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The Concept of the Irreplaceable

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An analysis is proposed for the common argument that something should be preserved because it is irreplaceable. The argument is shown to depend on modal elements in *irreplaceable*, existence assumptions of *preserve*, and the logic of obligation. In terms of this theory it is argued that utilitarianism can account for most, but not all instances of persuasive appeals to irreplaceability. Being essentially backwards looking, utilitarianism cannot in principle justify preservation of objects irreplaceable because of their history or genesis.

I. THE NAIVE ARGUMENT

In this essay I investigate the following argument which often appears in environmental debates:

(P1) *X is irreplaceable.*
(C) Therefore, X ought to be preserved.

The argument is interesting because, although it is persuasive, it is only sometimes so. The great temple along the Nile, Abu-Simbel, was preserved from the waters of the Aswan Dam at least in part because it is irreplaceable. Part of what justifies setting aside the National Parks is their irreplaceable natural beauty. Likewise, the conservation of fossil fuel is motivated by the fact that with current technology it has no practical substitute. On the other hand, there are many counterexamples to the argument in the simple form given above. Smallpox was no doubt in some sense irreplaceable, but its eradication was a great good. Most of us would probably feel the same way about mosquitoes. Various regimes and eyesores, including even natural landscapes like the orginal Marais of Paris, are all in some way unique, but the world is probably better off without them. The argument, then, in its unqualified form must be invalid, but as the early examples suggest it must contain some legitimate insight at its core. The goal of the paper is to find and explain a valid reformulation.

As minimum conditions for the adequacy of a reformulation I propose the following: first, the reformulation must amount to a plausible translation of its naive version. As a minimum, we should expect to find (P1) and (C)

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present in the new argument, perhaps in some more explicit form designed to reveal their logical structure. Secondly, the reformulated argument must be valid. It must not only have the intuitive "ring" of validity, but to be completely understood its validity must be explicable in theoretical terms. Thirdly, the argument must be sound in those cases which are intuitively convincing, and unsound in those cases which are counterexamples. The reformulation would then provide an explanation of the intuitive data: convincing and unconvincing cases would correspond to sound and unsound uses of the argument. As in the case of validity, soundness must also have a theoretical grounding. That is, we should gain some theoretical understanding of why some cases but not others are sound.

The reformulation that is defended in the following pages is:

(P1*) Necessarily, X is the unique member of kind K.
(P2*) There ought to exist some member of kind K.
(C*) Therefore, X ought to exist.

The first premise says that X is irreplaceable; the conclusion says X ought to be preserved. The second premise, in the naive version, divides convincing cases from counterexamples. The argument for these claims proceeds as follows:

Section II attempts to satisfy the first and second criteria of adequacy, translation and validity. Analyses of the premise and conclusion of the naive argument are defended, and a hidden premise advanced that validly bridges the gap between them. Validity is then explained by a combination of logical and ethical theory. The logical theory employed is possible world semantics, and its use is dictated fairly straightforwardly by the importance of modal terms in the argument. The discussion will not advance the metalogical understanding of these ideas, and will only appeal to their uncontroversial properties. The interest rests rather in seeing these ideas explicate an important case of practical reasoning. The explanation must also appeal to moral theory, but here the proper choice of theory is far from obvious. My choice for this paper is utilitarianism. Its philosophical strengths in other areas and the frequency of its use in actual environmental debates make it a reasonable candidate. Its adoption here will be purely provisional. In the logic of my argument it serves as an assumption which, together with logical theory, I will use in an attempt to explain the intuitive data about preservationist cases. To the extent I am successful, utilitarianism will be indirectly supported by its explanatory power, and the preservationist argument will be illuminated. In section II, I argue that these theoretical assumptions can explain the validity of the reformulated argument.

Section III addresses the third criterion of adequacy, soundness. It is argued, first on the basis of intuition and secondly on the basis of utilitarianism, that the convincing and unconvincing cases of the naive argument do correspond to the sound and unsound uses of the reformulation. The parti-

cular variety of utilitarianism employed is one that defines the good in economic terms. I claim this theory can explain the cases of unsoundness and, in the majority of cases, the cases of soundness as well. A significant category of examples is discussed, however, which seem to be sound but nevertheless elude explanation under the theory.

The validity of the preservationist argument proved informally in section II is formally established in a short appendix.

II. REFORMULATION AND VALIDITY

The Problem. The goal of this section is to provide a reformulation that meets the first and second criteria of adequacy. To achieve this, I must provide conceptually convincing translations of the propositions found in the naive formulation, and must show that the argument as a whole is explicably valid. The desire to explain validity imposes a framework on the discussion. According to standard logical theory, any argument must be proven valid by reference to the usual definition of validity:

(R1) An argument is *valid* if, and only if (hereafter iff), for all possible worlds w, if the premises are true in w, so is the conclusion.

