

# Valuing Species and Valuing Individuals

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My goal in this paper is to account for the value of species in terms of the value of individual organisms that make them up. Many authors have pointed to an apparent conflict between a species preservationist ethic and moral theories that place value on individuals. I argue for an account of the worth of individual organisms grounded in the representational goals of those organisms. I claim that this account leads to an acceptably extensive species preservationist ethic.

## INTRODUCTION

The black stilt living on the South Island of New Zealand is in danger of extinction. Introduced predators and habitat destruction have reduced its total population to eighty individuals.<sup>1</sup> Why would the loss of this species be a bad thing? Philosophers are familiar with two ways of assigning value to the environment. Anthropocentric reasons for valuing nature are focused on the interests of human beings. These interests can be nakedly instrumental. Preservation of species may serve human ends more effectively than their destruction for economic gain. The patchwork of species largely constitutes the environment for which nature has designed us. Small changes can lead to big changes affecting in unpredictable ways the good functioning of the many systems that make up our bodies.<sup>2</sup> In addition, noninstrumental reasons such as those that point to the aesthetic value of species fall into this anthropocentric category. Nonanthropocentrists give quite different reasons for preserving species. In their view, species are intrinsically valuable, or valuable regardless of any use or benefit that they might bring to human beings. Perhaps the boldest move is to attach moral significance holistically to species. According to some ways of telling this story, a species has morally considerable interests in virtue of a tendency to maintain its structure in the face of an array of external threats.

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<sup>1</sup> See Carolyn King, *Immigrant Killers: Introduced Predators and the Conservation of Birds in New Zealand* (Auckland: Oxford University Press, 1984), pp. 141–42, and Peter Gaze, *Rare and Endangered New Zealand Birds: Conservation and Management* (Christchurch: Canterbury University Press, 1994), pp. 43–47, for a fuller account of the threats faced by the black stilt.

<sup>2</sup> Anthony McMichael, *Planetary Overload: Global Environmental Change and the Health of the Human Species* (New York: Cambridge University Press, 1993), is an interesting discussion of the impact of environmental derangement on human health.

A big problem with this approach is the tenuous grip that our traditional moral concepts seem to have on groups or collections. We are accustomed to using established moral frameworks dealing with individuals.<sup>3</sup>

My aim in this paper is to explore a connection between a nonanthropocentric species preservationist ethic and claims about the moral status of individual organisms. On the face of it, such a relationship does not seem to be a promising place to look for a way of valuing species. As I show, however, the best extant accounts of the value of individual organisms pull in different directions from an ethic grounded in respect for species. I argue that despite appearances, an acceptably extensive nonanthropocentric species preservationist ethic does emerge from the right kind of concern for individual organisms.

### DIFFERENT INDIVIDUALISMS

Many people believe that individual human beings are intrinsically valuable. Properties such as self-consciousness and the capacity for belief and desire are commonly thought to be among those that underwrite this intrinsic value. The quest for a nonanthropocentric environmental ethic is a search for properties that could ground intrinsic value in nature. Perhaps the most straightforward extension of familiar ethical positions is to assign intrinsic value to nonhuman individuals. Peter Singer and Tom Regan offer probably the best-known arguments for this kind of position.<sup>4</sup> They claim that many of the same properties that are worthy of respect in humans underwrite the value of many animals. Singer points to capacities, widely considered to be morally significant in humans, that are also possessed by many animals. His utilitarianism requires that we extend consideration beyond humans to all beings capable of sentience or self-consciousness. For Regan, animals that have the capacity for belief and desire, are self-conscious, and are able to have goals regarding the future—a group includes all mentally normal mammals of one year or older—are subjects-of-a-life and have rights protecting them from harm.

