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H. H. Liebhafsky

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"THE PROBLEM OF SOCIAL COST" —AN ALTERNATIVE APPROACH*

H. H. LIEBHAFSKY**

The arguments, conclusions, and policy recommendations presented by R. H. Coase¹ in his 1960 paper—"The Problem of Social Cost"—have by now been embraced and refined by many economists, with an occasional dissent here and there. Indeed, a survey,² published in December of 1972, of works dealing with economic theory and property rights, lists more than 120 articles and books on subjects ranging from economic theories of property rights and "an economic theory of constitutions" to economic theories of tort liability, including Coase's paper. His paper was the pump primer.

Much of this flood of the printed word has been explicitly or implicitly concerned with a discussion of policies to deal with environmental pollution, and—more often than not—the verbal solutions to the hypothetical problems stated have resulted in the same conclusion; namely, in the real world, *laissez-faire* is, after all, the best solution for dealing with such problems; *provided however, only*, that the author's definition of *best* and his assumption of his conclusion in his statement of the problem are granted.

This paper consists of two parts in addition to this introduction. In the second part I will discuss the philosophical preconceptions which constitute the basis of a spiritual and methodological kinship which exists among the various works seeking to produce new and permanently settled meanings in many areas of the law already mentioned in my opening paragraph, and I will compare these philosophical positions with their counterparts in jurisprudence. In the second part I will also provide a statement of the philosophical position which supports the alternative approach to the problem I will present in the third part and compare that position with its counterpart in legal philosophy. In the third part I will provide an economic and legal analysis of Coase's arguments and of his solution

* This essay is dedicated to Clarence Ayres who died at the age of 81 in Alamogordo, New Mexico in July 1972. For 31 years he was my friend and teacher, and for nearly 40 his was the most compelling voice in the Department of Economics, University of Texas. He played an important role in the establishment of the Association for Evolutionary Economics and served as its first president. Today economists are paying more and more attention to "relevant" problems to which Clarence Ayres pointed 30 years ago. His original ideas had an impact upon those of all who knew him; the influence of his ideas on my own is clearly evident in this paper.

** Professor, Department of Economics, University of Texas at Austin.

1. Coase, *The Problem of Social Cost*, 3 J. Law & Econ. 1 (1960).

2. Furutobn & Pejovich, *Property Rights and Economic Theory: A Survey of Current Literature*, 10 J. Econ. Lit. 1137 (1972):

to the problem of social cost and present an alternative. In doing so, I will make use of Coase's arithmetical example of a hypothetical case involving damage to a farmer's crops by a neighboring rancher's "inevitably" straying steers. Coase has limited his analysis to two legal situations in which the straying is "inevitable". I will explain his analysis and compare his results with the result produced in a case he has not considered—one in which an equitable remedy is enforced restraining the rancher from conducting his ranching activities "in such manner as to inflict harm on the farmer". I will also consider—primarily to stimulate further discussion—the possibility of use of a nonjudicial remedy in the form of administrative action to control pollution by means of an abatement regulation combined with a tax and a tax credit. Throughout this paper unless explicitly stated to the contrary, I will accept for the purposes of argument, without granting the validity of, his assumptions. Finally, I will also include in the third part my own interpretations of four English cases involving various legal problems used by Coase in an attempt to establish a philosophico-ethical and legal justification for his position and compare my interpretation with the one he has presented.

THE PHILOSOPHICAL PRECONCEPTIONS OF ORTHODOX ANALYSIS AND OF THIS PAPER

The various current economic theories of property and of legal liability reflect—as does Coase's paper—the relevant writer's acceptance of either a secular natural law philosophy or that of logical positivism. Occasionally the work of one or another of these writers seems to reflect an intermingling of both points of view.

As T. E. Cliffe Leslie³ pointed out in 1870, the secular natural law basis of economic policy recommendations proceeds from an analysis based on "assumptions obtained [*a priori*], not by interrogation, but by the anticipation of nature; what is nature being at bottom a mere conjecture concerning its constitution and arrangements." For example, in the 1930's Henry Simons⁴ frankly admitted that his views were based upon a conception of a "relatively absolute absolute" and affirmed Adam Smith's view that the "invisible Hand" would lead to the best of all possible worlds in a free market system operating in the long run under conditions of perfect competition. Thus also, F. A. von Hayek⁵ has asserted that a very small part of the social order only can be made a "conscious product of human reason" and that the automatic price system is a "marvel." And Ludwig von Mises⁶ has

3. Leslie, *The Political Economy of Adam Smith*, 43 *Fortnightly Rev.* 549, 551-552 (1870).

4. H. Simons, *Economic Policy for a Free Society* (1948).

5. F. von Hayek, *Individualism and Economic Order* 87-88 (1958).

6. L. von Mises, *Human Action* 1-2, 38-40, 65, 239-40, 754-56 (1949).

proclaimed his belief in the "regularity" of social phenomena "to which man must adjust his actions" and asserted that "the principles of human action" (the theory of choice) are "revealed to man by the same signs that reveal the reality of natural law, namely, the fact that his power to attain his ends is restricted."

Probably the most useful example of a counterpart secular natural law philosophy in law is the substantive due process interpretation of the 14th amendment employed by the Supreme Court—from the time of *Munn v. Illinois*⁷ in 1877 until the decision in *Nebbia v. New York*⁸ 1934—to limit the power of legislative bodies to regulate economic activities. Contemporary natural law jurisprudence seems today to be moving toward an instrumentalist point of view in its conception of "natural law with a variable content."⁹ But in economics those holding this view still rely on Adam Smith's work of 1776.

The logical positivist point of view is the prevailing one in economics, particularly among economists who hold that value judgments are unscientific but who paradoxically devote themselves to a study of problems of "welfare economics", including questions of "economic efficiency" and "optimal resource allocation". This point of view and the problems considered often involve the use of advanced mathematical techniques to produce logical consistency both in the attempt to discover the full meanings and implications of new assumptions about the behavior of "economic men" (whose existence is denied but nevertheless assumed) in the face of proposed or actual uses of governmental power, as well, as to restate old theories expounded verbally by earlier writers.

This approach in economics has much in common with the legal positivism of Hans Kelsen¹⁰ and the "analytical jurisprudence" of H. L. A. Hart.¹¹ Thus, Kelsen presupposes the existence of a *Grundnorm* (the fundamental constitution) "upon which the validity of all the norms of our legal order depends".¹² All other norms in the legal system are tested against this *Grundnorm*. Moreover, the *Grundnorm* "is valid because it is presupposed to be valid; it is presupposed to be valid because without this presupposition no human act could be interpreted as legal, especially a norm-creating act".¹³ A cynic might be tempted to remark, "It is presupposed to be valid because without this presupposition legal positivism would have no foundation." In the

7. 94 U.S. 113 (1877).

8. 291 U.S. 502 (1934).

9. J. Brierly, *The Law of Nations* 15 (1928).

10. H. Kelsen, *General Theory of Law and the State* (1945).

11. H. Hart, *The Concept of Law* (1961).

12. H. Kelsen, *supra* note 10, at 116.

13. *Id.*

“analytical jurisprudence” of H. L. A. Hart, the term, “secondary rules”¹⁴ identifies the concept Kelsen calls the *Grundnorm*.

The prevailing logical positivist approach to welfare economics also has its *Grundnorm* or its “secondary rules”, and theoretical work in this area consists of testing policies against this presupposed *Grundnorm*. But more than this: there is today a widespread conviction on the part of economists using this approach that economists are peculiarly entitled to sit on the thrones of philosopher kings in our society. For example, consider the following statement made by Professor Jules Margolis to a Senate Subcommittee, and note, particularly, his definition of “the public interest”:

. . . Who is the client and who is the employer of the economist? The typical answer of the economist is that he is true to the principles of serving the public interest *as defined by the profession in their scientific journals*, i.e., the aggregation of individual preferences. *He selects his models and criteria so as to maximize the professional view of the public interest . . . unfortunately the purchasers of the economist’s information and advice (the administrative officials or political leaders) are neither persuaded by the economist’s insight nor do their incentives impel them to accept the perspective of the public interest as formulated by the economist. . .*¹⁵ (Emphasis added.)

J. M. Buchanan has defined “the criterion employed by a modern welfare economist” in deciding “whether or not a given situation is ‘efficient’ or ‘optimal’” in these words:

. . . If, in any given situation it is found to be impossible to make *any* change without making some individual in the group worse off, the situation is defined as Pareto-Optimal or Pareto-efficient.¹⁶

An assumption of maximization by rational individuals of their preferences, or of the utility obtainable from their given flows of money income at the given prices is inherent in the economist’s *Grundnorm*. Prices are a measure of social value. The existing distribution of income and the status quo in property rights are also built into the concept of Pareto optimality. Any change in income or property rights which makes any one individual “worse off” is not optimal. In his 1972 mathematical critique of Coase’s analysis, Baumol has stated the condition of Pareto optimality as follows:

Pareto optimality then requires maximization of the utility of

14. Hart, *supra* note 11, at 92.

15. 1 Joint Econ. Comm., 91st Cong., 1st Sess., The Analysis and Evaluation of Public Expenditures: the PBB System, A Compendium of Papers Submitted to the Sub-Comm. on Economy in Gov’t. 538 (Joint Comm. Print 1969).

16. J. Buchanan & G. Tullock, *The Calculus of Consent* 172 (1962).

any arbitrarily chosen individual, say m , subject to the requirement that there be no loss in utility to any of the other $m-1$ persons, i.e., given any feasible level for these other persons' utility. The problem then is to maximize. . . .¹⁷

I have omitted the equations which follow this statement, however, the first of these omitted equations may be worth a remark. It specifies that the utility of the individual designated m (those who prefer can designate him "one John Doe") is a function of the quantities of the goods only. This formulation is a reflection of Baumol's "simplifying" assumption in his analysis that "an [e]xternality (smoke) only affects the costs of neighboring laundries, rather than causing disutility for consumers."¹⁸ Thus are any effects of the smoke on the physical environment which are not included in the damaged firms' costs excluded from the analysis.

It is instructive to consider also another definition also provided by Buchanan in these words:

. . . A change is defined to be Pareto-optimal if, in the transition from one situation to another: (1) every individual in the group is made better off; or (2) at least one individual in the group is made better off and no one is made worse off.¹⁹

The two definitions quoted are, of course, fundamental to the "economic theory of political democracy" postulated by Buchanan and Tullock,²⁰ a theory which owes much to Coase's analysis.

Criticisms by economists of judicial decisions on grounds that the decisions do not satisfy the test of Pareto optimality are largely a reflection of the fact that the critic does not understand either the nature or the role of the judicial process in our complex society. This process is largely concerned with the evaluations of arguments favoring and opposing and with making decisions producing changes which are not Pareto optimal.

In his 1969 presidential address to the American Economic Association, Kenneth Boulding remarked:

Many, if not most, economists accept the Pareto optimum as almost self-evident. Nevertheless, it rests on an extremely shaky foundation of ethical properties.²¹

He then noted that the concept implies that there is neither "malevolence nor benevolence anywhere in the system".

17. Baumol, *On Taxation and the Control of Externalities*, 67 *Am. Econ. Rev.* 307, 310 (1972).

18. *Id.* at 309.

19. J. Buchanan & G. Tullock, *supra* note 16, at 172.

20. *Id.* at 55ff, 91ff.

21. Boulding, *Economics as a Moral Science*, 59 *Am. Econ. Rev.* 1, 5 (1969).

Some indication of an economist's conception of social welfare has already been given above in the explanation of the nature of the utility or preference functions usually employed in welfare analysis. The jump from these functions to the claim that economics is the "hardest of the social sciences", the only one able to employ measurable concepts, is made by using market prices as measures of social value. In a theoretical analysis the market prices used are generally those which would exist if all firms in the economy were operating in long-run equilibrium positions under conditions of perfect competition.²² In making a cost-benefit study, however, an analyst is forced to face some degree of reality and to recognize that the concept of perfect competition is merely an analytical category, a short-hand term specifying that the theorist is assuming the existence of certain rigorous and extreme conditions not met in the real world; and so the cost-benefit analyst makes use of "proxy" variables selected according to his own value judgments with, of course, one eye on the question of whether or not his variables will be approved by the judgments of other economists.

Turvey and Prest have accurately concluded their authoritative survey of the subject of cost-benefit analysis by remarking that it is "one of the useful arts" rather than a science.²³ In the address

22. The phrase "long-run equilibrium positions under conditions of perfect competition" contains several "terms of art" used by economists. The conditions in question will be explained in the text later, but for the benefit of readers who are not economists, I will explain the terms of art, perfect competition, short run, and long run in this note since they play a key role in Coase's analysis.

When an economist says he is assuming that a firm is operating under conditions of perfect competition, he is using the term as a short-hand expression to mean that he is assuming for analytical purposes that all firms in the industry are operating under the following conditions: (1) there are many ("a large number") buyers and sellers, none of whom can individually affect the market price of the commodity because the amount he produces and sells is insignificant in relation to the total quantity changing hands at the given market price; (2) the products sold are homogeneous (interchangeable); (3) all buyers and sellers have perfect knowledge of the situation confronting them and of their alternatives; (4) all buyers and sellers behave so as to maximize their self interests (utility, net revenue, or what have you) on the basis of that knowledge; (5) freedom of entry into or exit from any industry exists, and all inputs are perfectly mobile.

The concept of perfect competition is thus a logical category; it does not describe any real world situation nor one that is attainable and hence cannot serve as a norm or standard to be achieved in the world in which we live. In general, when an economist says perfect competition is an "ideal," what he means is that the concept is the abstraction defined above—which is not to say that there are not economists who utilize the analytical content of perfect competition as a policy goal for its own sake when it is convenient to do so.

A short-run time period is an analytical category—a period within which it is assumed that a firm can vary the output from its existing capacity (usually, plant size) but cannot vary that capacity. A long-run time period is also an analytical category—a period within which it is assumed that a firm can vary all inputs under its control, including capacity (or size of plant).

For a detailed critical explanation of these and other price theory concepts, see H. Liebhafsky, *The Nature of Price Theory* (Revised ed. 1968).

23. Prest & Turvey, *Cost Benefit Analysis: A Survey*, 3 *Surveys of Economic Theory* 155 (1966).

mentioned above, Boulding also commented on cost-benefit analyses in these words:

Even though economic measurement may be abused, its effect on the formation of moral judgments is great, and on the whole I believe beneficial. The whole idea of cost-benefit analysis, for instance, in terms of monetary units, say "real" dollars of constant purchasing power, is of enormous importance in the evaluation of social choices and even of social institutions. We can grant, of course, that the "real" dollar, which is oddly enough a strictly imaginary one, is a dangerously imperfect measure of the quality of human life and human values. Nevertheless, it is a useful *first approximation*, and in these matters of evaluation of difficult choices it is extremely useful to have a *first approximation* that we can later *modify*.²⁴

To which one might add, "and the user of the results of such studies must be on his guard not to be misled by the precision with which the results are stated numerically, nor should he forget that they are, indeed, merely first approximations and represent quantitative statements of the qualitative or subjective judgments of the analyst making the study."

One with legal training who has little or no knowledge of economics is apt to think that an "econometric cost-benefit analysis" is really an economist's "term of art" identifying an equivalent of the judicial process of "balancing the interests." Not so, however. A decision is made by a court after an adversary proceeding has occurred, subject to instrumentally-defined rules of procedural due process. In this proceeding, each of the advocates of the various positions (including interveners) will have presented arguments and evidence to show, why a social policy which favors the position of the party he represents should be adopted. Also, in this proceeding, the contesting parties will call attention to as many as possible of the competing social policy considerations favoring their respective positions. In making its decision, the court must keep in mind that not only will the positions of the parties be affected by the decision made, but also, the decision itself will constitute an incremental change in the law. In Cardozo's words, the task of the court "is to exercise discretion informed by tradition, methodized by analogy, disciplined by system and subordinated to the 'primordial necessity' of order in social life".²⁵ All this is well understood by lawyers but not by economists.

But now consider what is well understood by economists but, perhaps, not by all lawyers, namely the methodology employed when

24. Boulding, *supra* note 31, at 7.

25. B. Cardozo, *The Nature of the Judicial Process* 41 (1921).

and the environment in which an economist makes an econometric cost-benefit analysis. An economist begins with the assumptions that "preferences are to be maximized", "price is a measure of social value", and "the distribution of income is 'given'". He then builds a model based upon theories produced by deductive reasoning about hypothetical cases, and specifies what he conceives to be the "objective" (utility or social welfare) function to be maximized subject to known or assumed constraints. If data concerning the variables in the model are not readily available, he makes use of "proxy" variables for which data are available. It is not uncommon to select the variables themselves on the basis of the availability of data. The structure and content of the model and the study itself are significantly influenced by availability of mathematical techniques for dealing with the problem at hand. The value judgments built into the model will be those acceptable to a majority of economists, a factor which itself influences the relationships considered. No adversary proceeding, no process to call attention to social interests which are not measurable in money, is involved. Nor do consequences for others rest on the conclusions reached by the analyst unless his recommendations qua conclusions are implemented by a legislative or judicial act. In his own case, it will be his reputation, particularly among other economists, which will be affected.