Accordingly, analyses called *truth conditions* must be formulated which state when the premises and conclusion are true in arbitrary possible worlds. Ordinarily, if the sentence in question is grammatically complex, its truth conditions in w are stated in terms of the truth conditions in w of its sentential parts:

(R2) If S is a complex sentence, truth in w of S is defined in terms of truth in w of its sentential parts.

If a sentence is not complex and is made up of parts of speech smaller than a sentence, its truth conditions in w are stated in terms of the interpretation in w of its component parts of speech:

(R3) If S is not complex, truth in w of S is defined in terms of the interpretations in w of the expressions which make up S.

Analysis of the preservationist argument must proceed so as to establish its validity by reference to these rules.

Uniqueness. At least part of what is asserted in (P1), *X is irreplaceable*, is that X is unique. But talk of uniqueness is elliptical. Something is always unique in some respect or other. Talk of respects can, in turn, be translated into traditional philosophical vocabulary in various ways, in terms of proper-

ties, in terms of kinds, and in terms of similarity.[1] Being elliptical, (P1) presupposes a given property P, a given kind K, or a special sense of similarity S, and may be reformulated, in part, in any of the following ways:

(1) Only X has property P.
(2) Only X is in kind K.
(3) There is no Y distinct from X such that Y is similar to X in sense S.

Furthermore, it is possible to state rules explaining how to translate from one of these vocabularies into the other:

(4) X has property P iff X is in kind K.
(5) X is in kind K iff there is a Y such that X is similar to Y in sense S.

Somewhat arbitrarily, let (2) be chosen as the preferred translation of uniqueness. For our purposes (2) may be viewed as a simple, noncomplex sentence, and its truth conditions in conformity with (R3) are easily stated:

(TC1) *Only X is in kind K* is true in w iff the referent of X in w, if there is one, is the only element in the extension of *kind K* in w.

More, however, is implied by (P1) than just uniqueness.

Necessity. Like other *-able* words, *irreplaceable* is modal. (P1) asserts not only that X is unique but that it is necessarily so. Thus, (P1) seems analyzable into the grammatically complex sentence formed by prefixing the adverb *necessarily* to the core sentence (2):

(P1*) Necessarily, only X is in kind K.

By (R2) the truth conditions of (P1*) must be defined in terms of its core sentence (2). Traditionally, necessity amounts to truth in all possible worlds. Here, however, the somewhat more abstract account standardly used in modal logic will be adopted. This defines necessity not in terms of all worlds, but in terms of a subset of worlds, called the *alternatives* to a world:

(TC2) *Necessarily S* is true in w iff in all worlds w' alternative to w, S is true in w'.

If every world is an alternative to w, this formulation yields the traditional definition. But, as we shall see shortly, the notion of *alternative* appropriate to the preservationist argument is much narrower. By applying (TC2) to (TC1), we get complete truth conditions for (P1*):

(TC3) (P1*) is true in w iff in all worlds w' alternative to w, the referent of *X* in w', if there is one, is the only element in the extension of *kind K* in w'.

1. For a discussion of these alternatives and their intertranslatability, see Willard V. Quine, "Natural Kinds," in *Ontological Relativity and Other Essays* (New York: Columbia University Press, 1969).

Let us turn now to the conclusion of the preservationist argument. Its analysis will shed light on the relevant meanings of possible world and alternative world.

Obligation. From a logical perspective, the striking feature of (C), *X ought to be preserved*, is that like (P1) it employs a modal concept, the deontic modality of obligation. On this reading, (C) is viewed as a complex sentence formed by prefixing the operator *It ought to be the case that* to a core sentence calling for preservation. Let us begin, working from the outside in, by stating the truth conditions for obligation.

Any account of obligation presupposes a moral theory, and the moral theory I shall assume here is utilitarianism. The challenge is to see whether, together with the translations of the naive argument and the rules of logical theory, it can explain the validity of the reformulated version.

In its most abstract form utilitarianism assesses obligation in terms of consequences of action. This rather vague moral intuition may be given a fairly clear statement in deontic logic, a theory which falls partly in logic and partly in ethics. On this approach, utilitarianism is formulated as a thesis about the truth conditions in a possible world of statements asserting obligation. The conditions capture the content of utilitarianism by giving a special interpretation to the concepts of possible world and possible alternative.[2] On this interpretation, a possible world is understood as a context of moral choice that is itself open to appraisal of its moral worth. Possible worlds thus correspond roughly to the stages on which moral action is performed. They may be thought of as slices of history, idealized instants of time. These time slices are additionally susceptible to moral comparison; some periods are morally better or morally preferable to others. The two important features of this reading may be singled out:

(i) Possible worlds are instants of time.

(ii) Possible worlds are ordered by a *better-than* relation.