One problem for species preservationism is immediately clear. Because Singer and Regan's individualisms cover a tiny fraction of living things, any move from the value of individuals to the value of species in terms of their views only covers a relatively small number of species. Individuals belonging

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<sup>3</sup> For a recent attempt, see Lawrence Johnson, *A Morally Deep World: An Essay on Moral Significance and Environmental Ethics* (Cambridge: Cambridge University Press, 1993). For criticisms of holism, see Bryan G. Norton, *Why Preserve Natural Variety?* (Princeton: Princeton University Press, 1987), chap. 9, and Janna Thompson, "A Refutation of Environmental Ethics," *Environmental Ethics* 12 (1990): 147–60.

<sup>4</sup> See Peter Singer, *Animal Liberation* (London: Granada, 1977); "Not for Humans Only: The Place of Non-Humans in Environmental Issues," in K. E. Goodpaster and K. M. Sayre, eds., *Ethics and Problems of the 21st Century* (Notre Dame: University of Notre Dame Press, 1979), and *Practical Ethics*, 2d ed. (Cambridge: Cambridge University Press, 1993), and Tom Regan, *The Case for Animal Rights* (Berkeley: University of California Press, 1983).

to many species that preoccupy species preservationists—such as coral organisms and kauri trees—do not qualify for respect.<sup>5</sup> Paul Taylor tries to remedy this problem by including a much wider range of individuals in the class of the morally considerable than the sentient and the self-conscious.<sup>6</sup> According to Taylor, all living things are inherently valuable.<sup>7</sup> The first step in his argument is the claim that all living beings have goods of their own. He writes:

Even when we consider such simple organisms as one-celled protozoa, it certainly makes perfectly good sense . . . to speak of what benefits or harms them, what environmental changes are to their advantage or disadvantage, and what physical circumstances are favorable or unfavorable to them.<sup>8</sup>

Fire is something that harms protozoa, and therefore acts against their good. With the idea of individual good established, Taylor goes on to push for the adoption of the biocentric outlook, part and parcel of which is the dislodgment of sentient beings from positions of moral superiority over the rest of nature. This outlook provides the basis for the recognition that all beings that have goods of their own—or all living beings—have inherent worth.

For Taylor, the boundary between the living and the nonliving rather than the boundary between the sentient and nonsentient separates the morally considerable from the morally inconsiderable. There may, however, be a cost in broadening the individualistic base. Thompson, for example, wonders whether there is any natural stopping point once the familiar moral boundary is moved.<sup>9</sup> The fact that rocks, rivers, volcanoes, and molecules do not have the properties associated with life may not make them less valuable. Indeed, rocks and rivers might be able to be understood as having goods in a Taylor-like sense. A rock tends to maintain its structural integrity and certain interactions with its environment act against this integrity or “harm” it. Taylor needs to respond to Thompson by finding grounds for limiting inherent worth to biological objects—thereby, separating a barnacle’s good from that of a radium atom.

Gary Varner has addressed the problem of the apparent arbitrariness of assignments of interests to nonsentient beings.<sup>10</sup> He argues that this arbitrariness

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<sup>5</sup> Norton, *Why Preserve Natural Variety*, p. 160, makes the same point.

<sup>6</sup> Paul Taylor, *Respect for Nature: A Theory of Environmental Ethics* (Princeton: Princeton University Press, 1986).

<sup>7</sup> Taylor differentiates inherent worth from intrinsic value. He gives intrinsic value an anthropocentric reading. Roughly, an object is intrinsically valuable if it is valued by a human valuer for itself. An object possesses the properly nonanthropocentric inherent worth by virtue of having a good of its own. Taylor’s *inherent* should be seen as interchangeable with my *intrinsic*. For detail on this distinction, see Paul Taylor, “Are Humans Superior to Animals and Plants?” *Environmental Ethics* 6 (1984): 149–60.

<sup>8</sup> Taylor, *Respect for Nature*, p. 66.

<sup>9</sup> Thompson, “A Refutation of Environmental Ethics,” p. 150.