To think that the terms *cost-benefit analysis* (in economics) and *balancing the interests* (in the judicial process) are synonymous is to fail to understand the one or the other (and in a few cases, both) of these concepts. An executed cost-benefit study is a quantitative statement of the qualitative judgments of the economist making the study that preferences are to be maximized and price is a measure of social value, more or less shared by other economists who make use of the same *Grundnorm* or secondary rules.

For example, the authors of one recent cost-benefit study employing new techniques and "control theory" for the first time in such a study supported their view that the demand for (and thus the price of and benefits from) wilderness recreation "appear to be increasing" by noting that "[r]ising education levels . . . seem to be associated with increasing preferences for taking . . . leisure in a natural environment."²⁶ Also, they asserted, "The effect of population growth, for example, *given the unchanging preferences and distribution of income* would be to increase the quantity demanded . . ." ²⁷ (emphasis added). They also specified conditions under which price increases

26. Fisher, Krutilla, & Cicchetti, *The Economics of Environmental Preservation: A Theoretical and Empirical Analysis*, 62 *Am. Econ. Rev.* 605 (1972).

27. *Id.* at 610.

(increases in the “value” of such recreation) were likely. In their study, these authors measured the benefit²⁸ (to society) of one “Visitor Day” devoted to “Streamside Angling” as equal to \$5 and one “Visitor Day” devoted to “Big Game Hunting” as equal to \$25. They added that “. . . given what is known about prices paid for fishing and hunting rights where such rights are vested in private parties, we feel our estimates are conservative”.²⁹

Two of the authors of the paper had previously been employed by the Staff of the Federal Power Commission as expert witnesses to support the Staff’s position—in a hydroelectric licensing proceeding—that the application should be denied.³⁰ The number of appearances in this proceeding on behalf of the parties and interveners amounted to 17. In a well-written statement, listing 122 findings of fact as a basis for his decision, the Hearing Examiner commented on the cost-benefit study presented by saying,

. . . The benefit to cost technique is an indispensable tool in determining the *economic feasibility* of proposed water resource projects.

It is not, however, the sole or most important factor in the ultimate decision. The totality of public benefits and costs cannot be quantified or measured directly in economic terms despite the heroic and novel efforts . . . to measure mathematically the value of the river in its present “free flowing state. . . . Preservation is not just an economic question.”³¹ (*emphasis added*).

A cost-benefit study ought to be recognized for what it is, as it was in this case, a piece of evidence presented by the one side or the other. In an adjudicative or legislative adversary proceeding, evidence (such a study) is not a substitute for the proceeding itself.

One economist has argued that contemporary “subjective” legal procedures for determining liability for accidental death should be replaced by what he has called a “measurable” economic rule whose quantification includes as a part of “the value of the marginal life lost” a sum “equal to the value put upon life by the decedent himself”³² (before or after death?). His work has been refined and corrected by a later writer who has cited Coase’s analysis as a basis for

28. *Id.* at 614-15.

29. *Id.* at 615.

30. Federal Power Commission, Presiding Examiner’s Initial Decision on Demand, Pacific Northwest Power Project No. 2243 & Washington Public Power Supply System Project No. 2273, February 23, 1971, at 30. [This proceeding was necessary because of the Supreme Court’s decision in *Udall v. Federal Power Commission*, 387 U.S. 428 (1967)].

31. *Id.* at 25, 30-31.

32. Rottenberg, *Liability in Law and Economics*, 55 Am. Econ. Rev. 107, 108 (1965). In this paper, the author has succeeded in some unspecified way in “Putting to one side [i.e. “aside”] ethical questions implicit in the compensation principle. . . .”

this refinement.³³ In both analyses, market prices are employed to make the relevant valuations.

Judges no longer pretend that they are “discovering the law” (as if it has been hidden previously under a stone or in the hollow of a tree) and the mystical philosophy of Blackstone has disappeared from the bench and the bar. Anyone with an understanding and knowledge both of the methodologies of law and economics must conclude that judges and lawyers ought not to allow themselves to be intimidated or misled by the esoteric form and apparent, but only apparent, precision with which welfare conclusions asserted by economic theorists or produced in cost-benefit studies are presented.

The very precision with which they are presented may obscure the qualitative nature and bases of such conclusions. And these conclusions or judgments are also an inevitable reflection of an analyst’s position concerning the existence of a “relatively absolute absolute”, inexorable “laws” of the universe to which man must conform his actions, or a presupposed *Grundnorm* or secondary rules.

E. J. Mishan has produced the *reductio ad absurdum* of cost-benefit studies purporting to measure “the cost of human life” in his paper, “Evaluation of Life and Limb: A Theoretical Approach”.³⁴ He has not only surveyed the existing methods used to evaluate in monetary terms the values of lives lost—as a result, for example, of disposal of waste from an atomic power plant, so that this cost may be compared with the estimated monetary benefit gained from using nuclear energy—, but he has also noted that the existing measures must be refined to take account as “social benefits” of such magnitudes as the value to the j^{th} person of an improved chance of the death of the i^{th} person, for example “an improved chance of his [the j^{th} person’s] losing some dependent or inheriting some asset—or inheriting it sooner”.³⁵ The negative of this value must, of course, be included as a social cost.

It remains to be demonstrated that such studies by economists or welfare conclusions drawn by economists from general theoretical analyses are a more effective way of taking into account and calling attention to the conflicting social interests involved in a lawsuit or in

33. Borcharding, *Liability in Law and Economics* 60 Am. Econ. Rev. 946 (1970). This author measures the “marginal social benefit of safety” of air transportation as equal to the sum of the “individual marginal evaluations; of the passengers and noncarriers, such as may occur when planes crash in cities and suburbs. Also, “. . . any passenger will react to disequilibrium by finding a price-safety package more to his liking.”

34. von Mises, *supra* note 17, at 239-40, 745-56. Mishan, *Evaluation of Life and Limb: A Theoretical Approach*, 79 J. Pol. Econ. 687 (1971).

35. *Id.* at 700. The relative values of transfers *inter vivos* are, of course, recognized to be different from transfers *causa mortis*, particularly in the case of the decedent.

a legislative contest than is the current process of reliance on adversary proceedings. This is not to assert that cost-benefit studies as "first approximations", econometric studies, or statistical evidence constitute inadmissible evidence; but it is to say that they must always be recognized as circumstantial evidence presented by (hostile or friendly, as the case may be) dedicated, expert, witnesses—subject to cross examination. It is the role of expert witness which is appropriate for an economist; but it is not a proper role for an economist to be accepted as a philosopher king by designating him as a special clerk and to endow him with an influential role in making of a decision or in the framing of a decree, views of many economists to the contrary notwithstanding.

It is clear that economists with natural law or logical positivist points of view inevitably come to the conclusion in their logical analyses on the basis of their initial assumptions that an "optimal" allocation of resources will exist if all consumers are rationally maximizing the utility (some prefer to call *It* satisfaction") available from their given flows of money income per period of time at given prices, and if all firms in the economy are operating in the long run under conditions of perfect competition, assuming the distribution of income is "given". Therefore, once a policy has been adopted or a decision has been made which leads to such an "optimal" result, further inquiry into the problem is precluded. The problem has been solved when the analysis reaches the *Grundnorm*.

Thus one reads a recommendation that "no public investment [for example, in highway safety] be deemed 'economic' or 'efficient' if it fails to yield overall benefits which are at least as great as those which the same resources would have produced if left in the private sector."³⁶ The principle seems unexceptionable until one recognizes that determination of the "overall benefit" may involve estimating the money value of the addition to total output less the estimated lifetime consumption of some prospective decedents, plus or minus various magnitudes of the type identified by Mishan and others already mentioned, and comparing them with the estimated money value of the output had the same amount of resources been invested privately under conditions of perfect competition. And, of course, much argument has occurred as to the "proper" rate of "social" discount to be used in the estimates. Thus the market test is the ultimate solution and no inquiry into the consequences of adopting it is deemed necessary. To the contrary, such an inquiry lies outside the

36. Joint Econ. Comm., 90th Cong., 2d Sess., Economic Analysis of Public Investment Decisions: Interest Rate Policy and Discounting Analysis, Report of the Subcomm. on Economy in Govt. 1 (Joint Comm. Print, 1968).

scope of "positive economics" and is precluded. Not only Coase and his followers but also his critics have employed the market test.

An alternative to the points of view discussed above and the one upon which this paper rests is that of instrumentalism. This point of view does not preclude further inquiry once the market solution has been reached. Instead, it emphasizes that the consequences of adopting any solution must be taken into account.

Instrumentalism originated in the work of C. S. Peirce, was later expounded and called "pragmatism" by William James, and was further developed and called "instrumentalism" by John Dewey.³⁷ In economics, this philosophical approach permeated the works of Wesley C. Mitchell (one of the earliest advocates of econometric and statistical research into economic problems in the United States) and of John R. Commons (whose work in the areas of public utility regulation, workmen's compensation, and unemployment insurance eventually led to the adoption of legislation at the state and federal levels to deal with the problems to which he pointed).³⁸

Clarence Ayres employed this point of view to produce a "theory of economic progress"³⁹ which anticipated by two decades the theories of economic development whose generation became fashionable in economics after World War II. He also presented what he called a "Technological Theory of Value"⁴⁰ as a theoretical basis for economic analyses taking account of the effects of institutional arrangements upon economic activity.

Although Coase's paper and contemporary economic theories of property rights, political democracy, legal liability, and what have you, pay much lip service to the proposition that "alternative social arrangements" must be analyzed, all rest on "first principles" or "anticipation rather than an interrogation of nature". They thereby employ standards of evaluation—of the kind already discussed—which are external to, and independent of, the problem being examined. In making use of such standards, an analyst is precluded from considering all of the relevant alternative social arrangements. Thus, Coase's analysis and its refinements have proceeded from such a *Grundnorm* or secondary rules, and this procedure alone has been sufficient to guarantee that analyses of the effects of the enforcement of equitable judicial remedies and their legislative counterparts would be eliminated from consideration by economic theorists.

37. For a further discussion of their works and references, see H. Liebhaufsky, *American Government and Business* 23 (1971).

38. *Id.* The Appendix to this book contains a further discussion and references to their works.

39. C. Ayres, *The Theory of Economic Progress* (1942).

40. C. Ayres, *Toward a Reasonable Society* 113 (1961).

The instrumentalist point of view involves rejection of an external standard of evaluation of solutions to problems or of policies. It emphasizes instead the method or process of evaluation and that the standard of evaluation is inherent in the definition of the problem itself. Such a point of view necessarily involves taking into consideration the consequences of solutions proposed or adopted. The process of evaluation is one of making self-correcting value judgments to reach conclusions which are sufficiently reliable to provide a basis for further action as new problems arise and experience is acquired. The instrumentalist point of view thus substitutes the process of making a judgment for the "relatively absolute absolute" as a test.

Clarence Ayres's "Technological Theory of Value" is a case in point. It can be illustrated with a simple example: Consider the case of a mechanic faced with the problem of removing a nut from a bolt. He has no other bolts or nuts and intends to use the nut again when he has repaired the component of the equipment which is the source of the trouble. He will search in his tool box until he finds a box wrench that fits closely and remove the nut. He learns from his mistakes. Indeed, he may have to try several box wrenches to see which fits best. He could save time by using a pipe wrench which is close at hand. But if he did use it, he might "chew up" the nut so that it could never be used again. He has had such an experience on a prior occasion; so his knowledge is based on experience; and in the process of determining by experience which wrench to use he gains more knowledge. Once he has removed the nut from the bolt with the proper-sized wrench, the wrench that fits, he is in a position to take further action on the troublesome component. And by the time he has repaired this particular piece of equipment, another customer may have brought in another piece of equipment to be repaired—this time of a later model, perhaps, since technological changes (the combination and recombination of things, and of ideas) do occur in the world in which we happen to live. The test concerning which box wrench to use is inherent in the problem of repairing the equipment in a situation in which no replacement nut is available.

To ask why we are here, what is the ultimate objective of our being alive is fruitless. But when a problem arises or is perceived, the process of self-correcting value judgments, the experimental methods, seems to be the one which has been instrumentally validated by the very process of experience in time.

An individual on being invited to have a second martini at lunch may refuse the invitation if he has an important conference scheduled for later in the day if his experience in the past from having two at

noon have provided him with the knowledge that having two makes him less alert later in the day. Values are thus subject to instrumental validation and analysis. Or to quote from one of Ayres's works:

It is in this, the life process of mankind, that values arise. To recognize this fact is not to say that "nature intends" the development of human culture. Nature does not intend anything. Intention is an aspect of human behavior. But it does mean that the value judgments which emerge from this process have a basis in fact. When we judge a thing to be good or bad, or an action to be right or wrong, what we mean is that, in our opinion, the thing or act in question will, or will not, serve to advance the life process insofar as we can envision it."⁴¹

Ayres pointed out that "taking the life of another is regarded as an offense by all peoples"—although "what one society regards as justifiable homicide another regards as murder". The reason is that the proposition "Thou shalt not kill" (regarded as a mere wish by logical positivists) is a functional rule: (1) not only is the taking of life disruptive of social order; but (2) the life taken cannot be returned—the consequence of this act producing the loss of life is irreversible. Genuine universal values thus have a functional, factual basis.⁴²

The same sort of reasoning is applicable to many forms of pollution activity. Aside from the question of loss of life which cannot be restored, the question exists—and it can be answered only by physical scientists having access to the relevant tools and skills—are there some forms of pollution which cannot be reversed? It is possible that disposal of atomic waste at random throughout the land may be the cheapest way to dispose of such waste if prices only are used as a measure of social value, but are there possible, as yet unknown, genetic effects on all forms of life if such actions are uncritically accepted because they are justified in the name of maximization of the unspecified preferences for goods only of assumed individuals in hypothetical situations?

But if it is admitted that social control either in the form of legislation or judicial action is to be exercised in cases of disposal of radioactive substances, the principle advanced by Coase and others—that whether or not the market value under perfect competition of the output gained exceeds the market value of the output lost is the decisive measure of "social value", and therefore provided a universal *ratio decidendi*—has been breached. Then the problem becomes one for judgment by responsible men of the significance of the competing social interests involved, in the face of strong advocacy of reasons for

41. *Id.*

42. *Id.* at 157.

favoring one party or another in the light of available evidence concerning probable consequences of deciding one way or another. A process of selecting a box wrench that fits is thus substituted for a belief that relationships among men are governed by some "relatively absolute absolute" or should be governed by a presupposed *Grundnorm* such as Pareto optimality.

Or to put the matter another way, is the heritage of future generations to be a polluted planet justified by reliance on the concept of Pareto optimality and increasing consumption or perhaps poetically by an appropriate modification of Edna St. Vincent Millay's lines so that they read, "If we burn our candles at both ends it *really* will make a lovely light." Of course, she did add, "It will not last the night".

The instrumentalist emphasis in economics upon consideration of consequences of policies adopted, and upon a process of self-correcting value judgments to determine which box wrench fits the nut involves looking away from "first principles" and from "verbal solutions to hypothetical problems" and looking towards concrete questions involving difficult decisions. It is analogous to the judicial process of allowing the content of general rules to be determined on a case-by-case basis as experience grows and changes occur. The alternative is to begin with a *Grundnorm* or a "relatively absolute absolute" and make use of a standard of evaluation external to the problem. Pareto optimality is such an external standard, a standard which contains an economist's version of a rule against perpetuities even stricter than the one announced in the *Duke of Norfolk's Case*.⁴³ In economics, the preferences we maximize are all preferences of lives in being; were they not, it would be impossible to indulge in an economic fiction that preferences are discoverable "in principle" (*i.e.* are quasi-discoverable). It is thus beside the point to assert that the interest rate measures the preferences for current and future consumption of present lives in being.

Mishan has concluded his scholarly 1971 essay on externalities with an "Epilogue" which opens with what is *prima facie* an almost apologetic statement that the last portions of his essay "do not lend themselves easily to analytical elegance"⁴⁴—which really means that they are excluded from traditional analysis because they cannot easily be stated quantitatively—but he has then taken the offensive and asserted correctly that the points he has made "with respect to environmental spillover—the most urgent problem of our fragile

43. 3 Ch. Cas. 1; Tiffany, *Real Property* 265 (Abridged ed. 1940).

44. Mishan, *The Postwar Literature on Externalities: An Interpretive Essay*, 9 J. Econ. Lit. 1 (1971)

civilization. . . are more pertinent than those arising from traditional allocation analysis".⁴⁵ He has added in a further statement that it is not hard to understand the "exaggerated weight" given to problems of allocation by economic theorists because these aspects of economic problems "lend themselves nicely to formal theorizing and, with patience and a little finesse, impressive measures of social losses and gains can be foisted on credulous civil servants and a gullible public".⁴⁶

It is also worth pointing out in this context that Baumol has paradoxically concluded his mathematical analysis—of a case of a firm whose smoke emission injures other firms only—by recommending an approach "more for its promise of effectiveness, than its theoretical nicety".⁴⁷ He has done so because of the great problems involved in actually quantifying (measuring) the concepts stated quantitatively (in a precise mathematical form) in his equations. Since actual measurement of the quantitatively-stated concepts in his mathematical analysis is admittedly not possible, Baumol has also remarked that the adoption of a tax scheme to enforce minimum standards of acceptability in pollution problems may be the best solution even if an optimal allocation is not achieved and added that, "It may be that with time we can learn to improve the workings of a set of standards of acceptability. . . . Successive modifications in the criteria based on experience and revaluation may produce results that on the whole are not too bad."⁴⁸ Thus, although he had begun with the standard of Pareto optimality, Baumol eventually abandoned his "relatively absolute absolute" and, in substance though not form, adopted the Instrumentalist solution of a process of self-correcting value judgments obtained from the definition of the problem itself. (He did, of course, first produce a mathematical demonstration that "successive iteration" could lead to an optimum position.)