The concept of possible alternative is also interpreted in terms of time and morality: the alternatives to w are those worlds that would immediately result given any possible change in w. Alternatives are worlds that are possible immediate successors in time. The changes in w that would usher in its alternatives may be viewed as the result of various factors like natural law or change, but one factor that is intended to be operative is moral choice. One way we can change the world is by moral choice. Abstracting from the particular mechanisms of change, the interpretation of possible alternative may

2. For an account of deontic logic and its semantics, see Bas C. Van Fraassen, "Values and the Heart's Command," *Journal of Philosophy* 70 (1973): 5-19. The account given here draws heavily on R. E. Jennings, "A Utilitarian Semantics for Deontic Logic," *Journal of Philosophical Logic* 3 (1974): 445-56.

be stated as follows:

(iii) A world w is an alternative to another world w' iff w is a possible immediate temporal successor of w.

The readings (i)-(iii) provide the framework for applying possible world analysis to the utilitarian account of obligation. Informally, the utilitarian assesses obligation on the basis of consequences. That is, one ought to bring it about that S if the consequences of doing so are better than those of not doing so. This idea may be expressed in terms of possible worlds as follows:

(TC4) *It ought to be the case that* S is true in w iff for any alternative w' to w such that S is false in w', there is a w'' alternative to w such that S is true in w'' and w'' is better than w'.

For the complete analysis of (C) let us turn now to the content it encloses within the deontic operator.

Preservation. The ordinary language definition of *preservation* amounts to something like "continued existence in an unchanged manner." This definition refers to three philosophically important ideas: existence, futurity, and change. But of these I argue only existence need be represented in the reformulation of the preservationist conclusion(C).

Clearly, in the context of the preservationist argument the issue of whether X exists is nontrivial. It is the very existence of X that is in question. Thus, at least part of what (C) asserts is captured in the following:

(C*) It ought to be the case that X exist.

I will now argue that no more is asserted in (C) than is stated in (C*).

The futurity of (C) is already captured in (C*) by the deontic operator. Of future times (C*) asserts that those which are immediately possible and in which X exists are better than similar times in which X does not exist. No further temporal reference is needed.

Likewise, nothing about change really needs to be said in the reformulation of (C) because in an important sense the question of change does not arise. *Ex hypothesi*, the only change that would be relevant to the argument would be that of X no longer being a member of kind K. But by (P1) such a change is ruled out; X is in K in w and in all alternatives to w in which X exists. Thus, in asserting (C), the preservationist is not concerned about X being in K. Of that he is already assured. He should not be understood as trivially repeating what he has already said in (P1). Rather, his sole concern in asserting (C) is with whether X will continue to exist, and this is admirably captured in (C*). To be sure, it is sometimes difficult to decide whether an alteration should be described, on the one hand, as a continuing thing changing properties or, on the other, as one thing with its properties coming into being. But the use of necessity in (P1*) decides this issue for the preservationist argument. By this premise change is precluded. Only

questions of existence can arise.

It remains, then, only to state the truth conditions for (C*). Those of its contained sentence are straightforward:

(TC5) *X exists* is true in w iff *X* refers in w.

By (TC4) and (TC5), then, conditions for the whole are obtained:

(TC6) (C*) is true in w iff for any w' alternative to w in which X does not refer, there is an alternative w'' to w in which *X* does refer and which is better than w'.

Given truth conditions for both (P1*) and (C*), we are now in a position to seek a plausible premise to bridge the gap between them.

The suppressed premise. The second criterion of adequacy for the reformulated argument is that it be valid. I would now like to discuss the hidden premise and present an informal argument that the reformulation, with the additional premise, is valid. A more formal proof of validity is provided in the appendix, and the last criterion of adequacy is addressed in section III. The proposed premise is, not surprisingly, prescriptive:

(P2*) It ought to be the case that there exist some element of kind K.

To show validity, we must have truth conditions. Those of the sentence contained in (P2*) are fairly obvious:

(TC7) *There exists some element of kind K* is true in w iff the extension of *kind K* in w is nonempty.

Those for the premise as a whole are obtained by applying (TC4) to (TC7):

(TC8) (P2*) is true in w iff for any alternative w' in which *kind K* has an empty extension, there is an alternative w'' to w in which it has a nonempty extension and w'' is better than w'.

Given the truth conditions of the two premises and the conclusion, it is now possible to indicate that the reformulated argument is valid. The proof here, though informal, is precise enough to show how the argument depends on the interplay of its various logical features: predication, existence assertion, and the modalities of necessity and obligation.

Theorem The argument from (P1*) and (P2*) to (C*) is valid.

Proof. Assume (P1*) and (P2*) are true in w and that w' is an alternative to w such that *X* does not refer in w'. But if *X* does not refer in w' and, as (P1*) ensures, the most *K* has in its extension in w' is the referent of *X*, it follows that the extension of *K* in w' is empty. But then by (P2*) there is an alternative w'' to w such that the extension of *K* is nonempty in w'' and w'' is better than w'. Let E be an element in this extension. Then by (P1*) E must

be the referent of *X* in w''. Therefore, there is an alternative w'' of w such that *X exists* is true in w'' and w'' is better than w'. Thus (C*) is true in w. QED.