<sup>10</sup> Gary Varner, “Biological Functions and Biological Interests,” *Southern Journal of Philosophy* 27 (1990): 251–70.

ness can be removed by an appropriately biologized notion of interests. According to this notion, interests are possessed by a being by virtue of that fact that it has subsystems with biological functions. Here biological function is analyzed in terms of natural selective history.<sup>11</sup> To take an example of Varner's, cow mammary glands have the function of producing milk for calves rather than having some other function—such as the boosting of dairy farmers' profits—because the glands have been selected to permit the nourishment of calves.<sup>12</sup> Their current existence depends on the fact that past copies have had this historical function, not on the fact that they make farmers rich. Varner argues that this selection history permits the assignment of determinate interests. Activity that impedes the function of the subsystems of an individual acts against the interests of that individual. This approach provides a way around one set of Thompson's problem cases. Rocks, unlike nonsentient living individuals, clearly do not possess interests understood in Varner's sense because they do not have selection histories. It is not the case that a particular groove on a rock exists now because of the effects of similar grooves on earlier copies of the rock.<sup>13</sup>

Varner's move may also help Taylor to deal with another objection raised by Thompson. Parts of organisms—kidneys, lungs, and hearts—have their own goods which certain types of environmental damage can act against. Does every part of any living thing therefore have inherent value? The normal response is that these interests exist only in the context of the organism. For example, the selectionally determined function of the kidney is to purify blood *for its possessor*. This answer, however, does not impress Thompson. She draws an analogy between the relationship that the good of a kidney bears to its possessor's good, on the one hand, and the relationship that the good of a wood-boring insect bears to the good of the tree in which it is found, on the other hand. The good of the kidney

. . . can be determined independently to the same extent that the good of a wood-boring insect can be determined independently of the good of the tree it feeds on. . . . Kidneys, like insects, . . . need certain kinds of nourishment; they are healthy under some conditions and are caused harms by others. These conditions can be specified without mentioning the organism in which the organs reside.<sup>14</sup>

<sup>11</sup> See Ruth Millikan, "In Defence of Proper Functions," *Philosophy of Science* 56 (1989): 288–302, and Karen Neander, "Functions as Selected Effects: the Conceptual Analyst's Defence," *Philosophy of Science* 58 (1991): 168–84, for accounts of the etiological, or selectional, theory of biological function.

<sup>12</sup> Varner, "Biological Functions and Biological Interests," p. 259.

<sup>13</sup> We have seen that the biofunctional analysis of interests might help us with nonsentient beings. Varner also argues that the account has important implications for human beings. Although it may not be the full story, he claims that any statement of a human's interests is incomplete without information about the bio-functions of subsystems making up that human's body. See Varner, "Biological Functions and Biological Interests," pp. 265–67.

<sup>14</sup> Thompson, "A Refutation of Environmental Ethics," p. 153.

Attention to the historical dependencies at the heart of the selectional theory of function allows us to see a key difference in the ways kidneys and wood-borers relate to organisms that house them. In both cases, we can, as Thompson insists, give a statement of good or function that makes no reference to the good of any surrounding organism. Even though the selectional theory permits a narrower statement of my kidney's good independent of my good, it also validates specification in terms of my good. In saying that kidneys have been selected to pump blood, we make no direct reference to the good of any individual organism. We can go on to ask another question, however. Why does blood purification occur—or what is *its* selected function? An expanded selectional account, in the end, makes reference to enhanced survival and reproductive prospects of human bearers. This expanded account provides the link between kidneys, blood purification, and enhanced fitness. No such expanded account is possible for the wood-borer. Its current existence does not depend on past wood-borers having produced some benefit for past trees. Indeed, wood-borers have not boosted the fitness of the historical trees that they have infested. As a result, on no expansion of the selectional account does the function of any current wood-borer contribute to the good of any tree.