The counterpart in jurisprudence of instrumentalism in economics is the philosophy expressed in Holmes's widely-quoted statement: "The life of the law has not been logic: it has been experience. . . .

The law embodies the story of a nation's development through many centuries, and cannot be dealt with as if it contained only the axioms and corollaries of a book of mathematics."⁴⁹ In our own time, Wolfgang Friedman's conception of "Law as an Instrument of Social Order" is also a counterpart. Thus Friedmann wrote:

45. *Id.* at 26.

46. Mishan, *supra* note 44, at 26.

47. Baumol, *supra* note 17, at 307.

48. *Id.*

49. O. Holmes Jr., *The Common Law* 1 (1881).

That the content of the rule of law cannot be determined for all time and circumstances is a matter not for lament but for rejoicing. It would be tragic if the law were so petrified as to be unable to respond to the unending challenges of evolutionary or revolutionary changes in society.⁵⁰

The Coase analysis and its refinements would limit the responses of courts and legislatures to responses to changes in assumed preferences for goods only, as reflected in relative prices under hypothetical conditions of perfect competition, with the preferences determinable "in principle".

A thorough search of the literature has failed to reveal that any economist has yet produced the preference (or utility) function of any life in being, including his own. Thus far in economics we have been able only to postulate a theory of "Revealed Preference". Its basic axiom is that *the* particular market basket of goods actually purchased by a rational consumer with his given money income at given market prices, when it was also open to him to purchase one or more other market baskets of goods, must have been *the one* he preferred to buy. Otherwise he would not have been the rational consumer we assumed him to be.

Nor for that matter, has anyone yet produced an empirical counterpart of a demand curve as this concept is defined in economic theory. It is, of course, always difficult to find the exact real world counterpart of a hypothetical or imaginary function or entity.

Legislative action, legal methodology, and the judicial process—for example, the refusal of the Supreme Court to render gratuitous opinions by observing generally the informal rules⁵¹ of constitutional interpretation developed as a result of experience since Justice Marshall's opinion in *Marbury v. Madison*⁵²—and the established judicial practice of allowing the specific content of general rules to be determined in the course of time as experience grows and changes in our society, are clearly instrumental processes, a point I have mentioned above but now repeat for emphasis.

Upon careful analysis, many of the criticisms by economists of the courts and the law can be demonstrated to be disagreements about the finding of fact made in the case in question, whether that finding was made by a jury or by a judge. But responsible men can almost always disagree about how to interpret evidence, particularly if it is circumstantial. And yet, the critics often think they are criticizing the

50. W. Friedmann, *Law in a Changing Society* 503 (1959).

51. *Ashwander v. Tennessee Valley Authority*, 297 U.S. 288 (1936).

52. 1 Cranch 137 (1803)

law. Moreover, in such criticisms, they often make use of much extra-record evidence, most of which would be inadmissible, and assume that our federal appellate courts, in general, normally review *de novo* findings of fact made by administrative agencies and courts of the first instance.

And, as many writings by economists attest, economists have also generally failed to understand either the functional nature of an adversary proceeding or of the judicial process. The latter has been clearly described by Friedmann in these words:

The task of the modern judge is increasingly complex. Hardly any major decision can be made without a careful evaluation of. . . conflicting values and interests. . . Totalitarian government eliminates much of the conflict by dictating what should be done. [And so would uncritical reliance upon a "relatively absolute Absolute".]

The lot of the democratic judge is heavier and nobler. He cannot escape the burden of individual responsibility, and great, as distinct from competent, judges have, I submit, been those who have shouldered that burden and made their decisions as articulate a reflection of the conflicts before them as possible.⁵³

And to this statement one might add, "And who have articulated also the reasons and considerations which have led them to resolve the conflict of one set of values and interests rather than another in the face of strong advocacy that they take the reverse position."

Such views are, however, rejected by economists who accept the Coase position. The position is clear: not only must this view of the law be abandoned, but so must the view of Holmes be disregarded that "the life of the law has . . . been experience". Instead, the view he rejected must be adopted by dealing with the law "as if it contained only the axioms and corrolaries of a book of mathematics"; provided however, that the axioms shall be those laid down by the economists taking this position. Thus, logical positivism in economics and reliance upon a "relatively absolute absolute" go beyond the legal positivism of Kelsen and the analytical jurisprudence of Hart by undertaking to acquire by adverse possession title to, and specifying the content of, the *Grundnorm* and the secondary rules assumed by Hart and Kelsen as a starting point for their legal analyses. In the view of these economists, a new home must be found in environmental law for the concept of "substantive due process" in matters of economic regulation abandoned by the Supreme Court nearly forty years ago.⁵⁴

53. Friedmann, *supra* note 50, at 67.

54. *Nebbia v. New York*, 291 U.S. 502.

In his 1969 presidential address to the American Economic Association already mentioned, Kenneth Boulding cited "The economy theory of democracy developed by Anthony Downs" as an example "of 'economic imperialism', which is an attempt on the part of economics to take over all the other social sciences".⁵⁵ Boulding might well have cited also the Coase theorem and its issue as an attempt on the part of economists to take over the law.

But questions remain to be asked; and a consideration of the result in Coase's analysis when an equitable remedy is enforced—the case he eliminated from consideration—demands attention.

Economics contains many terms of art. The statement of the definition of some of these requires considerably more space than others. In what follows for the benefit of readers who are not economists, I will place such longer definitions in footnotes and incorporate only the very short one in the text itself. Footnote 22 *supra* containing the definition of *perfect competition*, a purely analytical category which does not describe a state of affairs existing in the real world, is an example.

AN ECONOMIC AND LEGAL ANALYSIS OF COASE'S ARGUMENT AND AN ALTERNATIVE

George Stigler has stated the Coase theorem in these words: ". . . The Coase theorem thus states that under perfect competition private and social cost will be equal."⁵⁶ Private costs are the costs incurred by firms or individuals engaged in an activity. Social costs are the costs to society of the activity, including any harmful effects inflicted upon others by such firms or individuals as a result of their engaging in such activity. In the Coase theorem literature, the costs of such harmful effects are also called externalities.⁵⁷ The definition of perfect competition and that this term of art specifies an analytical category and not a real world condition have already been stated in footnote 22 *supra*.

Calabresi has provided a refined version of the Coase theorem which states

. . . as an axiom the proposition that all externalities can be internalized and all misallocations [of resources], even those created by legal structures, can be remedied by the market, except to the extent that transactions cost money and the legal structure

55. Boulding, *supra* note 21, at 8.

56. G. Stigler, *The Theory of Price* 113 (1966).

57. In economics generally, the word externalities may refer either to harm inflicted or to benefits conferred upon others as specified by the author, but in the Coase theorem literature the word invariably means harmful effects.

itself creates some impediments to bargaining. [Provided however, that the definition is accepted that]. . .there exists a misallocation when a situation can be improved by bargains.⁵⁸

And provided further that the hypothetical bargaining parties behave rationally to maximize their self-interests under perfect competition.

I have already mentioned that Coase has produced his conclusions by analyzing an arithmetical example of a hypothetical case involving damage to a farmer's crop by a neighboring rancher's "inevitably" straying steers in two different legal situations and comparing the results. He has tacitly assumed that no fence law exists within the jurisdiction and asserted:

. . .If it is inevitable that some cattle will stray, an increase in the supply of meat can be obtained only at the expense of a decrease in the supply of crops. The nature of the choice is clear: meat or crops.⁵⁹

However despite his frequent assertions that "When an economist is comparing alternative social arrangements, the proper procedure is to compare the total social product yielded by these different arrangements,"⁶⁰ Coase has restricted his analysis of his farmer-rancher case to an analysis of two only of the possible legal situations encompassed within his example. That is, he has analyzed only: (1) the case in which liability for compensatory damages only exists—with the value of the crops destroyed measured at the current market price; and (2) the case in which no liability for monetary damage exists. Doing so effectively deletes the word *if* with which the quotation above opens. He has failed—as have other writers discussing and refining his work—to consider the case of actual enforcement of an equitable remedy to restrain the rancher from conducting his ranching activities "in such manner" as to inflict damage upon the farmer.

Coase's hypothetical example and analysis assume not incidental, occasional, straying by the steers, but that the straying will continue even after the farmer "abandons cultivation". Indeed, in Coase's analysis, the rancher would not allow the "straying" and the resulting crop damage to occur were it not in his own self-interest (In the form of an increased income) to do so. Nor does a case of environmental pollution, in general, involve occasional, sporadic, infrequent, emis-

58. Calabresi, *Transaction Costs, Resource Allocation and Liability Rules—A Comment*, 9 J. Law & Econ. 67, 68 (1968). Eventually, like Baumol, Calabresi produced an instrumentalist solution—in desperation.

59. Coase, *supra* note 1, at 2.

60. *Id.* at 34.

sion by the firm engaged in the activity whose effects produce the pollution if a gain is to be had.

And, having limited his analysis to cases in which the straying is, indeed, "inevitable", the clarity with which Coase has been able to see the mutually exclusive choices of meat or crops is inevitable as the "inevitable" straying, which is inevitable only if no equitable remedy is enforced. Thus he has not analyzed a case analogous to one of enforcement of an abatement regulation.

At a later point in his paper, Coase has discussed a few reported decisions in cases involving injunctions but he has applied directly his reasoning based upon his hypothetical case of an award of monetary damages, thereby substituting his model for reality. Thus, he has asserted at the outset of his later discussion of several cases involving injunctions, ". . . although it may have appeared to be a rather special case it [the farmer-rancher case] is, in fact but one example of a problem which arises in many different guises."⁶¹ In discussing one of these cases—in which an injunction was granted—he has said, "The basic conditions are exactly the same as they were in the example of cattle which destroyed crops."⁶² In discussing another case in which the damage remedy was held adequate, he has repeated substantially the preceding quotation and asserted that the situation in the case in which the damage remedy was held adequate "is essentially the same as it was" in the case in which the injunction was granted.⁶³ Thus he has stated his general view: ". . . situations which are from the economic point of view identical will be treated differently by the courts. The economic problem in all cases of harmful effects is to maximize the [money] value of production."⁶⁴

If Coase's view were correct, some equitable remedies might never have been developed to deal with situations in which "the damage remedy is inadequate" to provide that flexibility which the law must possess if it is, indeed, to serve as "an instrument of social order". Coase has failed to understand—as have other economists accepting his arguments—the difference between the effect on total output of enforcement of an equitable remedy which reduces or eliminates continuing harm—but not necessarily the activity whose effects produce that harm—and that of an award for monetary damages for past harm which leaves the future harm to continue, as does Coase's *laissez-faire* solution (the existence of a rule of nonliability for

61. *Id.* at 8.

62. *Id.*

63. *Id.* at 10.

64. *Id.* at 15.

compensatory damages). Even if, under Coase’s assumptions, the allocation of resources is, in general, the same in the two legal situations he has discussed, enforcement of an equitable remedy must produce different total product mix and may produce a larger one. In the case of the specific arithmetical example he has used to illustrate his argument, enforcement of an equitable remedy does result in a greater total social product than do either his liability or nonliability (*laissez-faire*) situation.

The validity of the preceding points can be demonstrated by previewing Coase’s argument and comparing the results produced by means of his arithmetical example of the farmer-rancher case in his cases of liability and *laissez-faire* with the result produced when an equitable remedy is enforced.

In this example, not only has Coase assumed that price is a measure of social value, that the farmer and the rancher are both operating under conditions of perfect competition on neighboring properties, and that no fence law exists, but also he has restricted his analysis to the case of one farmer and rancher only, so that the problem of straying steers is not an industry-wide problem.⁶⁵ I will accept these assumptions for the sake of argument.

Table 1 contains a reproduction of Coase’s arithmetical representation of the relationship between the number of steers in the rancher’s herd and the crop loss or damage suffered by the farmer as a result of the “inevitable” straying of the steers.

Table 1

Number in Herd (Steers)	TDC Annual Crop Loss (Tons)	MDC Crop Loss per Additional Steer (Tons)
1	1	1
2	3	2
3	6	3
4	10	4

65. *Id.* at 4. Coase has said:

Of course, if cattle raising commonly involved the destruction of crops, the coming into existence of the cattle-raising industry might raise the price of crops and farmers would extend their planting. But I wish to confine my attention to the individual farmer.

That the crop destruction cannot increase the price of crops is, of course, essential to Coase’s argument. He has failed to point out that if such a price increase occurred the damage cost would increase even if there were no increase in the quantity planted and that even in the pure world of economic theory it is unlikely that an increase in the quantity planted will result in an increase in sprouted and growing-crops (corporeal hereditaments) instanter. As pointed out in the text earlier, Coase has frequently asserted that his analysis has general application, whatever may be the legal policy issues raised in various other cases.

The third column labeled, "Loss per Additional Steer", is the marginal damage cost (MDC), the addition to the total damage cost per additional steer; and the total damage cost (TDC) in the second column is thus simply the sum of the numbers in the third column from 1 for the relevant numbers of steers assumed produced.

Coase has not provided any information concerning any other costs of production of the steers. He has, however, assumed that the annual cost of fencing is \$9 and that the market price of the crop is \$1 per ton. He has then noted that if the rancher is liable for the damage caused by his steers, he must add the total and marginal damage costs to his other costs (as appropriate) in deciding what size herd to produce or in deciding to make changes in the size of the herd. Rather than to produce four steers and pay a total damage cost of \$10, he would build the fence for \$9.⁶⁶

Since Coase has assumed perfect competition both in ranching and in farming, he has assumed that neither party can affect the price of the output by the amount he sells.⁶⁷ Each takes the market price as given and adjusts his output and thereby his costs to the given price by producing that quantity of output at which the addition to his total revenue from selling an additional steer (marginal revenue) is just equal to the addition to his total cost (marginal cost).

Economists specify that a firm is in a short-run equilibrium position when it is selling a quantity such that the addition to the firm's total cost (its marginal cost) is equal to the addition to its total revenue from selling an additional unit of output (its marginal revenue) provided that the increase in total cost from selling more units than this quantity exceeds the increase in total revenue. When a firm is in such a position, it has no incentive to increase its output from its existing capacity. (What is produced is assumed to be sold.) Under perfect competition, since the amount sold by the individual firm does not affect the price, the addition to total revenue from selling an additional unit of output (the marginal revenue) is simply equal to the price, the amount received from selling that unit.

It must also be noted that economists define total cost differently than do accountants. An economist includes in the total cost of the firm an amount equal to the "opportunity cost"⁶⁸ of all of the inputs

66. *Id.* at 3.

67. See note 22 *supra*.

68. From the point of view of the individual firm, opportunity cost is defined as the income foregone by a firm as a result of using inputs which it owns in one way rather than in another. Thus, a firm which invests its own capital in an expansion of its facilities foregoes the income which that capital would earn if invested in its next most profitable use.

From the point of view of society, opportunity cost is defined as the output which would be foregone if the input were devoted to its "next best use." The amount foregone is usually

owned by the firm itself. In addition, an economist includes in the concept of the total cost a "normal profit," defined in a rather circular way as the amount of profit earned by the marginal (borderline) firm when the industry is in a long-run equilibrium position (to be defined shortly).

The objective of the firm is then assumed to be maximization of its net revenue or its economic profit (its "greater than normal profit") defined, in turn as the difference between total revenue and total cost (which includes the "normal profit"). For our purposes, it is enough to remark that, if the price of the product is greater than its average cost (including any relevant average damage cost), the firm must by definition be earning a greater than normal profit (or a positive net revenue or an economic profit).

Such a greater than normal profit can, however, by definition and assumption, be earned under perfect competition in the short run only. That is, such profit is rationalized as a functional return, since its existence results in the expansion of existing capacity or entry of new firms into the industry—actions which increase the supply of the product forcing its price down. Eventually the point is reached at which the firm and industry are in a position of long-run equilibrium. In this position, there is no reason nor incentive for any firm either to change the output from its existing capacity nor for the capacity of the industry (size of existing plants or numbers of plants) to change. Such a position is attained under perfect competition when the price of the product is equal to both the marginal and average costs of the marginal (borderline) firm which is thus earning a normal profit only. Any return above the normal profit made by the marginal firm which is being received by an infra-marginal firm—one whose total cost

assumed to be measurable "in principle" in units of output or in the money value of the output foregone.