Though a formal development is genuinely a necessary condition for any theoretical understanding of validity, the informal argument presented above exhibits the essentials and is sufficient to let us turn now to questions of soundness.

III. SOUNDNESS AND SOME LIMITATIONS OF UTILITARIANISM

This section will investigate the contribution of the hidden premise to the preservationist argument and attempt to satisfy the third criterion of adequacy, soundness. I argue first that moral intuitions about the persuasiveness of the argument stand or fall with the truth of (P2*). Secondly, I make an attempt to explain the intuition behind (P2*) and its contribution to the argument as a whole from the point of view of utilitarianism. I argue that in the majority of cases utilitarianism can explain the truth of (P2*) and the derived prescription for preservation, but that there is a special category of cases in which utilitarianism appears to clash with intuition's call for preservation. The section concludes by discussing some attempts to resolve the apparent conflict.

Counterexamples. The first group of cases, which I discuss only briefly, are those in which irreplaceability does not imply preservation. This class includes the examples of smallpox, mosquitoes, and undesirable natural features which, contrary to the naive argument, all seem to be unique but unworthy of preservation. The interesting general feature of these cases is that questions of their preservation all seem to turn upon properties of the object in question. From the perspective of preservation, the uniqueness of smallpox, mosquitoes and pernicious swamps is undermined by their undesireable properties. For these cases (P1*) may well hold, but (P2*) definitely fails. They have no sufficiently desirable properties or, to put it in the terms of (P2*), they do not fall into a kind which ought to be represented by some elements or other. Thus (P2*) makes explicit the fact that the preservation of irreplaceable objects is to be decided on the basis of their merit, on the basis of their relevant properties. Counterexamples to the naive argument are those lacking in this merit.

Independently of its use in explaining counterexamples, it is plausible to think that something like (P2*) is operative if the argument is going to be rational. There should be some reasons for preserving irreplaceable objects, and the properties defining the kinds of (P2*) are these reasons. Thus, general considerations about the nature of rationality, as well as intuition, support the claim that counterexamples to the argument are to be explained by failure of the second premise.

This conclusion is, moreover, supported by a utilitarian analysis of the argument. Utilitarianism in its most abstract form says that obligation is to be judged on the basis of consequences but leaves the *better-than* relation essential to this judgment undefined. It is only in particular versions of the theory that this relation of moral comparison is defined and that particular assessments of obligation are possible. One of the more plausible versions of the theory philosophically and certainly the most common one found in environmental debate is *economic utilitarianism*.

The counterexamples to the naive argument can be explained in terms of economic utilitarianism because for these cases (P2*) can be shown to fail and with it the prescription for preservation. On the economic theory, one world is said to be better than another if, and only if, it possesses more social utility than the other. Utility here is sometimes defined in terms of pleasure or happiness, but in its most plausible form it is identified with the satisfaction of citizen preferences. The actual figure representing a world's social utility has been calculated in various ways. It may or may not include some factor representing satisfaction in its possible subsequent futures, perhaps with factors measuring their probability. These details are familiar enough, and my remarks here will not depend on them.

Regardless of the details of the calculation, however, it seems clear that the utility of possible futures with smallpox, mosquitoes, and noxious swamps is less than that of worlds in which similar classes of these objects, their kinds, have no representatives. The second premise fails and with it the call for preservation. The cases can, therefore, be explained within this moral theory.

From the standpoint of utilitarianism it is also possible to see the importance of the appeal to rationality that (P2*) exemplifies. The utilitarian calculation is based on prediction about future worlds, and this prediction in turn is based on rules and laws. These rules and laws are not *ad hoc* but rather are stated in terms of the properties of objects: objects of this or that kind are likely to affect future satisfaction in this or that way. Utilitarian reasoning thus dictates that it is primarily kinds of objects that are important, and this importance is reflected in the role of (P2*).

Nongenetic cases of preservation. As in the counterexamples just discussed, we should expect that the persuasive cases of the naive argument would likewise be decided on the basis of merit, on the basis of the object's properties. Preservation would then follow because of the truth of (P2*). This expectation is born out by a study of the cases. Intuition verifies that (P2*) is true when preservation seems called for. The chincona tree should be preserved because of its curative properties; it is the only source of quinine. The ozone layer must be protected and Freon spray cans banned because the layer has filtration properties that shield us from radiation. Rubber trees and natural diamonds were very important for their industrial properties and are

now less so due to the discovery of synthetics. These intuitive judgments may be further explained by appeal to utilitarianism and, in particular, by appeal to the economic variety that defines *better-than* in terms of utility. Worlds in which there are some cures for malaria, some high altitude radiation shields, and some materials with the properties of rubber and diamonds have higher social utility than those lacking these things. So powerful and extensive does the utilitarian explanation of preservationist cases seem to be that I would like to discuss four major examples.

