 167.
54. J.M. Buchanan and G. Tullock, *The Calculus of Consent—Logical Foundations of Constitutional Democracy* (Ann Arbor, Mich.: The Univ. of Michigan Press, 1962), p. 29.
55. Buchanan, *Constitutional Contract*; F.A. Hayek, *Law, Legislation and Liberty—Rules and Order Vol. 1* (Chicago: Univ. of Chicago Press, 1973); Robert Nozick, *Anarchy, State and Utopia* (N.Y.: Basic Books, 1974); and John Rawls, *A Theory of Justice* (Cambridge: Harvard Univ. Press, 1971).
56. Yet this seemingly elementary point is ignored or forgotten as economists continue to measure all kinds of inefficiencies (including "X-inefficiency"). E.C. Pasour, Jr., "A Further Note on Production Outside the 'Economic' Region of Production," *The American Economist* (forthcoming).
57. W.C. Mitchell, *The Anatomy of Public Failure: A Public Choice Perspective*, Original Paper 13 (Los Angeles, CA.: International Institute for Economic Research, 1978).
58. H. Demsetz, "Information and Efficiency: Another Viewpoint," *Journal of Law and Economics* XII (1969): 1-21.