This concept, of course, plays a crucial role in Coase's argument. He has emphasized throughout his paper that "a receipt foregone is the equivalent of payment of the same amount" Coase *supra*, note 1, at 7. This statement is, however, misleading, since the "opportunity cost" concept is merely a device employed by economists to account for a part of the total revenue received by the firm. In the long run, the "receipt foregone" by the firm must be offset by an income received from some other source, the source being the one which benefits from the alternative use of the input. In other words, in the long run, the price paid by consumers for a good includes the "opportunity cost" along with all other costs of production of the firm. However, in general since the firm owns the input to which the "opportunity cost" is attributable, this portion of the price paid by consumers is not paid out to others by the firm. This "functional" justification for the inclusion of "opportunity cost" in a firm's total cost approaches an ethical justification since it rests on an assumption that the firm has title to the input in question. If the firm does not own the input in question, but an "opportunity cost" equal to a bribe foregone not to destroy the property of another is included in the firm's "opportunity cost," the concept degenerates into a naked rationalization of the particular social arrangement which results in a receipt by the firm of an income equal to the "bribe foregone" in not refraining from the use of property to which it has no title.

(including the normal profit) is less than its total revenue—is then identified as an “opportunity cost”⁶⁹ or as “rent” necessary to retain the firm in the industry. This sum is then added to the total cost of the firm so that its total cost plus rent or plus “opportunity cost” and its total revenue are made equal; and the firm is then specified as earning normal profits only also.⁷⁰

Coase has analyzed the example given in Table 1 and demonstrated that whether or not liability for compensatory damages exists, the allocation of resources to ranching will be the same. He has first discussed the case in which liability for damage exists and concluded that a rational profit-maximizing rancher will take into account both the total and marginal damage cost and produce a level of output such that the marginal revenue (the price under perfect competition) is equal to the sum of the marginal damage cost and the marginal costs of the resources owned or purchased by the rancher required to produce the marginal unit of output.⁷¹ I shall call the marginal costs of these resources the marginal resource costs (MRC) to distinguish them from the marginal damage costs (MDC) or Loss per Additional Steer in Table 1) assumed by Coase. Thus, the marginal total cost is equal to the sum of the marginal damage cost and the marginal resource cost.

Coase has not assumed any arithmetical values for the marginal resource cost nor the price of steers in his example. But it must be noted that since—under perfect competition—equilibrium can exist only when the marginal total cost is equal to the price of the output and since Coase has specified the marginal damage cost in his example, once a price has been given the marginal resource cost for the assumed equilibrium level of output is determined as a residual equal to price minus marginal damage cost. And also, once the marginal resource cost has been determined for the equilibrium level

69. Stigler has asserted:

The surplus of earnings over what can be earned in the best alternative is called a *rent*. As the name suggests, economists first attached this concept of returns beyond those needed to hold a resource only to land. [*Sic.*] The concept has since been generalized to include such returns even when received by laborers or owners of specific goods. (emphasis in the original) Stigler, *supra* note 56, at 106, n.2.

70. If, at the same time, all other industries in the economy are also in a position of long-run equilibrium so that normal profits only are being earned in them also; and if all consumers in the economy are rationally maximizing the total utility of the goods and services obtainable from their given flows of money income at the given prices, the economy is in a state of general equilibrium. The value of every variable in the system is “determined.” No reason for any change exists within the envisioned system. Such a system satisfies the condition of Pareto optimality: “no one can be made better off without making someone else worse off.” The wagons have been formed into a perfect circle. The logic is impeccable. The full meaning has been drained from the initial assumptions made.

71. See note 22 *supra*.

of output, the price must be equal to the sum of that marginal resource cost plus the corresponding marginal damage cost, or to the marginal total cost.

In Table 2 below, I have assumed a marginal resource cost function (MRC) which falls to a minimum point and then rises—in keeping with the stylized function assumed traditionally in price theory. (See Column 4 of Table 2.)

In his farmer-rancher case, Coase has concerned himself with a discussion of the effects on cost of an increase in the number of steers (a variable) raised on a fixed quantity of farm and ranch land. The case is thus one involving changes in output from existing capacity. The number of steers, their feed, water, care, etc. are variable inputs; in Coase's arithmetical example, the output is "meat on the hoof" (an intermediate output not yet ready for final consumption).⁷²

His example involves changes in output of steers from existing capacity, since he has nowhere considered the effect of a de facto increase in the total quantity of land used to raise steers nor has he spoken of changes in the size of the ranching industry, since he has limited his analysis to the case of one farmer and one rancher only.⁷³ He has allowed the quantity of cropland to change.

At various points in Coase's paper there is obscurity as to his assumptions. Buchanan⁷⁴ has emphasized that Coase's analysis involves beginning from a position of "disequilibrium"; such a procedure is unusual in economic analysis. Wellisz⁷⁵ has also been troubled by the obscurity of some of Coase's assumptions and concluded that

Table 2

(Without fence, $F = \$1$; with \$9 fence, $F = \$10$ and asterisk * indicates relevant values.)

(1) OUTPUT	(2) <u>MDC</u>	(3) <u>TDC</u>	(4) <u>MRC</u>	(5) <u>TVC</u>	(6) MTC = $\frac{\text{MRC} + \text{MDC}}$	(7) TDC = $\frac{\text{TVC} + \text{TDC}}{+ F}$	(8) <u>P = 9</u>	(9) <u>R</u>	(10) <u>N</u>
1	1 0*	1 0*	6	6	7 6*	8 16*	9	9	1 -7*
2	2 9*	3 0*	4	10	6 4*	14 20*	9	18	4 -2*
3	3 0*	6 0*	6	16	9 6*	23 26*	9	27	4 1*
4	4 0*	10 0*	8	24	12 8*	35 34*	9	36	1 2*
5	2 0*	12 0*	10	34	12 10*	47 44*	9	45	-2 2*
6	0 0*	12 0*	12	46	12 12*	59 56*	9	54	-5 -2*
7	0 0*	12 0*	14	60	14 14*	73 70*	9	63	-10 -7*

72. Whether the rancher eventually butchers the meat on the hoof himself or sells it is irrelevant. For purposes of argument only, I am granting Coase's necessary implicit assumption that the steers are homogeneous, although I have never seen such a herd.

73. See note 65 *supra*.

74. Buchanan & Tullock, *supra* note 16, at 347 n. 2.

75. S. Wellisz, *On External Economies and the Government-Assisted Invisible Hand*, 31 *Economica* 345, 350, 351 (1964).

since, under perfect competition, "every firm operates at a zero profit level"—meaning thereby that in the long run, firms operate at a normal profit level—the "net gain" Coase has assumed his firms to be earning must be interpreted as economic rent.

For our present purposes, economic rent may be defined simply as a greater than normal profit earned by a firm which owns an input (land) whose supply cannot be increased in response to price changes, as input which is not available to new firms wishing to compete away the resulting greater than normal profits. As the price of the product produced rises, the demand for the scarce input and the return to it accordingly rise. Since the supply of the input earning the economic rent cannot be increased, economic rent does not perform the function of a true greater than normal profit—that of inducing expansion of capacity. Thus, rather than being a case of short-run equilibrium within which the "net gains" are greater than normal profits whose function is to induce increases in capacity, Coase's farmer-rancher example involves a case of economic rent, a functionless surplus enjoyed by the owner of a scarce resource. Coase's analysis involves rent at the "intensive margin" only. The "intensive margin" involves a de facto fixed quantity of land (a concept equivalent to a given size plant) and hence a case of given capacity.

Some writers, particularly those seeking to rationalize *laissez-faire*, argue that the receipt of economic rent—the return received by the owner of a resource whose supply cannot be increased—can be justified by reliance on the "opportunity cost concept". However, their conclusion that the economic rent will be greatest when the resources are "efficiently allocated" is an explanation of the level of rent and not a demonstration that its payment to the owner of such a resource performs an economic function. It is well-established in economic theory that a "lump sum tax"—a tax whose magnitude is independent of changes in output—imposed upon the recipient of economic rent will leave the allocation of resources unaffected, not only under perfect competition but irrespective of the degree of competition.⁷⁶ If the economic rent or surplus can be extracted by means of such a lump sum tax without affecting the allocation of resources, what function does receipt by the owner of the resource of this surplus perform? The economic theorist concept of economic rent is not the same thing as nominal rent in the real world. The latter may include elements of interest and wages also. Actual measurement of economic rent, like that of many other magnitudes of price theory, is generally possible "in principle" only.

76. A graphical explanation can be found in H. Liebhafsky, *The Nature of Price Theory* 482 (Revised ed., 1968).

In general, a firm's total cost will consist of fixed costs (F)—defined as costs which are independent of the level of output—and variable costs, costs which do vary as output varies. Property taxes are an example of a fixed cost. In Table 2, I have assumed that, if no fence is built, the rancher's fixed cost is \$1, or $F = \$1$. Since Coase has assumed that the "annual cost of building and maintaining a fence is \$9, if the rancher did build such a fence, his fixed cost would increase to $\$1 + \$9 = \$10$. The numbers without asterisks in Table 2 apply if no fence is built and $F = \$1$; the numbers with asterisks apply if a \$9 fence is built so that $F = \$10$.

The total variable cost (TVC) is given in column (5) of Table 2 and does vary as output varies. In column (5) total variable cost is computed as equal to the sum of the marginal resource costs in column (4)—(the sum of the additions to the resource cost as output increases) at each level of output. This total variable cost function is thus consistent with Coase's procedure and assumptions.

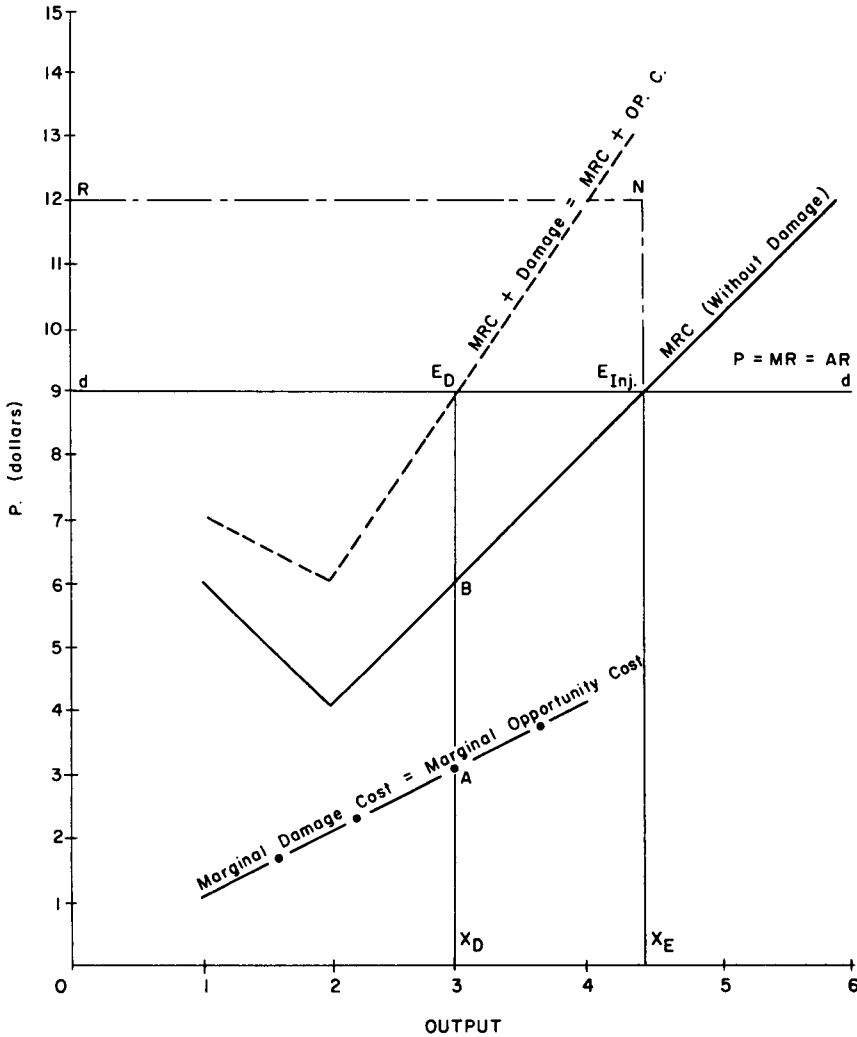
The first three columns of Table 2 merely reproduce Coase's assumed damage-output relations already given in Table 1. Coase has not specified the maximum number of steers which the rancher can raise and I have extended Coase's damage-output relationship in the logical way. He has specified that the size of the farmer's crop is 12 tons, that the marginal damage cost is equal to the number of steers produced, and that four steers will destroy ten tons of crops. Therefore, addition of the fifth steer can result in only two tons of crop damage rather than in five tons. Once the crop has been totally destroyed by five steers, addition of the sixth and seventh steers can result in no further crop destruction, so the marginal damage cost in these cases is zero. Moreover once the total crop of 12 tons has been destroyed by five steers, the total damage cost is a constant equal to 12 tons. I will discuss later the relationship between the size of the herd and the cost of the fence.

Coase has discussed in detail a situation in which the rancher is assumed to be in equilibrium producing three steers.⁷⁷ Comparison of the cases of liability and nonliability and of a case he does not discuss—that of use of an equitable remedy—can be most forcefully presented by means of a simple diagram.

Consider Figure 1. In this diagram the upward sloping line consisting of dots and dashes represents Coase's Marginal Damage Cost function, the data reproduced in columns (1) and (2) of Table 2. Although Coase's example assumes a "discrete" case—one in which output is not continuously variable, for visual clarity I have drawn the line in the traditional way to represent an output which is continuous-

77. Coase, *supra* note 1, at 2-8.

Figure 1



ly variable; this assumption is harmless insofar as my conclusions and analysis are concerned; indeed, it produces a more general analysis. At point A, for example, when three units of output are being produced, the marginal damage cost is equal to \$3 in Figure 1 and in Table 2. The inverted L-shaped solid line labeled "MRC without Damage" is a picture of the marginal resource cost function. It represents the data contained in column (4) of Table 2.

As noted earlier, Coase has argued that if liability for damage exists, the rancher must take account of the marginal damage cost in

addition to his other costs in determining the size of the herd to be produced at the given market price. In Figure 1, the inverted L-shaped dashed line labeled "MRC + Damage . . ." represents the sum of the marginal damage cost and the marginal resource cost at each level of output; it is a picture of the relationship expressed by the numbers contained in column (6) of Table 2. I have already defined the sum of these two magnitudes as the marginal total cost.

Now consider the case in which 3 steers are being produced "in equilibrium" by the rancher. Reference to column (6), Table 2, discloses that the sum of the marginal damage cost and the marginal resource cost when three steers are being produced is \$9. As has been noted, under perfect competition the marginal revenue is equal to the price. And if the rancher is in equilibrium, the marginal total cost must be equal to the marginal revenue and thus to the price. Therefore, the market price of steers, when three steers are being produced must also be \$9. This assumption—inherent in the others already made—is depicted in Figure 1 by the horizontal line labeled dd . This line represents the demand curve "facing the rancher." The price (P) is a constant and is not affected by the amount the rancher sells; moreover, the addition to his total revenue from selling an additional steer, or his marginal revenue (MR) is simply equal to the amount of money he receives for that steer, the constant price. His total revenue is defined as equal to the number of steers sold multiplied by that price and is found in Column (9) of Table 2. His average revenue (AR) is the same as his price. The dd line in Figure 1 represents the price, the marginal revenue, and the average revenue all of which are equal and constant.

Simple inspection of the picture drawn in Figure 1 shows that the MRC + Damage line—the dashed line—intersects the horizontal $P = MR = AR$ solid line at the point labeled E_D , at which both the price and the marginal total cost (or the MRC + Damage) are equal to \$9 on the vertical axis and the number of steers produced is 3 (XD) on the horizontal axis.

At this level of output, the rancher's total revenue (R) is thus (3) (\$9) = \$27. His total cost at this level of output is equal to the sum of the total variable cost, the total damage cost, and the fixed cost (of \$1), as given in column (7) of Table 2. Column (7) is, of course, merely the sum of columns (3) and (5) plus \$1, the amount of the fixed cost, if no fence is built; if the fence is built the numbers with asterisks apply. The difference between the rancher's total revenue and his total cost, absent the fence, is thus $\$27 - \$23 = \$4$ (his "net gain" N in Coase's terminology) at this level of output in column (10) of Table 2. This "net gain" (N) is his economic rent.

Coase has further assumed that the farmer produces 12 tons of crop at a price of \$1 per ton and has total costs of \$10. Thus he has assumed the farmer's "net gain" or economic rent as equal to \$2 if no damage occurs.⁷⁸

With liability for damage, six tons of crop are destroyed, but the rancher reimburses the farmer at the current market price—exemplary damages are ruled out by assumption—for the damage done. Thus the farmer is, in effect, "made whole" while having been required to engage in a continuing "forced sales" to the rancher. With damage and liability, the farmer's total revenue thus is \$12; his costs are \$10, and his "net gain" is equal to \$2 as before. The rancher, having included the damage cost in his calculations, produces three steers and has a "net gain" of \$4. He has merely served as a transfer agent, passing on to the farmer the amount consumers pay to him for the damage. Society thus has available for consumption three steers plus six tons of crops. The "opportunity cost" to society of three steers is the value "elsewhere"⁷⁹ of the resources used on the ranch plus the value of six tons of crops destroyed, and the consumers have paid \$6 for this crop destruction; the rule of liability has insured that the farmer be reimbursed for the damage he has incurred and for which consumers have paid.