(1) *Conservation.* As defined in the tradition of Gifford Pinchot, conservation means the long-term rational exploitation of resources for human consumption. Conservation is nothing more than economic utilitarianism taking the long view. Arguments for preservation grounded in conservation, then, do so by establishing (P2*), and they do so in a utilitarian manner.

(2) *Cost-benefit analyses.* Friends and foes of preservation try to assign dollar values to its consequences. Some such methods are even used in environmental impact statements. But on market theory these dollar values are just indirect measures of social utility. These methods, then, explicitly decide questions of preservation on the basis of both an object's properties and the theory provided by economic utilitarianism.

(3) *Externalities.* A common environmentalist concern is how to preserve natural areas free from various negative externalities like litter, noise, and pollution. *Ex hypothesi,* cost-benefit analyses do not apply in such cases because these evils are not properly priced by the market. Nevertheless, their bad consequences are real, and economic utilitarianism dictates that objects with such properties should not be preserved. It would likewise dictate that poorly priced positive externalities should be preserved.

(4) *Ecology.* A reason frequently given for preserving species and ecosystems is their unique ecological properties. Sometimes these items are held to be valuable because their properties are of scientific interest, but many times their importance lies in the beneficial affects the object has on the human environment. In either case objects with these properties are valuable because of their long-term affect on social utility. Such arguments are properly seen as being consistent with economic utilitarianism.

These four categories represent, I think, a substantial number, probably a good majority, of the intuitively plausible cases of arguments for preservation. As in the intuitively implausible cases discussed earlier, (P2*) appears essential to the justification of preservation, and as before its role is explicable in terms of moral theory in the form of economic utilitarianism. Thus, to a large extent, the third criterion of an adequate reformulation of the naive argument has been met: (P2*) does intuitively separate convincing and unconvincing calls for preservation, and this intuition is theoretically grounded.

I would like now, however, to discuss a variety of problem cases. In these examples intuition says that (P2*) is true and that preservation is required, but neither the truth of (P2*) nor the call for preservation appears explicable in terms of utilitarianism. The cases seem to elude explanation within the moral theory we have chosen.

Genetic cases of preservation. Let me begin by pointing out a tendency within economic utilitarianism to group objects potentially worthy of preservation into broader rather than narrower kinds. At one extreme, the economist could group all objects together that were similar on the grounds that they yield the same utility. From the point of view of social utility such objects would be indistinguishable. Practically speaking, however, such a broad category would be hard to use in economic reasoning. It is very unlikely that it would correspond to a definable scientific property or projectible predicate. Since it is the latter that figure in the predictive laws on which consequences are measured, the economist is forced to narrow his similarity classes so as to coincide as much as possible with scientific categories. These kinds would nevertheless be the broadest possible classes with consequences of like utility definable in scientific terms. Notice that the larger a similarity class the harder it is to make a case for preservation: (P1*) tends to fail.

Contrast this generous notion of similarity with a narrower concept that excludes the very possibility of substitution. These are cases in which the properties relevant to preservation are what I shall call *genetic*, properties defined in terms of an object's history, mode of generation, or cause.

Consider now four varieties of such cases. In each, intuition calls for preservation and does so in terms of genetic properties, which would be cited in (P2*). Furthermore, these properties are so specific that they narrow the relevant similarity class to a set with a single member, the object to be preserved. Some historical and genetic properties define a kind with one member only, and sometimes they are so specific that necessarily only one possible object could possess these properties.

(1) *Art objects.* The physical properties of an art work—its pigments, textures, harmonies, word choice, etc.—are all relevant to its worth, but so in addition are genetic properties. For example, its efficient cause must be an artist; and its period, model, and artistic point are all relevant to its appraisal. Not only are these genetic properties relevant, they preclude any other object having just these properties. The point can be made in terms of forgeries. Even though two works may be indistinguishable in terms of physical properties, a forgery lacks the same value as an original. One is better than the other.

(2) *Keepsakes.* Keepsakes, souvenirs, relics, heirlooms, and objects of historical importance, like the original manuscript of the Declaration of Independence or the Crown of St. Stephen, are irreplaceable, like art

objects, in part because of their history. Moreover, their historical properties are so specific that they admit no substitutes.

(3) *Persons.* Cora Diamond has pointed out that what distinguishes persons and, to some extent, art objects from machines is in part that the former possess historical properties in a way machines do not.[3] Unlike persons, one machine is as good as another with the same physical properties. In Diamond's terminology they are *interchangeable*; in ours they are similar or of the same kind. Persons are by contrast valued uniquely in part for their historical properties. If technology could provide you with an exact physical replica of your best friend, you would not take it.

(4) *Wonders of nature.* Two Yosemite valleys, one built in a year by the bulldozer and the landscape gardener, and the other over eons by the forces of nature are not equivalent. An essential part of what is important about the true Yosemite is its natural genesis. Mark Sagoff makes a similar point about astro-turf and grass.[4] Practical properties notwithstanding, the two are not the same. Likewise, part of the worth of the honeycomb and the nautilus shell is that they are literally works of nature.

These cases establish what I think is relatively uncontroversial, that sometimes preservation of irreplaceable objects is dictated by appeal to their genetic properties. What is less obvious, though, is that these cases are difficult to reconcile with utilitarian theory. They present an obstacle to our goal of explaining all cases of the preservationist argument within a unified moral theory.

Blindness to the past. There is a quite general argument that, in principle, no utilitarian theory can recommend preservation on genetic grounds. This argument is, I think, rather important. It depends on the possible world analysis of utilitarian obligation given in section II, and the fact that this argument can be formulated in terms of that analysis justifies its use. Methodologically, its increased precision in terms of truth conditions bears fruit. Not only does the question of validity turn on such precision, but the possible world framework fleshes out the abstract statement of utilitarianism enough that it is possible to deduce some of its properties in a clear manner.

The argument's thesis, precisely stated, is that no theory which subscribes to the utilitarian analysis of obligation (TC4) can account for the truth of any (P2*) referring to a kind defined in terms of historical properties. For it is clear from these truth conditions that the truth value of (P2*) in a world w are completely independent of facts about worlds earlier than w. Its truth value does depend on other worlds, but these are all later than w. It is feasible to change the history previous to w in any logically possible way

3. Cora Diamond, "The Interchangeability of Machines," in *The Business of Reason*, ed. by J. J. MacIntosh and C. Coval (New York: Humanities Press, 1969).

4. Mark Sagoff, "On Preserving the Natural Environment," *Yale Law Review* 84 (1974): 205-67.

without altering the truth values of (P2*), and thus (P2*) will have the same truth value in any historical sequences which assign the same truth values to sentences at w and every world subsequent to w, but differ on the truth values of sentences in worlds prior to w. Thus, it is impossible to understand the kind term of (P2*) as directing your eyes to the past because the deontic operator which governs it directs your eyes toward the future. A historical property on the other hand would be one whose truth would make a difference about the past. Saying that there ought to be something with such properties would be inconsistent with some previous histories. It follows then that (P2*) cannot on a utilitarian account be read as referring to a kind defined by historical properties.

The point may be made somewhat differently in terms of validity. No preservationist argument with (P2*) taken as referring to historical properties can be valid on the utilitarian analysis of obligation. For let (P2*) be true at w_0 because w_0 is preceded by the sequence of earlier times S = . . .,w_{-1}. But (C*) on the utilitarian account depends on worlds later than w_0. There is no logical reason why the history beginning with S and w_0 could not be completed so as to satisfy both (P1*) and (P2*) at w_0, but falsify (C*) at w_0. Actual cases are easily constructible given the semantics of the appendix.

In addition to these rather transcendental arguments, there are many good examples illustrating the inability of utilitarianism to account for preservationist intuitions connected with genetic properties. Indeed, the preservationist's main foe is usually the economist. Economic utilitarians, armed with cost-benefit analyses and other means of calculation, can evaluate the obligation to represent kinds of the relevant sort only by looking at the consequences of such representation for future utility. There are so many actual cases in which preservationists are battling utilitarians that it would be tedious to list them. The utilitarian counts astro-turf as the equal to grass; he allows roads and motels within the boundaries of national parks; he dams rivers and lumbers forests. In all cases he is unswayed by genetic considerations. I draw attention to the actual cases because it is important to see that there are some examples in which intuition suggests there is a genuine clash between its dictates and those of utilitarianism. The conflict therefore is more than theoretical. But intuitions about cases will not decide the question. The utilitarian may well argue that a fuller understanding of the cases will show they are really consistent with his theory. However, given these intuitions and the earlier general argument, it seems clear that the burden of proof, that such fuller understanding is possible, rests with the utilitarian.

Seeing history indirectly. Even though considerations about the past cannot enter the utilitarian calculation directly, it may be possible to introduce

them indirectly. One plausible attempt at this indirect grounding takes into account the fact that facts about the past are reflected in the truths of the present and the future. It is a matter of contingent fact about the present and the future that people have special attitudes towards objects based on genetic considerations. These attitudes, moreover, have consequences for the future and may serve as a means for justifying utilitarian preservation. People cherish and enjoy objects because of their genetic properties, and the economist, for example, must take these attitudes into consideration in calculating future utility. Preservation may turn out the better policy because, given present attitudes and psychological laws, worlds with preservation have more satisfied populations. An economist dictator would be silly to destroy all heirlooms, not because of any intrinsic worth based on genetic properties, but because of contingent human attachments. Environmental cases might be treated similarly. I restrict myself here to a few observations on this proposal.