The legal theory can be one of trespass, intentional nuisance, or negligent nuisance. Since it is not assumed that the cattle eat the crops and gain weight in the process, no question of unjust enrichment is involved in this sense.

Coase has thus postulated a case involving continuing prospective injury to the farmer, but few lawyers would consider repeated actions for compensatory damages to be an appropriate remedy in such a case. At the very least, exemplary damages—which Coase has ruled out by assumption—would also be requested. Most lawyers could seek compensatory damages for injury already suffered and equitable relief to prevent the rancher from conducting his ranching activities "in such manner" as to inflict harm upon the farmer.

78. *Id.*, at 5.

79. The reader must be cautioned that Coase's usage of the expression "value elsewhere of the resources used" as an equivalent to the words opportunity cost need not necessarily mean the value of the resources in another location in the same activity. The phrase merely means that the opportunity cost is measured by the value of the given quantity of resources if they were not devoted to farming in this location. The "value elsewhere" of the resources used could be their value in some other activity (production of Brand X) at this location or in another place or by farming there. In short, "elsewhere" is not a term specifying a geographical location. In the example under discussion, the "value elsewhere" of the resources devoted to producing three steers is simply the sum of the total variable and fixed costs in Table 2 and the value of six tons of crops destroyed is \$6. The total "opportunity cost" to society is thus \$23, the rancher's total cost of producing three steers.

A close reading of Coase's paper and of its predecessor⁸⁰ suggests that his failure to analyze his farmer-rancher example in a legal situation ("social arrangement") involving enforcement of an equitable remedy has been the result of his failure to understand the difference between the nature and purposes of equitable remedies and the compensatory damage remedy. The same is true of many of his disciples. At times Coase seems to have assumed that the plaintiff and defendant in a case involving an injunction have a knowledge of the values to them, respectively, of enforcement and of nonenforcement equivalent to that possessed by parties with respect to damages in an action for liquidated damages. In discussing one reported decision in which the court granted a mandatory injunction to the plaintiff requiring the defendant to control the harmful effects upon the plaintiff of the defendant's activities, Coase has asserted, "With costless market transactions, the decision of the courts concerning liability for damages would be without effect on the allocation of resources"⁸¹ Not only did the case under discussion by Coase involve continuing prospective injury to the plaintiff, but also the court granted the requested injunction and the Master of the Rolls remarked: ". . . as has often been said in these cases, the Plaintiff is not bound to go on bringing actions for damages every day when he is entitled to an injunction."⁸²

The counterpart in economic analysis of the compensatory damage remedy is a compensating tax (equal to the damage cost) imposed by a legislature. From the time of A. C. Pigou's⁸³ classic work on the problem of social cost to the present—with the exception of those who have followed the teachings of Coase—economists have taken the view that a legislatively-imposed tax (equal to the damage cost) imposed upon the damager is the "proper" way to deal with the problem.⁸⁴ It is not always been made clear, however, whether the taxing-authority is to use the tax proceeds to reimburse those who suffer injury. Compensating taxes and damage payments can easily be dealt with in economic theory by making appropriate adjustments in the cost and revenue curves of firms. Equitable remedies and abatement regulations have not been the subject of extensive analysis by economic theorists; apparently because many economists think that such rules do not lend themselves readily to formal theorizing (in terms of the traditional apparatus of price theory).

Coase and his followers have been careful to eliminate from their

80. Coase, *The Federal Communications Commission*, 2 J. Law & Econ. 1 (1959).

81. Coase, *supra* note 1, at 10.

82. *Sturges v. Bridgeman*, 11 Ch. D. 852, 855 (1879).

83. A. Pigou, *The Economics of Welfare* (1920).

84. Baumol, *supra* note 17; Wellisz, *supra* note 75.

statements of the problem any suggestion of specific intent on the part of the damager to inflict injury upon anyone. He intends to produce "goods." Coase's analysis of the case of short-run adjustment of the rancher's output at the given price under a rule of liability explained earlier is an analysis based on an assumption that the size of the ranch is limited in form but not in substance to the rancher's land. The ranch does not include the farm although the straying of the steers is "inevitable" and also profitable.

Since all inputs are assumed variable in the long-run⁸⁵ in economics, Coase's long-run solution to the liability case is one in which the quantity of land devoted to ranching is increased in form but not in substance, while the quantity of land devoted to producing the crop on the farm is decreased. Thus, in his analysis of the long-run case of liability, Coase has stated as his coda this proposition:

. . . It follows [under the conditions assumed in our arithmetical and graphical example explaining his short-run case] that it would be desirable to abandon cultivation of the land and release the factors employed for production elsewhere. . . Whether the cattle-raiser pays the farmer to leave the land uncultivated or himself rents the land by paying the land-owner an amount slightly greater than the farmer would pay (if the farmer was himself renting the land), the final result would be the same and maximize the value of production.⁸⁶

In the long run therefore, in form though not in substance, the quantity of land devoted to ranching is increased, and that devoted to crop production is in fact decreased. In the short run, the rancher pays damages for the use of the farmer's land, and crop destruction occurs; in the long run, the rancher pays rent for the use of that land and cultivation is abandoned, but the farmer produces \$10 worth of output elsewhere. It is assumed that price is a measure of social value, and since the resources are being allocated in accordance with consumer preferences, Coase has produced his widely-accepted conclusion that—under his assumptions—"the value of production will be maximized."

Coase has emphasized in this context that this "desirable" result will occur if transactions cost are zero under perfect competition only

85. See note 22 *supra*. "Long run" is usually defined as a period of time within which all inputs are variable. Coase's tacit definition apparently means "a period long enough for the effects of the rancher's activities to force the farmer to abandon cultivation." The quantity of land of the "ranch" and that devoted to the "inevitable" straying are the same in the short run and in the long run in Coase's analysis, but the quantity of land devoted to crops is less in the long run than in the short run.

86. Coase, *supra* note 1, at 6.

if the parties are left free to make a private settlement of their disagreement by saying:

. . . A procedure which merely provided for payment for damage to the crop caused by the cattle but which did not allow for the possibility of cultivation being discontinued would result in too small an employment of factors of production in cattle-raising and too large an employment of factors in cultivation of the crop.⁸⁷

This statement may be puzzling to lawyers, since the mere existence of a rule of liability for compensatory damages does not bar private settlement of a dispute. Courts have long welcomed private settlement of disputes. Coase's statement may be aimed at proposals for statutory compensatory tax schemes containing also provisions for damage payments to the injured parties, but I am not aware of any proposals to prohibit contracts for the rental of land.

Coase's explanation of this long-run solution can be illustrated in terms of his numerical values although he has not provided such an arithmetical illustration. According to Coase's assumption that the damaging firm takes account of its damage liability in making its output decisions, the value to the rancher of use of the farmer's land for "inevitable" straying by the steers must be at least equal to the amount of the damage inflicted at the equilibrium level of output, or to \$6 when three steers are produced. The rancher will thus be willing to pay the farmer a rent of up to \$6. The farmer's net rent from farming the land has been assumed by Coase to be \$2. Therefore the farmer will accept any rent above \$2 to abandon cultivation. A range for bargaining exists; the assumption of profit-maximizing behavior demands the conclusion that "a bargain will be made within these limits."

Coase has not mentioned the point, nor to my knowledge, has its significance been noticed elsewhere in the literature, but the abandonment of cultivation by the farmer eliminates the damage cost and the payment of rent by the rancher increases his fixed cost.

Therefore, with cultivation abandoned and the farm rented by the rancher, the solid MRC w/o Damage line in Figure 1 becomes the relevant one and the rancher's equilibrium position will be point E_{Inj} . Economists should avoid the temptation to say that "the marginal cost curve has been shifted;" the MRC Damage line in Figure 1 has not been shifted. It has simply become irrelevant in the long-run rental-abandonment situation and should be ignored except in discussions of comparisons of results. In the long-run rental-abandonment

87. *Id.*

situation, the rancher will produce four steers and his total revenue will be \$36, while his total cost excluding the rent paid to the farmer (in Table 2) will now be equal to $TVC + F = \$24 + \1 (since MDC and $TDC = 0$). The rancher's "net gain" excluding the rent paid to the farmer will thus amount to $\$36 - \$25 = \$11$.

The difference between his "net gain" of \$4 in the short-run damage payment case and of \$11 the long-run rental-abandonment case can be explained simply. Elimination of the damage eliminates his previous damage liability of \$6, and the production of the fourth steer causes no damage. The steer is sold at a price of \$9 although its marginal cost is only \$8, yielding an addition of \$1 to his "net gain." Alternatively, elimination of the damage and damage liability (which would have amounted to \$10 when four steers are produced) plus the \$1 addition to his "net gain" from producing the fourth steer accounts for his long-run rental-abandonment case "net gain" of \$11. That the price of the fourth steer is \$9 while its marginal resource cost is \$8 in the long-run rental-abandonment equilibrium position is explained by the fact that the rancher cannot produce a fractional steer (his output function is discrete; his herd does not include pregnant cows).

Since the rancher's "net gain" will increase by \$7 if he rents the farm, he can pay the farmer a rent of up to \$7. The total product will consist of four steers, \$10 of output from employment of the resources elsewhere and cultivation of the farm abandoned. The value figure of \$10 of output elsewhere is the cost of the resources when they are used by the farmer to produce crops on the farm. The figure thus represents his total revenue from using the resources elsewhere after he has abandoned crop production and includes any economic rent he might receive by using the resources elsewhere.

That a legislative enactment providing for collection from the damager by a tax agency of a compensating tax equal to the amount of the damage inflicted and payment of the proceeds to the injured parties will produce precisely the same result as does a judicial rule of liability for compensatory damages should be obvious. What difference can it possibly make whether a court orders the defendant to pay damages measured at current market prices to the plaintiff or whether some other agency collects a tax from the damager in the same amount and disburses the proceeds to the injured party? But some have apparently thought a difference between the two procedures does exist.⁸⁸

Such tax schemes, which have stemmed from the work of Pigou,⁸⁹

88. Baumol, *supra* note 17; Wellisz, *supra* note 75; Buchanan, *External Diseconomies, Corrective Taxes, and Market Structure*, 59 *Am. Econ. Rev.* 174 (1969).

89. Pigou, *supra* note 83; Buchanan, *supra* note 88.

rest on a different behavioral assumption from the one made by Coase and this fact probably explains why some economists, using Pigou's assumptions have undertaken to prove that Pigou was indeed correct in concluding that such compensating taxes would "make private cost and social cost equal." Pigou assumed that firms do not take account of the marginal damage cost in making their output decisions. Coase has assumed that firms do take account of such costs. Thus Coase has implicitly assumed that the price paid by consumers includes the damage cost while Pigou assumed that that price does not. In Figure 1 prior to imposition of a compensating tax, Pigou would have considered the solid MRC w/o Damage line the relevant one; after the tax he would have considered the dashed MRC + DAMAGE line the relevant one. Thus, after imposition of a compensating tax equal to the damage inflicted on the farmer when the rancher is producing three steers, the Pigovian equilibrium position will be X_D with three steers, and six tons of crop produced and six tons of crop destroyed. Pigovians and Coase agree on one point at least: the damage is "inevitable" unless crop production is abandoned.

Coase's argument concerning the possibility of an agreement by bargaining or of rental by the rancher of the farm applies to the tax scheme in the long run also. The rancher could avoid the compensating tax by paying the farmer a rental in excess of \$2 and the rancher would be able to pay a rent of up to \$7. Total product in the long run would again consist of four steers, \$10 of output elsewhere and abandonment of cultivation by the farmer.

Coase has also analyzed the farmer rancher case in the legal situation in which the legal rule is nonliability. It is not altogether clear from his discussion whether he is analyzing a "social arrangement" in which a court has actually held that no liability exists or one in which the question has not previously arisen and is therefore an "undecided" question. His case of nonliability is a proxy for a *laissez-faire* situation and his purpose seems to be to provide an ethical justification for the retention by the rancher of the sum paid by consumers for the damage inflicted on the farmer in the short run and for the rancher's retention of the entire rent paid by consumers for the use by the rancher of the farmer's land in the long run. I will point out some of the flaws in his argument—these have apparently escaped notice by others and have not previously appeared in the literature.

In the nonliability case, Coase has concluded that under his assumptions, the level of output will be the same as in the liability case. His argument concerning the short-run nonliability situation is as follows: if there is no liability, it is open to the farmer to bribe the

rancher to reduce the size of his herd or to discontinue ranching altogether, thereby either reducing or eliminating the damage. If the rancher foregoes the bribe and produces three steers plus six tons of crop damage, he incurs an opportunity cost of \$6 which must be added to his total variable cost at that level of output. The marginal damage cost is now redefined as "marginal opportunity cost" so that the MRC + Damage line in Figure 1, now redesignated at the MRC + Op. C. line, remains relevant. Under these circumstances, the rancher's equilibrium position will be at E_D as before. He will produce three steers and receive a "net gain" of \$4 as before. The farmer, however, will *not* be reimbursed for the six tons of crop destroyed and thus his total revenue will fall to \$6, while his costs will remain \$10 so that his "net gain" will decline from \$2 to -\$4. The rancher, on the other hand, will retain the \$6 payment made by consumers for the damage—as a reimbursement for the "bribe foregone," that is, to cover his "opportunity cost." From Coase's point of view his "net gain" will be the same as before, but his income will now be \$10. The increase in his income is accounted for by the fact that he has produced three steers while destroying six tons of crop. The farmer's loss is his gain. The total social product will be the same in the short run under the two different social arrangements of liability and nonliability—three steers, six tons of crop and six tons of crop destroyed and one farmer considering the possibility of abandoning cultivation. The will of society will be done on the farm as it is on the ranch.

The long-run nonliability or *laissez-faire* solution follows logically. The \$6 worth of uncompensated crop destruction suffered by the farmer will result in his losing \$4 and he will eventually be forced to abandon cultivation. In the nonliability *laissez-faire* legal situation or one in which no compensating tax is levied, there is no reason for the profit-maximizing rancher to reduce his income by increasing his fixed costs as a result of making a rental payment to the farmer. Just as he can make costless use of the farmer's land for the "inevitable" straying of his steers in the short run by destroying crops, so can the rancher make costless use of the farmer's land for the same purpose in the long run after crop production has been abandoned. Neither Coase nor his disciples have emphasized this point. Abandonment of cultivation by the farmer will reduce the rancher's opportunity cost to zero. Since the farmer will offer no bribe, the rancher will have no opportunity to forego one. With cultivation abandoned, no damage will be done and the damage cost will be zero.

In the long-run *laissez-faire* (nonliability social arrangement), abandonment legal situation, the solid MRC w/o Damage line in

Figure 1 will again be relevant. With the minor exception of the fact that the rancher will be able to pocket the sum paid—according to Coase's assumptions—by consumers for the rental of the farmer's land so that the rancher's "net gain" or functionless surplus is now equal to \$11 subject to no rental payment, the result in terms of total product in the long run *laissez-faire* abandonment legal situation (the nonliability social arrangement) will be precisely the same as that in the long-run rental abandonment legal situation (the liability or compensatory-tax social arrangement): four steers, \$10 of output produced elsewhere and abandonment of cultivation on the farm.

Using price as a measure of social value, some economists conclude that since the rancher will be making a "more efficient" (in terms of total product) use of the farmer's land than the farmer would have made, an ethical qua functional justification exists for the retention by the rancher of the full rent paid by consumers for the use of the farmer's land for "inevitable" straying by the rancher's steers.

Having begun with an assumption that the land is more valuable for ranching (the rent of the farm in steers when three are produced is \$6) than for farming (the rent in farming is \$2), Coase has proved that the land is, indeed, more valuable for ranching than for farming, and the ethical judgment contained in the initial assumption inevitably leads to a policy recommendation calling for a *laissez-faire* social arrangement. The "public interest" is being served as defined by economists "in their *scientific journals*."⁹⁰ (emphasis added).

Quaere: In Coase's long-run *laissez-faire* abandonment case, if the "run" is long enough would the rancher also acquire title to the farmer's land by adverse possession? Or would he merely acquire a prescriptive right to its use by his "inevitably" straying steers? Conceivably, titles to property and rights in land would then become functions of long-run market prices, possessing the same degree of certainty as do economic and weather forecasts. But resources used in registering deeds could be saved. The legal theory would not be that it is easier to fence cattle "out" than "in" or custom, but that "relative prices determine rights in land."

I submit that the *quaere* is less frivolous than it may seem to be at first glance: What are the implications for certainty of property rights if the proposition advocated by Coase and others is adopted that enforcement of such rights should be made a function of the relative money values of the uses to which the property is put? That, after all, is what the "economic theories of property" and of the state which have sprung from Coase's farmer-rancher case are all about.⁹¹ Nor is

90. Joint Econ. Comm., *supra* note 15.

91. See note 2 *supra*.

the problem confined to a long-run case. Assume a short-run situation and a reversal of the relative values. Would a reversal of the court's decision follow as a matter of course? Surely certainty of property rights is not perceived as some ultimate, external end in itself; and if not, what is the significance of such certainty as is sought for maximization of total product?

In the *laissez-faire* abandonment (nonliability) case, Coase has apparently justified the retention by the rancher of the sum paid by consumers for the damage inflicted by adding this sum to the rancher's cost and calling the sum added an "opportunity cost." In Coase's words, "a receipt foregone of a given amount is the equivalent of a payment of the same amount."⁹² However, Coase has also said of the bribe in his farmer-rancher case:

. . . But the farmer would not wish to pay to avoid crop damage which the cattle-raiser would not be able to cause. For example, the maximum annual payment the farmer could be induced to pay could not exceed \$9, the annual cost of fencing. *And the farmer would only be willing to pay this sum if it did not reduce his earnings to a level that would cause him to abandon cultivation of this particular tract of land.*⁹³ (emphasis added).

If the farmer would not be willing to pay a \$9 bribe if doing so "would cause him to abandon cultivation. . . .", would he be willing to pay a smaller sum which produced that same consequence?⁹⁴ The difference between the farmer's total revenue and his total cost is his economic rent (assumed by Coase to be \$2). Reference to Table 1 discloses that Coase has assumed the total damage cost to be greater than \$2 at every level of output except that at which one steer is produced. The farmer could not, therefore, offer a bribe which did not result in his abandonment of production unless the rancher was producing one steer only.

In the case of production of one steer only, the farmer would be able to bribe the rancher without suffering a loss only if the rancher's net gain, including the \$1 paid by consumers for the \$1 of crop damage at this level of output was less than \$2. If such a bribe was offered and accepted, no steers would be produced and no opportunity cost would exist. If no bribe is offered so that no bribe can be accepted or if a bribe is accepted, what is the cost of forbearance from accepting that bribe? Coase's long-run *laissez-faire* (nonliability) solution contemplates abandonment by the injured parties. Such an end result is inconsistent with his argument that the farmer can bribe

92. Coase, *supra* note 1, at 7.

93. *Id.* at 4.

94. *Id.*

the rancher and that therefore the rancher incurs an opportunity cost as a result of his forbearance in not accepting the bribe. Coase's opportunity cost of foregoing the bribe does not exist; it is an economic fiction.

Coase's reliance on this economic fiction to justify retention by the rancher of the sum paid by consumers for the damage has diverted attention from the fact that other ranchers in the industry who do not have the opportunity to inflict crop damage on neighboring farmers do not enjoy an addition to their "net gain" comparable to the additional income enjoyed by this rancher. Coase has explicitly⁹⁵ excluded this possibility from the discussion. Apparently this rancher has access to a scarce resource to which other ranchers in the industry do not have access. Coase's profit-maximizing railway company whose engines are operated under conditions of perfect competition while setting fire to the crops of farmers whose fields border the railway's right of way similarly has access to a scarce resource.⁹⁶ So does the factory whose emissions of smoke and smells dirty the housewives' laundry and pollute the air. So does any firm whose plants are located in a place such that by virtue of the plant's location it can dispose of its waste at no cost into an environment to which it has no exclusive title.

The additional income which the individual firm—assumed by Coase to determine its output at a given price under perfect competition—thus enjoys is clearly a form of economic rent. In technical jargon, such a firm enjoys a site rent by virtue of its location. This site rent is an addition to its "net gain" already defined as economic rent also. In the short run in our nonliability example, the rancher enjoys total economic rent of \$10: he receives \$6 of site rent to add to his \$4 of other economic rent (Coase's "net gain"). Moreover, if the damage occurs, according to Coase's assumptions this "net gain" must be positive, although its magnitude cannot be determined.⁹⁷

However, although he has made no mention of the fact, Coase's analysis does provide a way of measuring that part of the firm's total economic rent which is its site rent. He has shown that this site rent (which he has called an "opportunity cost," thereby providing an apparent ethical justification for its retention as income by the rancher) is equal to the amount of damage inflicted at the specified

95. *Id.*

96. *Id.* at 32.

97. See Liebafsky, *supra* note 76, at 482. Coase has solved-in-part—the problem Henry George could not solve.

level of operations. If the damage is measurable, so is the site rent, since Coase has shown that the two are equal.

Suppose, now, we consider an alternative social arrangement—one not analyzed by Coase. Suppose a permanent mandatory injunction is issued and enforced requiring the rancher to conduct his ranching activities “in such manner” as not to inflict injury upon the farmer.

Compliance with the injunction by the rancher means that in Figure 1 the $MRC + \text{Damage} = MRC + \text{Op. Cost}$ line is again irrelevant. No damage will be done and no bribe will be offered. The rancher’s “opportunity cost” will fall to zero along with the damage cost. The solid MRC w/o Damage line is again the relevant one. The numbers with asterisks in Table 2 are now the relevant ones, since the \$9 fence will have been built by the rancher.

Clearly, in Figure 1 at the given price of \$9 per steer, compliance with the injunction will produce precisely the same allocation of resources to and output from ranching as is produced in Coase’s two long-run abandonment cases: four steers. But the \$10 worth of resources used by the farmer will continue to produce \$12 worth of crops on the farm as compared with \$10 worth of output elsewhere in Coase’s two cases. *De facto* the ranching operation will now be conducted on the ranch without making use of the infra marginal farm land. No crops will be destroyed and no abandonment will occur.

Coase’s two cases have been widely accepted as “maximizing total product” as he claims they do. The use of an equitable remedy produces a larger total product than does either of Coase’s “Maximizing” solutions. No damage is done to anyone in the case of the equitable remedy. The damage appears not to be “inevitable” as assumed in the Coase analysis and in the Pigovian compensatory tax schemes. Both the farmer and the rancher “make” marginal cost equal to marginal revenue. Even when all the assumptions of the received price theory and the Coase argument are granted for the sake of argument only, institutional arrangements and the rule of law do seem to “matter” after all.

In our example, the rancher’s fixed costs will increase by the cost of the fence equal to \$9. Compliance with the injunction also eliminates the damage cost qua “opportunity cost.” The cost of compliance is independent of the level of output and has no effect on the marginal resource cost (which is a function of output). The enforcement of an equitable remedy in our example is equivalent to imposition of a lump sum tax equal to the fixed cost of compliance. In a case of pollution abatement involving both fixed and variable costs, an

administrative agency can use a combined injunction-tax-tax credit remedy and maximize output while reducing or eliminating pollution.⁹⁸

In our example the rancher's "net gain" will be positive even after the fence has been built. His total revenue will be $(4 \times \$9) = \36 and his total cost will be \$34; thus his economic rent will be \$2. The farmer's economic rent will also be \$2. The sum of the two "net gains" will be \$4. The prices to consumers are the same as before. The damage inflicted by the rancher's "inevitably" straying steers adds nothing to the value of his steers. Elimination of that damage subtracts nothing from their value. The straying is "inevitable" only if consideration of alternatives to the market solution is precluded because a *laissez-faire* solution is assumed in the inception.

The source of funds for payment for the fence can be explained simply. The cost of the fence is \$9. The amount paid by consumers for the damage equal to \$6 is a set-off against this \$9. The rancher's unearned increment will fall from \$4 (in Coase's two short-run cases) to \$2, bringing the amount of the set-off to \$8. The remaining \$1 cost of the fence is accounted for by the fact that the marginal cost of the fourth steer is \$8 and its price is \$9. Thus the set-off is complete.⁹⁹

98. Such a injunction-tax-tax credit remedy is explained later in the text. The cost of Coase's fence is a fixed cost at some levels of output and then may increase at some higher level of output. He has said that a rancher who wished to raise a herd of "4 or more steers" would build the fence but he has added that a more expensive fence might be needed if more or heavier steers were likely to lean against it. But the rancher would not "wish" to increase the size of his herd unless the price of steers changed. Coase has limited his analysis to a case of adjustment to a position of equilibrium from a position of disequilibrium and has not considered how the results would be affected by the remedy employed in such a case. I will discuss such a case also later. It is not the function of judges nor the business of courts to supervise continuing optimal allocations; if it were, we ought to call our judges "commissars." In a dynamic economy, policies to abate pollution and at the same time insure a continuing optimal allocation of resources are problems to be dealt with by legislatures and implemented by administrative agencies. In any case of externalities in which a fixed cost only is involved, an equitable remedy (injunction) is sufficient; recognition of that fact leads to the discovery of the errors in Coase's analysis and assists in the invention of a combination remedy to deal with the problem. The cost of compliance (building a wall, a higher chimney, or a fence) is independent of output if a fixed cost only is incurred and compliance in such a case eliminates the damage cost without creating any variable cost; output of the damaging firm must increase and that of the damaged firm will not decrease under Coase's assumptions. Compliance with the injunction on Coase's facts and according to his assumptions decreases the rancher's income as well as his output at the given price. The gain to society is the rent from crop production not lost because no abandonment of cultivation takes place. The rancher is confined to raising his steers on his own property.

99. An alternative explanation can also be given. In the long-run nonliability case the rancher enjoys a net rent of \$11 since he is able to make costless use of the farm for the "inevitable straying." The cost of the fence is \$9 and the rancher's net income thus falls from \$11 to \$2. Instead of increasing his income by forcing the farmer to abandon cultivation and making costless use of the farmer's land, the rancher reduces his personal consumption of goods. Society gains the net rent in crops which would have been lost by the abandonment, since abandonment now does not occur.

Davis and Winston have taken the view that maximization of the joint rent is the test to be

Just as the site rent accounts for the damage payment in the case of liability, so does the site rent plus a portion of the other economic rent ultimately bear the burden of the cost of compliance with the injunction. Anyone else bidding for the use of the land for ranching purposes would have to take the cost of compliance into account and would offer to rent the land for not more than \$2. A new injunction would be granted requiring compliance on his part, given the same facts.

Had the rancher built the fence voluntarily, the same total product would have been produced as is when an equitable remedy is used. However—in keeping with that which has been received—it would have been irrational for him to build the fence absent the injunction. Doing so would have resulted in reducing his unearned increment qua “net gain” by \$2. Thus in the absence of use of an equitable remedy, the rancher’s self-interest and that of firms polluting the environment or wasting resources prevents him and them from taking any actions (having costs to them) to reduce or eliminate the harmful effects or any waste resulting from their activities.

Coase’s numerical example states that \$12 of total revenue is produced by the farmer at a cost of \$10 in cultivating the land. This seemingly innocent numerical example is fraught with obscurity in the context of his paper. Coase has stated that the farmer’s \$10 cost “(which is what he [the farmer] would pay . . .)” for the use of the resources on this land is “the additional product of the factors elsewhere”—meaning thereby “the money value of the output resulting from the use of the resources in some way other than in farming this land.”¹⁰⁰ The farmer’s cost of \$10 is, therefore, the total revenue he would receive from employing the resources “elsewhere.” But what is the “opportunity cost” of employing the released resources “elsewhere”?

employed. In our example, their view must be qualified to include a condition specifying that such rent be computed excluding abatement costs. In our example, excluding abatement cost, the joint net rent would be $\$11 + \$2 = \$13$, and this is the greatest net rent that can be produced under the assumed conditions. See Davis & Whinston, *Externalities, Welfare, and the Theory of Games*, 70 J. Pol. Econ. 241, 242 (1962).

In the case of our example, the rancher maximizes his preferences. Thus, if he builds the \$9 fence in compliance with the injunction, his preferences are clearly revealed. Given the injunction, he is not indifferent with regard to (1) a market basket consisting of \$9 more of goods and the consequences of noncompliance and (2) a market basket containing \$9 less of goods and the consequences of compliance. If he builds the fence, his preference for the latter basket is clearly, concretely revealed—and most especially so if his fence posts are embedded in a mixture of cement and sand. Such fence posts, being affixed to the land, of course, become part of his realty.

In short, the cost of the fence is financed by his economic rent or functionless surplus. The use of the equitable remedy makes it a matter of self-interest for the rancher to carry on his gainful activity in such a manner that the consequences of his doing so will not injure the farmer.

100. See note 79 *supra*.

If the value of the resources in the *laissez-faire* abandonment case is \$10 when employed elsewhere, but if they have a value of \$12 when these resources are employed in farming the land when an equitable remedy is enforced, is their value elsewhere \$10 and their opportunity cost \$12? Or is the opportunity cost of adoption of a *laissez-faire* policy \$2?

Even more puzzling is this problem: If the value of the farmland is greater when devoted to ranching than to crops, why would a rational profit-maximizing individual devote any resources to farming the land or to any activity other than ranching in the long run if he could make a greater economic rent by ranching the land? Apparently Coase's farmer is an irrational individual who does not in fact maximize his "net gains" (since he is farming and not ranching) at the beginning of the hypothetical case stated by Coase and is then transformed in some unspecified way into a profit-maximizing individual when such a transformation is called for by the conclusions desired. Why does the farmer not turn to ranching himself in the long run? In short, Coase's argument assumes the existence of a misallocation of resources and, at the same time, such conditions as are necessary for the existence of an optimal allocation.

An objection might be raised to enforcement of an equitable remedy on grounds that such enforcement would leave the rancher with less income than he would have under the *laissez-faire* solution. But two points must be made in reply: (1) The distribution of income is different in Coase's liability and nonliability cases but he has considered them both optimal since the total output is the same in both cases. Enforcement of an injunction produces a greater total product than do any of the Coase cases. (2) The second point to be made is that in evaluating a change by making use of the Pareto optimality test (on which such an objection would rest) it is necessary to select an initial position or a starting point from which to measure the change. Writers using this test in this context invariably choose as their starting point the positions of the parties at a time when one of them is engaging in an activity which inflicts harm on the other. Thus, in the case of the farmer and the rancher, let the starting point be the position in which the rancher is raising three steers, destroying six tons of the farmer's crops and the farmer is producing 12 tons but selling six only on the free market since the rancher's steers destroy six.

At this starting point, the rancher is inflicting harm on the farmer in his own self-interest by engaging in activities which produce the harmful effects but over which the rancher has sole control. All the farmer has is a power to interrupt the effect of the rancher's

activities; the farmer does not have control over the rancher's activities. Moreover, the harm is the result of the rancher's private decision, not subject to any procedural due process safeguards. For a court to adopt the test of Pareto optimality under these conditions would amount to validating the rancher's private decision to injure the farmer. But more importantly: a decision of the court to adopt the Pareto optimality test would, in effect, be a decision of the case prior to trial. Even though the rancher is injuring the farmer, the test precludes making the rancher worse off, and any decision holding him liable for damages for the enforcement of an equitable remedy which would reduce his income would make him worse off and is precluded. The farmer has no remedy, and apparently no cause of action. Or put more simply: If at a time when D's activity has effects injuring P, a rule holds that no decision can be made making anyone worse off at that time, P has no remedy, and apparently no cause of action. Adoption of Pareto optimality as a universal *ratio decidendi* for all time in all cases would undoubtedly help to clear dockets but that such a rule would satisfy what Cardozo called "the primordial necessity for social order" is less clear. One may doubt that the author of the opinion in *Palsgraf v. Long Island R. R. Co.*¹⁰¹ would have accepted such a universal *ratio decidendi*.

Coase's use of the word bribe is unfortunate; he has used his bribery argument both (1) to state the tautology that if the land is devoted to its most productive use total output will be maximized and (2) in a quasi-ethical sense to justify the use of, and the retention by the rancher of the entire rent from, the farmer's land in the nonliability case as a reward for destroying crops and devoting the land to its "most valuable use" in maximizing preferences. In the liability case, the rancher does pay to the farmer part of the rent paid by consumers for the use of the land—only because he can reduce his damage payments by doing so. But if the retention by the rancher of the amount paid by consumers for use of the farmer's land can be justified in a case of nonliability, it would seem to follow that the income enjoyed as a result of the use by a firm of the environment (including pollution) can also be justified—after all, no one has title to the environment; all are entitled to use it. But does it follow from this that lack of a title entitles some to destroy it for gain so that it cannot be used by others, not only of this generation, but also of future generations?

At one point, Pigou did remark that "authoritative controls" might be required "in addition to bounties."¹⁰² He did not, however, discuss

101. 248 N.Y. 399 (1928).

102. Pigou, *supra* note 83, at 194.

the possibility that problems of social costs might require the use of a combination of remedies such as an injunction and a compensating tax or a tax credit to achieve "optimal allocation." Nor to my knowledge has any other writer provided any economic analysis of the use of such a remedy. Most have been distracted by Coase's paper into a further discussion of compensatory taxes.

Such a combination remedy cannot be fashioned by the courts. But that fact is nothing more than evidence that it is not the function of the judiciary nor the business of courts to settle disputes by reference to the question of whether or not an economist's conception of an "optimal allocation of resources" will result from the decision. It has been well said of private actions that "A lawsuit is an orderly way of settling a dispute."¹⁰³ Parties who are able to find a solution by bargaining do not engage in lawsuits. Supervision of continuing optimal allocation is not a judicial function.