(1) *Contingency of preservationist obligation.* Obligation under utilitarianism is generally contingent. One variety of contingency is assumed in the analysis of obligation. Most of the consequences that determine obligation are not logically necessary; they are rather contingent factual matters. But, though they fall short of logical necessity, they are often the results of natural law and have a kind of physical necessity.

Grounding judgments of preservation on human attitudes introduces an additional element of contingency. Human attitudes as facts about the present may well not be determined by physical necessity. The question I would like to pose is whether this claim that obligation is contingent, as suggested by the theory, conforms to moral intuition. Interestingly, I think the answer is yes.

Certainly, some obligations seem independent of the contingent state of human attitudes. Wanton murder would not become moral if people condoned it. Such cases may even pose problems for utilitarianism, and some of these cases may be viewed as issues of preservation. Murder is a decision not to preserve a person. In a similar way it may turn out that the morality of preserving some art works is independent of human attitudes.

In most cases, though, environmental preservation does seem contingent on attitudes. If people did not now and in the future care about Yosemite Valley, arguments for its preservation based on genetic properties would not seem to carry any force. If nobody cared, intuition says, it would be perfectly moral, all else equal, to dam it up or plow it under. A similar datum is the intuitive inanity of a totally secret wilderness park, known to no one, ever, which has no favorable affect on the future. Likewise, it seems perfectly moral to discard keepsakes of the dead. Concern for history and genetic properties, at least for cases of natural objects and keepsakes, seems dependent for its force on human attitudes. To some extent, then, the

indirect method of justifying preservation is plausible.

(2) *Possibility of deception*. "Do not destroy things if the destruction hurts peoples feelings." Such is the utilitarian's indirect reasoning. But current attitudes may be served equally well by deception as by genuine regard for objects with genetic properties. What must be preserved is not so much the objects themselves as the beliefs that the objects continue to exist, and these beliefs may well be maintained by many different means, including deception, that fall short of genuine respect for the past. Such disregard, however, is intuitively unacceptable even in cases in which beliefs remain unaltered. Consider this case: secretly prowling through your personal affects, I come across one of your most prized possessions, the first dollar you ever earned. Being curious, I compare it with a dollar bill from my wallet, and being mischievous, I consider the idea of switching my bill for yours. Let's suppose there is no possibility you could detect the substitution. Making the switch could not, then, affect your attitudes. I nevertheless find myself in a moral dilemma. Respect for history and truth tells me it would be wrong to switch, and the reason it is wrong is not explained in this case by appeal to attitudes of humans. Even if I were a clever dog, the world would be marred by my making the switch. Thus, the past does seem to have value in addition to that derivative from attitudes. I have argued above that preservation is contingent on people caring. What we see here is that serving people's feelings is sometimes not enough. Sometimes genuine genetic properties dictate preservation when considerations of attitudes alone would not. I do not want to claim that the utilitarian could not further elaborate his theory in some, so far unenvisioned way so as to account for these cases. We can however conclude that the theory does need further elaboration. The value of truth and history, like that of justice, is *prima facie* independent of consequences. The discussion here, then, may be viewed as merely pointing out that issues of preservation again raise some of the traditional problems of utilitarianism. The traditional answers to these problems may well be adapted to cases of preservation.

(3) *Unpopularity of preservation*. There is, I think, some empirical evidence that, indirect grounding in attitudes notwithstanding, economic utilitarianism does not conform to preservationist intuitions. It is not inaccurate to view some of our social decision mechanisms, especially ones concerned with the use of wilderness areas, as determined by a crudely utilitarian method. At least in some of these cases, market mechanisms, votes, and lobbying do appear to add up to a democratic decision reflecting social utility. Nevertheless, the social decision seems to come out against preservationists. On utilitarian grounds, motor boats are allowed on lakes, and roads in parks, because in fact these alternatives seem to give more economic satisfaction of preferences. The explanation seems to be that the

utility derived from serving the attitudes of those favoring preservation is an insignificant part of total utility. The kicks people get out of the wilderness experience is now, and is likely to remain, a small part of total utility. Thus, as a matter of fact, the attempt to ground preservationist intuitions in attitudes will not yield the desired result: utilitarians do not thereby conform to the intuitive judgment that genetic properties can dictate preservation.

Conclusions. I have argued that (P2*) intuitively determines the persuasiveness of preservationist cases, and that in large measure the role of (P2*) in doing so is explicable within the moral theory of utilitarianism. At the conclusion of the discussion, however, there still seemed to be some cases in which preservation is dictated by (P2*) but which escape utilitarian explanation. We face a dilemma. One conclusion might be that utilitarianism as it stands is wrong. Then, this study has fallen short of its goal to fully explicate the preservationist argument, because some intuitively acceptable cases are yet unexplained by moral theory. Alternatively, we could conclude that intuitions uninformed by theory are unconvincing, and that therefore it is the intuitions, not the theory, which should be abandoned. But then moral theory is denying some of the data to be explained. Such a dismissal would only be reasonable provisionally.