A remedy consisting of an injunction and a compensating tax and a tax credit is one which must be created by a legislature and implemented by actions of an administrative agency, particularly if the remedy is to prove effective in the face of changing economic conditions. Such a remedy can be fashioned to deal with problems of environmental pollution and an agency now exists, the Environmental Protection Agency (EPA), to implement it. To illustrate the use and economic effects of such a mixed remedy, I will make use of the numbers contained in Table 2 and of Figure 1. For generality, redesignate the commodity sold as "Commodity X"; the reader can simply substitute the words "Commodity X" for the word steers in Table 2 and Figure 1.

In the general case of environmental control, there will be fixed costs of installation of an abatement device and variable costs of operation of the device. Our earlier result in the example of the use of a mandatory injunction in Coase's farmer-rancher case has shown that (1) if compliance involves a fixed cost only, the case is equivalent to one of imposition of a lump sum tax equal to the cost of compliance, and the allocation of resources by the damaging firm to its activity will be the same as it is under *laissez-faire*, but (2) since the net rent of the damaged firm is not lost in the injunction case, total product will be greater than in the *laissez-faire* case.

If abatement involves variable costs, the key to the problem is one of employing a device to be used together with the injunction such

103. I do not recall the source of this comment which I have remembered since I first heard it as an entering law student in 1946; I have a hunch Holmes said it. Perhaps some reader can supply a reference. But in the light of the new economic theories of property, the sentence has acquired an added meaning.

that the marginal cost of abatement will be cancelled, leaving the marginal total cost unaffected. Then the marginal total cost of the firm will simply be its marginal resource cost.

A simple way to accomplish this result is to allow the firm a tax credit equal to its expenditures to meet the variable cost of operation of the abatement device. For example, assume that in Figure 1 and Table 2, an abatement order has been issued and that the firm is in equilibrium maximizing its "net gain" producing four units at point $E_{Inj.}$ and spending \$9 annually on the installation and maintenance of an abatement device. Now assume that the price of its product increases to \$12 and that, in order to increase its output to six units of X at which the marginal resource cost is also \$12, the firm would have to increase its expenditures on the abatement device by \$9 to \$18. (Assume that production of four or less units of output requires an expenditure of \$9 for compliance but that production of five to eight units doubles the expenditure for compliance so that production of six units of output entails an \$18 expenditure for compliance, thereby assuming an "abatement cost function" of the type Coase has assumed. The assumption is extreme since a fifty percent increase in output results in doubling the abatement cost).

Under these circumstances, if the firm continued to produce four units of output only, it would not have to increase its expenditure on the device, while its total revenue would increase. Thus, when it is producing four units at the new higher price, the firm's total cost remains at \$34 (we must use the cost figures bearing asterisks in Table 2) while its total revenue increases to $(4)(\$12) = \48 , and its economic rent or functionless surplus increases from \$2 to \$14. The \$12 increase in its economic rent is depicted by area $dRNE_{Inj.}$ in Figure 1. However, if it increased its output to six units and increased its expenditure on the device to \$18, its total cost would rise to $\$56 + \$9 = \$65$ while its total revenue would amount to $(6 \times \$12) = \72 . Its income would thus amount to \$7 only and it would continue (under Coase's assumptions) to produce four units. But if the firm were given a tax credit equal to the increase in the cost of the abatement device, its total cost would be equal to \$56 and it would receive a net gain equal to \$16 while producing 6 units of output and taking measures to control the harmful environmental effects of its activities. Under an injunction-tax credit scheme, taxpayers bear the burden of the variable cost of abatement, even though under the assumptions made in Coase's farmer-rancher example the price paid by consumers includes the cost of the damage. A crucial assumption of his demonstration of the equivalence of the results in the liability and

nonliability situations is that the damage can be measured at the market price. His analysis is irrelevant in pollution cases if that assumption is not satisfied. If taxpayers bear the burden of the variable cost of abatement, the firm will be able to continue to enjoy such site rent (included in its profit) as may exceed the fixed cost of abatement. The advocates of *laissez-faire* take the view that taxpayers "should" bear this burden thus paying a price for their use of the environment. This view states a value judgment.

The quality of the use made of the environment by those who do not pollute is not the same as the quality of the use by those who do pollute it.¹⁰⁴ Those who merely enjoy the benefits of the environment without polluting it do not diminish its quantity; those who pollute it, denying its use to others, do diminish its quantity. After a firm has installed an abatement device and started to operate it, does the firm discontinue its use of the environment? or does the firm's use of the environment then become more nearly qualitatively comparable to the use made of it by those whose use does not diminish its quantity nor deny its use to others? Who profits from the effects of the activity whose effects are being abated? Who would have the potential power to minimize abatement costs? And under what conditions would an incentive to exercise that power exist?

The variable cost of operating the abatement device can be imposed upon the polluting firm without affecting the allocation of resources by imposing a lump sum tax (a fixed cost whose amount is independent of output) upon the firm along with the injunction and granting a tax credit. The measure of the tax does not affect the economic analysis of its effects, and the reader may choose his own measure. For clarity of exposition, I will assume that the lump sum tax is defined as equal to the variable cost of operation of the abatement device at some specified level of operation of the activity.¹⁰⁵ The specified level would be used for tax purposes only

104. As Baumol has also pointed out, and Pigou obviously knew. Baumol, *supra* note 17; Pigou, *supra* note 83.

105. The specified level of operations could be the existing level at the time the proceeding was begun (on the theory that firms always maximize profits), or it could be some percentage of the average level of past operations.

An alternative to fixing the lump sum tax in this way would be to levy a tax on changes in the firm's economic rent resulting from the price change. Even though the economic rent cannot be determined, changes in the economic rent can be estimated.

Moreover, changes in variable expenditures on the device will not occur unless output changes. And output changes are a function of price changes. Thus, in Figure 1 and Table 2 if the price of the commodity rose from \$9 to \$12, if the firm continued to produce four units at the \$12 price, its economic rent would increase by $(4 \times \$3) = \12 , or by \$3 for every unit of output sold. If the firm increased its output beyond four units, its economic rent would increase by more than \$12. This magnitude is represented by area $dRNE_{inj}$ in Figure 1. This increase in the economic rent is clearly a windfall gain. Suppose the agency was empowered to impose a tax

and the firm would be free to operate at any level it wished to. The imposition of the lump sum tax would increase the firm's fixed costs. Marginal costs would not be affected. However, the firm would also be receiving a tax credit equal to its variable expenditures for operating the device. The variable costs of operating the device would increase the firm's total costs, but the tax credit would reduce the firm's total costs simultaneously by the same amount, so that the total cost would be unaffected. Thus, if the firm happened to find that its profit-maximizing output coincided with the specified level of operations used for the tax base and actually operated at that point, its expenditures on the variable cost of operating the device would reduce its tax liability at that point to zero. In effect, the firm would be paying its tax in kind—by paying for the variable cost of pollution abatement it would be controlling the effects of its polluting activities. Taxpayers who did not also consume the goods would pay no abatement costs. With abatement in effect, the firm and others would be making the same qualitative use of the environment and no one would be denying its use to others or destroying it. And by Coase's test, resources would be optimally allocated. But do empirical studies show significant losses from misallocation in terms of GNP? Or is optimal allocation just "a game economists play"?

Having outlined the problem and its elements, I leave further study of such cases to the mathematical economists, merely noting that a continuing rule-making proceeding could be used by the regulatory agency to make self-correcting value judgments in fixing the specified output level and details of such a combined injunction-tax-tax credit remedy. The remedy would be equally effective under Coase's and Pigou's assumptions about costs.

From the point of view of the law, no discrimination would be involved; the standards would apply equally to all firms within the same class; full procedural due process would be accorded in the rule-making procedure; and, of course, appeal from the regulatory agency's ruling to the courts would exist.¹⁰⁶

The injunction-tax-tax credit scheme which I have outlined above satisfies the Coase test of optimal allocation and continues to assume for the purpose of argument only without granting that price is a

of 66% percent on this increase in the economic rent. If the firm produced four units, its tax credit would be zero but its tax liability would be \$8 and its income after taxes would then be $\$14 - \$8 = \$6$. But if the firm did increase output to six units, its tax credit would be \$9 and would cancel its tax liability of \$8. The firm's net income after taxes would be \$7. The firm would produce six units and the price of \$12 is equal to the marginal resource cost of \$12 at that output level in Table 2.

106. A procedure for administrative action already exists under the National Environmental Policy Act, 42 U.S.C. §§4321-47 (1970).

measure of social value, etc., and that optimal allocation is a test even though that test is external to the problem.

I now reject these assumptions.

In its Annual Report for 1972, the Council on Environmental Quality reported the results of several econometric studies concerning the effect of pollution abatement regulations by saying:

The microeconomic studies indicated that none of the industries studied would be severely impacted in that the long-run viability of no industry is seriously threatened solely by the pollution abatement costs estimated. However, profits will decline for some firms in most of these industries because firms will not be able to pass on the full cost of pollution abatement to consumers in the form of higher prices. . . .

Most of the firms or plants that will be forced to close are currently marginal operations (e.g., *smaller, older, less efficient* producers) that were already in economic jeopardy due to other competitive factors. In such cases, the impact of environmental standards is only to accelerate closings that would have occurred anyway. The pollution abatement costs either eliminate already slender profit margins or reduce them to a level at which they fail to justify the required capital expenditures on pollution abatement equipment (in terms of an adequate return on investment).

There are approximately 12,000 plants currently operating in the industrial activities studied. Of these it is expected that approximately 800 would close in the normal course of business between 1972 and 1976. It would appear from the contractor's evaluations that an additional 200-300 would be forced to close because of pollution abatement requirements. Many of these additional closings would appear to involve plants that were vulnerable for other reasons and, hence, that were likely to have closed anyway a few years later.¹⁰⁷ (emphasis added)

The cost figures used in making these studies were accounting costs and did not include Coase's "opportunity cost" of foregoing a bribe qua damage cost. If such a cost were added to the costs of the marginal producers ("smaller, older, less efficient firms"), the total costs of such firms would exceed their total revenues. According to Coase's assumptions such firms "should" be forced to close. Interpreted according to Coase's behavioral assumption, the studies would thus seem to disclose that the abatement regulations resulted in an increase in "economic efficiency."

In its Report,¹⁰⁸ the Council discussed problems of readjustment

107. Council on Environmental Quality, Third Annual Report of the Council on Environmental Quality 287 (1972).

108. Council on Environmental Quality 143 (1971).

assistance (apparently resources are not employed "elsewhere" in-stanter). It called attention to the many indirect effects which may result from compliance with abatement regulation, including the effect on firms forced out of the industry. It did so without assuming perfect competition. Under such an assumption no readjustment problems can exist.

Near the end of his paper, Coase has written:

If factors of production are thought of as rights, it becomes easier to understand that the right to do something which has a harmful effect (such as the creation of smoke, noise, smells, etc.) is also a factor of production.¹⁰⁹

As it stands, the sentence seems to be an interesting example of what courts have in mind when they have used the phrase "assuming that which is to be decided." The statement, of course, assumes that a "right to inflict injury" exists. In his farmer-rancher example Coase has utilized the opportunity cost doctrine with its emphasis upon mutually exclusive alternatives ("meat or crops") in an attempt to provide an ethical basis for the existence of such a right. In his philosophico-legal argument in support of the existence of this "right," he has combined the opportunity cost doctrine with a simplistic concept of comparing (money) values which a legal mind may mistake for a rather naïve version of the judicial concept developed in Chancery of "balancing the equities" or "balancing the interests."

Coase has opened his paper with two sentences stating the problem, the "facts in his hypothetical cases," and then somewhat later stated his argument. The following quotation contains the "statement of facts" and the statement of the argument (the "theory of his case for *laissez faire*"):

This paper is concerned with those actions of business firms which have harmful effects on others. A standard example is that of a factory the smoke from which has harmful effects on those occupying neighboring properties. . . .

. . . The question is commonly thought of as one in which A inflicts harm on B and what has to be decided is: how should we restrain A? But this is wrong. We are dealing with a problem of a reciprocal nature. To avoid the harm to B would be to inflict harm on A. The real question that has to be decided is: should A be allowed to harm B or should B be allowed to harm A? The real problem is to avoid the more serious harm. . . . What answer should be given is, of course, not clear unless we know the value of

109. Coase, *supra* note 1, at 44.

what is obtained as well as the value of what is sacrificed to obtain it. . . .¹¹⁰

The facts are special: the injury is to those occupying neighboring property; without more, it cannot be said that the facts assumed include the problem of injury to the environment; and in Coase's analysis such injuries are not considered. Upon a casual first reading of the statement of the argument, one is inclined to agree. But upon reading his paper and then critically reading again the statement of the argument, questions arise. The statement of the argument sounds like a case of "balancing the equities" and the question of "restraint" in a case of continuing injury suggests an equitable remedy; but the "value" contemplated in the concluding sentence is a precise money value measured at market prices and is taken to be equivalent to social value. Apparently the damage remedy is adequate. Moreover, an ethical proposition has been included in the statement of facts by the statement put in the form of a question which reads: "The real question that has to be decided is: should A be allowed to harm B or should B be allowed to harm A?" No assumption that B is in fact harming A has previously been made. A decision by a court in favor of B would have an effect on A but would that decision constitute an act by B harming A? By putting the matter in this way, not only have the choices been made mutually exclusive, but also an ethical justification seems to exist for a decision against B in precisely the same way in which the use of the opportunity cost doctrine results in an ethical justification for the retention by A of the amount paid for the damage by the consumers.

The statement which precedes the one under discussion reads: "To avoid the harm to B would be to inflict harm on A". If this statement constitutes nothing more than a belated recognition of the fact that an adversary proceeding involves parties having conflicting interests, no exception need be taken. This statement surely is not intended to demonstrate that if B succeeds in a legal or equitable action against A based on the injury being done by A, B has undertaken an unethical act or inflicted legal harm on A? According to the "statement of facts," B is the passive recipient of the effects of a gainful activity under A's control.

In 1901 in *Sullivan v. Jones & Laughlin Steel Co.*,¹¹¹ the Supreme Court of Pennsylvania reversed the decision of a trial court and directed it to issue an injunction against the defendant steel company "perpetually enjoining Jones & Laughlin Steel Company . . . from

110. *Id.* at 1, 2.

111. 208 Pa. 540, 57 A. 1065 (1901).

such operation of its furnaces . . . as to cause to be emitted therefrom clouds of ore dust working and causing the injury to the property of the appellants . . . found by the court below.” The court below had rested its denial of the request for the decree on its finding that the harm (with emphasis on money values) to the defendant from issuing the decree would be greater than the harm being suffered by the plaintiff. Coase’s question was thus squarely raised. But Brown, J. said in the majority opinion:

. . . And as to the principle involved, that a chancellor will refuse to enjoin when greater injury will result from granting than from refusing an injunction, it is enough to observe that it has no application where the act complained of is in itself as well as in its incidents tortious. *In such a case it cannot be said that injury would result from an injunction, for no man can complain that he is injured by being prevented from doing the hurt of another that which he has no right to do.* Nor can it make the slightest difference that plaintiff’s property is of insignificant value to him as compared with the advantages that would accrue to the defendants from its occupation.¹¹² (emphasis added).

Three justices dissented. They and the trial court agreed that the granting of the decree would result in the demise of the defendant company and the steel industry in Allegheny County “within a year.”

And in another case, in which sulphur dioxide fumes and dust discharged from the stack of the defendant’s smelter resulted in injury to the plaintiff’s farm, the issue presented by Coase’s proposition: “Should A be allowed to harm B or should B be allowed to harm A?” was anticipated and evaluated by Marshall, J. in these words:

Stated in another way, the claim in effect is that one wrongfully invading the legal rights of his neighbor will be permitted by a court of equity to continue the wrong indefinitely on condition that he invests sufficient capital in the undertaking.

I am unable to accede to this statement of the law. If correct, the property of the poor is held by uncertain tenure, and the constitutional provision forbidding the taking of property for private use would be of no avail. As a substitute it would be declared that private property is held on the condition that it may be taken by any person who can make a more profitable use of it. . . . In a state of society the right of the individual must to some extent be sacrificed to the rights of the social body; but this does not warrant the forcible taking of property from a man of small means to give it to the wealthy man on grounds that the public will be indirectly advantaged by the greater activity of the

112. *Id.* at 1071.

capitalist. Public policy, I think, is more concerned in the protection of individual rights than in the profits to inure to individuals by the invasion of those rights.¹¹³

Justice Marshall's pointed comment applied to Coase's economic theory of liability produces the conclusion that the power of eminent domain should be conferred temporarily upon those individuals whose activities have the greatest market value; provided, however that that power shall pass immediately and peacefully to others when relative prices change.

Although Coase has discussed his four English cases as if they were concerned with a simple issue, the legal problems raised in these cases range from questions of tort and rights in land to questions of jurisdiction of courts of equity.

Coase's philosophico-legal argument does not appear clearly until he has begun his discussion of his third case, *Bryant v. Lefever*.¹¹⁴ In this case, the plaintiff and the defendant lived in neighboring residences. The jury found:

. . . Before 1876 the plaintiff was able to light a fire in any room of his house without the chimneys smoking; the two houses had remained in the same condition for some thirty or forty years. In 1876 the defendants took down their house and began to rebuild it. They carried up a wall by the side of the plaintiff's chimneys much beyond its original height, and stacked timber on the roof of their own house, and thereby caused plaintiff's chimneys to smoke [because the new higher wall with timber stacked on it interfered with the flow of air whenever he lighted fires.]¹¹⁵

The plaintiff was awarded damages and the defendant appealed. The lower court's decision was reversed on the appeal.

Coase has employed this case as an ethical rationalization of his argument that both parties should bear the cost of an injury inflicted by A on B. He has done so by arguing that in this case both parties "caused" the nuisance in fact. Thus he has argued:

. . . Who caused the smoke nuisance? The answer seems fairly clear. The smoke nuisance was caused both by the man who built the wall and by the man who lit the fires. Given the fires, there would have been no smoke nuisance without the wall; given the wall, there would have been no smoke nuisance without the fires. . . .

. . . . The [appeal] judges' contention that it was the man who lit the fires who alone caused the smoke nuisance is true only if we

113. *McCleery v. Highland Boy Gold Mining Co.*, 140 F. 951, 952.

114. 4 C.P.D. 172 (1878-79).

115. *Id.* at 173.

assume that the wall is the given factor. That is what the judges did by deciding that the man who erected the higher wall had a legal right to do so. . . .¹¹⁶

But, although Coase has not discussed the matter, the questions which the judges met at the threshold were those of whether or not the plaintiff had acquired a right to an unimpeded flow of air "over the general unlimited surface" of his neighbors, and what would be the social consequences of holding that he had acquired such a right. Absent such a right, he had no cause of action. After considering the question of whether the plaintiff could acquire greater "natural" (legal) rights in his land by building a house upon it than he possessed before the house was built and answering the question in the negative, Bramwell, L.J. (joined by Brett) pointed out that no such right could have been acquired by prescription either since or prior to the defendant's acts of building the wall and stacking timber upon it, because the only means open to the defendant of defeating acquisition of such a prescriptive right would have been that of "surrounding the land with erections as high as it might at any time be wanted to build on the land."¹¹⁷ To hold that a prescriptive right could be acquired by the plaintiff under these conditions would obviously restrict future uses of the defendant's land—possibly resulting eventually in a misallocation of resources. Indeed, it was also pointed out that to hold that such a prescriptive right existed—and to hold that the defendant thus could not use his land as he did—would also have the result of preventing him from building an additional story of the same height on his house.

Cotton, L. J. provided an additional opinion stating that "a right by way of easement to the access of air over the general unlimited surface of a neighbor cannot be acquired by mere enjoyment." The plaintiff had not "acquired a right to get rid of this [smoke] *in a particular way* which has been interfered with by his neighbors."¹¹⁸ Consider the implications for land use and development of a holding that one can acquire a prescriptive right to such a particular use of the environment. The decision reduced the defendant's site rent. The court pointed out that the activity (building the fires) of whose effects the plaintiff complained was under his control and that he could have eliminated the effects by building higher chimneys. That is what is meant by the statement that "the plaintiff creates the smoke which interferes with his comfort." Therefore, the defendant did not cause an actionable nuisance.

116. Coase, *supra* note 1, at 13.

117. *Bryant v. Forbes*, 4 C. P. D. 172, 178 (1878-79).

118. *Id.* at 181.

In this case it was the plaintiff who engaged in and had control over the activity whose effects were complained of; in two of the other three cited by Coase¹¹⁹ it was the defendant who had control over the activity whose effects resulted in injury. In the other decision the defendant used self-help and the plaintiff had no alternative; his resources were not mobile, and other special facts existed. The first three decisions mentioned above rest on the same functional principle: one who engages in an activity whose effects result in an injury is responsible for those effects—it is he who is peculiarly in a position to control the activity and to abate its effects. The other party does not have that power of control over the activity; at best he may be able to intercept the effects of the activity upon a lawful activity he himself is carrying on. The use of an equitable remedy in the farmer-rancher case rests on the same principle. The functional concept of individual responsibility was recognized in law long before existentialism was invented. Such a concept is consistent with the concept of law as an instrument of social order.

Coase has followed his discussion of *Bryant v. Lefever* by asserting that in the farmer-rancher case “there would be no crop damage without the crops.”¹²⁰ True, but the farmer’s planting of crops did not cause the cattle to stray “inevitably;” he could have built a fence to intercept the effects of the rancher’s cattle raising activities, but the rancher was in control of his ranching activities. He could have controlled the straying. No question existed of the farmer’s legal right to grow crops. His growing them was an activity which had no physical effect on the rancher’s property. Where then is the ethical justification for holding the farmer liable for the injury he suffered? The crops did not destroy any steers, nor did they destroy themselves.

Apparently a key case in Coase’s thinking has been *Sturges v. Bridgeman*.¹²¹ In this case, a doctor was granted an injunction against a neighboring confectioner whose machinery was embedded in a party wall separating the doctor’s consulting room from the confectioner’s kitchen. The doctor had built the consulting room many years after the machinery was embedded. The plaintiff alleged “that the noise and vibration” when the machinery was in use “were very great” and were heard in his consulting room; that “such noise and vibration seriously annoyed and disturbed the plaintiff and materially interfered with him in the practice of his profession,” preventing him from “examining his patients for diseases of the chest” apparently with a stethoscope; and that he “also found it impossible to engage

119. Coase, *supra* note 1, at 8, 10.

120. *Id.* at 13.

121. 11 Ch. D. 852 (1879).

with effect in any occupation requiring deep thought and attention.”¹²² Coase has said of the injunction granted to the doctor:

. . . The doctor therefore brought a legal action to force the confectioner to stop using his machinery. The courts had little difficulty in granting the doctor the injunction he sought. . . .

The court's decision established that the doctor had the right to prevent the confectioner from using his machinery. . . .¹²³

One with legal training must surely wonder about whether or not an injunction framed in the terms Coase has specified would not be broader than the plaintiff's need and open to objection by the defendant on this ground; and if it was, how the case was decided.

According to the report of the decision, the plaintiff “claimed an injunction to restrain the Defendant from using his mortars and pestles in such manner as to cause him [plaintiff] annoyance.”¹²⁴ (emphasis added). One need not be a student of the law to recognize the difference between Coase's “to restrain from using” and the actuality, “to restrain . . . from using in such manner . . .” (emphasis added). The economic analysis of the two situations, as we have seen, is different. Coase's interpretation would prohibit the activity whose effects produced the harm; but the plaintiff prayed for a remedy requiring the defendant to conduct his gainful activity in such a way as to eliminate its harmful effect, not that the activity itself be discontinued. Coase's reading of the terms of the injunction in *Sturges* has, of course, been consistent with his “opportunity cost” economic analysis, an analysis which fails to consider abatement of the effects of the activity causing the harm without elimination of the activity itself. Coase's reading of the terms of the injunction is thus also consistent with his advocacy of a *laissez-faire* solution—indeed, such a reading is a condition precedent to the advocacy of that solution.

During his discussion of this decision, Coase has remarked,

. . . . The basic conditions are exactly the same in this case as they were in the example of the cattle which destroyed crops. With costless market transactions, the decision of the courts concerning liability for damages would be without effect on the allocation of resources.¹²⁵

But in his farmer-rancher example, Coase has limited his discussion of the case of “liability for damage” to a case of compensatory damages

122. *Id.* at 853.

123. Coase, *supra* note 1, at 9.

124. *Sturges v. Bridgeman*, 11 Ch. D. 852, 853 (1879).

125. Coase, *supra* note 1, at 10.

measured at the market price and we have seen that if an equitable remedy is enforced in the case he has put, under his assumptions the economic analysis is not the same and the total output is greater.¹²⁶

Coase has devoted most of his discussion of the cases presently under consideration to a direct application of the results obtained in his farmer-rancher bargaining situation to the facts in these decided cases. Even before Coase's paper was published, philosophers of science¹²⁷ had pointed to the illegitimacy of this procedure which involves essentially "substituting one's model with its assumptions for the real world case." Thus, in a curious passage (whose premise and relevance are not clear) Coase has argued that it "would have been possible" for the parties to modify the decision of the court in *Sturges*, saying:

. . . it would have been possible to modify the arrangements envisaged in the legal ruling by means of a bargain between the parties.

The doctor would have been willing to waive his right and allow the machinery to continue in operation if the confectioner would have paid him a sum of money which was greater than the loss of income which he would suffer from having to move to a more costly or less convenient location or from having to curtail his activities at this location or . . . from having to build a separate wall . . .¹²⁸

But if the doctor had lost the case, the argument goes on, the doctor would have had to bribe the confectioner.

Thus, one learns that in the case of a permanent mandatory injunction, the plaintiff knows the money value of enforcement to him both now and in the future, just as the defendant similarly knows the money value of nonenforcement; and a bargain is possible in a case in which an injunction has been granted if the money value to the defendant of nonenforcement exceeds the money value to the plaintiff of enforcement; *provided however* that the plaintiff and defendant in the actual dispute are rational profit-maximizing entrepreneurs—as in Coase's farmer-rancher case, are motivated solely by considerations of

126. Other writers have followed Coase in his view that the alternative to the injury is discontinuation of the activity producing the injury. See Buchanan, *supra* note 88. This view is apparently "inevitable" when the opportunity cost doctrine is employed.

127. Thus R. B. Braithwaite has remarked:

. . . There are, however, serious dangers in the use of models. . . . The first danger is that the theory will be identified with the model for it, so that the objects with which the model is concerned . . . will be supposed actually to be the same as the theoretical constructs of the theory. . . . Thinking of scientific theories by means of models is always *as if* thinking. (emphasis in the original.) R. Braithwaite, *Scientific Explanation* 93 (1959).

128. Coase, *supra* note 1, at 9.

monetary gain, and possess certain knowledge of the future and of the relevant money values involved. One may wonder why the case was not settled without a trial or whether the damage remedy may have been adequate after all.

In short, Coase has assumed the existence of a "one to one" correspondence between the assumptions in his farmer-rancher case and the facts in *Sturges* and then criticized the decision made by the court. What the judges should have done was "to compare the [money] value of the cakes or iron lost" with "the additional [money] value of the residential facilities obtained" and the larger and heavier sum would have unbalanced the scale in the direction of the "correct" decision. "But of this the judges seem to have been unaware."¹²⁹

Coase has also argued that no nuisance existed until the doctor built his consulting room and that therefore both parties "caused" the nuisance.¹³⁰ Coase has confused the lack of substantial interest on the part of the doctor to support a cause of action with a cause in fact. The confectioner in *Sturges* claimed that he had acquired a prescriptive right to the use of the party wall in the way in which he was using it. The court answered this contention by saying that no actionable nuisance existed prior to the time the doctor built his consulting room because until that time he had no way of physically or legally (lack of substantial interest) interfering with "that which was done by the defendant."¹³¹ Therefore the defendant had not acquired a prescriptive right to use the wall in such a way as to interfere with any legitimate use the plaintiff wished to make of it. There was "some" evidence.

. . . of the garden wall having been subjected to vibration, but this vibration, even if it existed at all, was so slight and the complaint [of the previous occupant to the confectioner], if it could be called a complaint, of the invalid lady, and can be looked upon as evidence, was so trifling a character, that, upon the maxim *de minimis non curat lex*, we arrive at the conclusion that the Defendant's acts would not have given rise to any proceedings at law or in equity.¹³²

129. *Id.* at 10.

130. *Id.* at 13.

131. 11 Ch. D. 852 (1879).

132. *Id.* at 863. Coase in his note 13 has quoted a portion of this statement also but has omitted the words "if it could be called a complaint, of the invalid lady and can be looked upon as evidence . . ." Coase, *supra* note 1, at 14. Jessel, M. R. had earlier remarked:

The only serious point that has been argued for the Defendant is that by virtue of the statute or by prescription, he was entitled as against the Plaintiff to make this noise and commit a nuisance. . . . As far as I can see there was until a recent

Indeed, it hardly seems necessary to point out that the defendant's claim that he has acquired a prescriptive right to use the wall in such a way as to produce noise and vibrations was in itself a recognition by him that it was his activity which produced the effect. When the doctor made use of his established legal right to use the wall, the doctor did not "cause" the nuisance in fact; but he did acquire a substantial interest, one sufficient to support his action for an injunction. No ethical ground for holding the doctor liable exists; his "doctoring" activity did not produce effects injuring the defendant confectioner. The confectioner's activities combined with his attempt to appropriate for his own use the party wall produced an effect which denied to the doctor the use of the wall, to which the doctor had an equal right. The confectioner had sole control over his activity. Suppose the court had held the other way. How would the use of party walls in general and total product have been affected?

Coase has also discussed *Cooke v. Forbes*¹³³ in which fumes produced by the activities of a manufacturer of ammonium sulfate injured the products of a producer of cocoanut fibre matting. In this case, the effect of the activity complained of was accidental, remedial action was taken, and action to control the effects of the activity which caused the injury was also being taken by the ammonium sulfate producer. The case did not involve continuing injury and the one in control of the activity was responsibly taking measures to control its effects. The court held that no injunction would lie—as should have been obvious to the plaintiff's lawyers—and the plaintiff was left to seek his damage remedy. This case was clearly one concerned with the problem of the adequacy of the damage remedy. Since the effects were the result of accidents in the conduct of the defendant's activities, how could they have been caused by both parties? Surely this case does not seriously purport to strengthen Coase's argument that both parties "cause" the harm?

The fourth case discussed by Coase, *Bass v. Gregory*,¹³⁴ involved an action for an injunction and damages—by one claiming a prescriptively-acquired right to use a ventilating shaft running from his cellar into an unused well in an adjoining yard to use a ventilating shaft running from his cellar into an unused well in an adjoining yard owned by the defendant—to require the defendant to discontinue preventing the use

period no nuisance to anybody—no actionable nuisance at all. (emphasis added.)

11 Ch. D. at 855.

The problem before the court was one concerning the existence of an actionable nuisance and that question would not have been reached if it had been proved that no nuisance in fact existed—as Coase has argued.

133. L.R. 5 Eq. 166 (1867-68).

134. 25 Q. B. D. 481 (1890).

of the shaft for purposes of ventilation. The defendant relied on *Bryant* and argued that no prescriptive right to the passage of air could be acquired.¹³⁵ The court held for the plaintiff and required the defendant to cease his activity of interfering with the plaintiff's use of the ventilating shaft. The court found as a fact that the defendant had had knowledge of the plaintiff's use of the shaft when he purchased the premises, but perhaps more important, the court also found as a fact that the shaft had existed and been used for ventilating purposes for "many years—certainly forty years," and that the area in question was one in which "many of the chambers have been excavated from the rock rather than being built in the ordinary way."¹³⁶ Coase has argued that this case was no different from *Bryant* and that the movement of air in general across the defendant's land in *Bryant* was equivalent to the movement of the air in the shaft impeded in this case by the defendant's activities. Thus he has remarked, "An economist might be tempted to add 'but the air moved all the same'."¹³⁷ But in this case the foul air not only moved in a "well-defined" channel, there was no alternative method of ventilation available to the plaintiff. There was no mobility of resources. Coase should have said that in *Bryant* "the smoke moved in a well-defined channel, the chimney." In *Bryant* the plaintiff's chimneys could be built higher, while in *Bass* the alternative was abandonment of use of the plaintiff's cellar.

The concept of social contract has sometimes been utilized by social scientists interested in finding a quasi-legal framework within which to advocate a *laissez-faire* system of social organization, and Coase has devoted some space to a discussion of the "balancing of interests" concept employed in deciding nuisance cases, apparently with the thought in mind that the interests can be quantified in money values. A more appropriate legal concept for use in philosophical discussions of problems of environmental pollution seems to me to be the tort of waste which can be dealt with by the equitable remedy of injunction against waste. In 1908 one judge adopted the following definition of waste:

. . . Waste is the destruction or improper deterioration or material alteration of things forming an essential part of the inheritance, done or suffered by a person rightfully in possession by virtue of a temporary or partial estate as, for example, a tenant for life or for years. The rightful possession of the wrongdoer is essential and constitutes a material distinction between waste and

135. *Id.* at 483.

136. *Id.* at 482.

137. Coase, *supra* note 1, at 14.

trespass. The remedy by injunction is fully established, and has not only virtually superseded the old common law 'action of waste,' but has to a great extent taken the place of 'action on the case' for damages. . . .¹³⁸

We are all tenants for life of the environment and our possession is rightful. The environment is an essential part of the inheritance, and uncontrolled pollution constitutes a destruction or improper deterioration of that inheritance. Those who may from time to time be in a position to make use of governmental power to preserve the inheritance stand as trustees. Coase's argument rests on an assumption that the waste is "inevitable." I have shown in this paper that it need not be. The inheritance includes also improvements of the land. I have made no case for the counterrevolution's aim of establishment of a state of nature inhabited by noble savages. But that is another story.

138. *Hayman v. Round*, 22 Neb. 598, 601, 118 N.W. 328, 329 (1908). The definition is a quotation from 4 Pomeroy, *Equity Jurisprudence*, §1348 (3d. ed. 1904).