Common to either conclusion is the fact that the vast majority of preservationist cases can be explained by a version of utilitarianism. Given that the major foes of preservation are utilitarians, this conclusion is surprising. It looks as if the foes may be defeated by turning their own theory against them and using it more carefully. Both alternatives imply that there is more work to be done. Moral theory, either within or without utilitarianism, needs to be developed to account for preservation justified by what I have called genetic properties. A nonutilitarian theory would have the additional task of explaining all those nongenetic cases that utilitarianism can already handle.

APPENDIX

In this section a minimal language L will be defined with a syntax capable of formulating the preservationist argument and a semantics meeting the intuitive requirements of section II. The semantics will validate the reformulated argument and do so by conforming to (R1)—(R3) and (TC1)—TC8). No attempt will be made to impose further structure on semantic concepts so as to validate the usual theorems of modal, deontic, tense, or free logic which are irrelevant to the preservationist argument. The semantics defined will be sufficient to show the preservationist argument to be valid.

The syntax of L is that of a rather simple first-order language

supplemented to include operators $\Box$ for necessity and 0 for obligation. There are a denumerable number of *variables* $v_1, \ldots, v_n, \ldots$ and two binary *predicates* $\equiv$ and $=$. If P is a predicate and v_i and v_j are variables, let Pv_iv_j be an *atomic formula*. The set of *formulas* is the least set such that atomic formulas are formulas and if p and q are formulas and v is a variable, then $\sim p$, $(p \rightarrow q)$, $(\forall v)p$, $\Box p$, and $0p$ are formulas. The basic semantic idea of L is that of a *temporal structure* defined as any $H = \langle T, U_O, U_I, D, R, B \rangle$ such that

(1) T is a nonempty set of elements called *times*;
(2) U_O and U_I are functions that assign to each t in T nonempty sets such that $U_I(t)$, the *inner domain* of t, is a subset of $U_O(t)$, the *outer domain* of t;
(3) D is a function that assigns to each t in T an integer called its *date*, R is a function that assigns to each t in T a subset of T, containing *alternatives* to t, and for any t' in R(t), $D(t') = D(t) + 1$;
(4) B is a binary relation on T called the *better-than* relation.

An *interpretation in a temporal structure H* is defined as any function I that assigns values to variables, predicates and formulas relative to times t in T of H as follows:

(1) for any variable v, $I_t(v)$ is in $U_O(t)$;
(2) $I_t(=)$ is the identity relation on $U_O(t)$, and $I_t(\equiv)$ is a binary relation on $U_O(t)$;
(3) for any formula p, $I_t(p)$ is either 1 or 0 as follows:
  (a) if p is $\sim q$, then $I_t(p) = 1$ iff $I_t(q) = 0$;
  (b) if p is $(q \rightarrow r)$, then $I_t(p) = 1$ iff $I_t(q) = 0$ or $I_t(r) = 1$;
  (c) if p is $(\forall v)q$, then $I_t(p) = 1$ iff, for any v-variant I' of I in t, $I'_t(q) = 1$;
  (d) if p is $\Box q$, then $I_t(p) = 1$ iff, for all t' in R(t), $I_{t'}(q) = 1$;
  (e) if p is $0q$, then $I_t(p) = 1$ iff, for all t' in R(t) such that $I_{t'}(\sim q) = 1$, there exists some t'' in R(t) such that t'' bear B to t' and $I_{t''}(q) = 1$.

In the above definition, to say I' is a *v-variant of I in t* means (1) I' is an interpretation in temporal structure H and (2) if e is either a predicate or a variable v' other than v such that $I_t(v')$ is in $U_I(t)$, then $I_t(e) = I'_t(e)$. The other truth-functional connectives and the existential quantifier are introduced as follows. Let p(v) mean a formula p with a variable v not contained in any part $(\forall v)q$ of p. Then define $v \in \{v' : p(v')\}$ as p(v); define $[v]$ as $\{v' : v' \equiv v\}$; define $\{v\}$ as $\{v' : v' = v\}$; and where $\leftrightarrow$ is the truth-functional biconditional define $\{v : p(v)\} = \{v' : q(v')\}$ as $(\forall v)(p(v) \leftrightarrow q(v))$. There are two concepts of implication. Let X be a set of formulas. Then, X *implies* p *relative to H* iff, for any interpretation I in temporal structure H and any t in T of H, $I_t(q) = 1$ for all q in X only if $I_t(p) = 1$. Finally, X *logically implies* p iff for all temporal structures H, X implies p relative to H. It follows

directly from the definitions that the preservationist argument is valid: the set containing $\Box[v] = |v|$ and $0(Ev')$ $(v' \epsilon [v])$ logically implies $0(Ev')$ $(v' = v)$.