Finally, I want briefly to point to one other difficulty for my amalgam of Taylor and Varner. A selectional theory of function is a dubious fallback position if a widely supported view of natural selection turns out to be true. I have argued that the selectional theory of function can establish a link between an organism and the good of some other entity. I have taken the orthodox Darwinian view and assumed that the entity is the individual organism. This position, however, has come under fire over the past twenty years. According to G. C. Williams, Richard Dawkins, and others, natural selection, the principle organizing force in the biological world, operates on genes.<sup>15</sup> For genic selectionists, evolution by natural selection is most fundamentally a story about directed changes over time to the constitution of the global gene pool. In accordance with this story, the function of each chunk of phenotype is ultimately the enhancement of the replication prospects of the underlying DNA. This account has unwelcome consequences for the position discussed above. If genes are the targets of selection, then the preservation of genes is the most fundamental function or purpose of natural things and an ethic grounded in the maintenance of biological goods, or protection of biological interests, must be focused on genes rather than on individual organisms. It would be a Siberian tiger's DNA rather than the tiger itself that is worthy of respect.

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<sup>15</sup> For defenses of genic selectionism, see G. C. Williams, *Adaptation and Natural Selection* (Princeton: Princeton University Press, 1966) and Richard Dawkins, *The Extended Phenotype* (Oxford: Oxford University Press, 1989).

## A POSSIBLE CONNECTION BETWEEN INDIVIDUALISM AND SPECIES PRESERVATIONISM

Even assuming that the above stories all provide adequate accounts of the worth of individual organisms and that Taylor's account, in particular, covers an appropriate range of organisms, there are still problems for the individualistic species preservationist. In this section, I outline the reasons that many have given for thinking that it is unlikely that the right kind of connection can exist between a preservationist ethic and any kind of individualism.

According to Elliot Sober, differences between animal liberationists, whom I have called individualists, and species preservationists emerge over the " $n + m$  question." Sober considers possible threats to the members of the species of blue and sperm whales. For one type of animal liberationist, what matters is the level of sentience of blue and sperm whales. By contrast, for the species preservationist

. . . [a] holistic property—membership in an endangered species—makes all the difference in the world: a world with  $n$  sperm and  $m$  blue whales is far better than a world with  $n + m$  sperm whales and 0 blue whales. Here we have a stark contrast between an ethic in which it is the life situation of individuals that matters, and an ethic in which the stability and diversity of populations of individuals are what matter.<sup>16</sup>

Individualistic theories are stated in terms of properties that an organism possesses regardless of membership in any group. By contrast, for species preservationists, an organism is more or less important depending on which group it belongs to. Is its species endangered or not? Certain situations bring the tension between the two positions to the surface. In order to save the black stilt, the feral cats, rats, and ferrets of the Mackenzie Basin in Canterbury may have to be trapped and killed. For Taylor, we have a choice between ignoring the good of their own of individual stilts or actively interfering with the goods of their own of presumably equally valuable cats, rats, and ferrets. Matters are worse for Singer and Regan. Cats, rats, and ferrets, because they are more cognitively complex than stilts, are very likely more intrinsically valuable. This problem is exacerbated when we consider attempts to save the weta, a scarcely sentient insect, from mammalian predators.

In such kinds of cases, individualists seem to give the wrong answer when deciding on a course of action that may affect individuals of two different species. They also run into trouble when focusing on the members of just one species. Saving the species of black stilts is not the same as protecting all of the

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<sup>16</sup> Elliot Sober, "Philosophical Problems for Environmentalism" in Bryan G. Norton, ed., *The Preservation of Species* (Princeton: Princeton University Press, 1986), p. 175.

current individuals from suffering. Removing each stilt from its predator-filled natural habitat and providing it with a safe, food-rich environment in which it could not mate would arguably, in Singer's and Regan's or Taylor's terms, benefit each individual, while exterminating the species. On the other hand, the cost of pain or harm that individuals might suffer in a successful captive-breeding program would be a price worth paying for the species preservationist.

Preservationist concerns seem equally out place when dealing with questions about individual value. The species membership of a gorilla makes no difference to the pain it feels in a medical research laboratory. A butterfly possesses the same good in terms of the biological functions of its parts, whether or not it belongs to the last breeding pair of its species.

Sober despairs of the resolution of the "deep theoretical divide" between individualism and species preservationism. He is far from alone. As part of his wide-ranging discussion of species preservationist ethics, Bryan Norton proposes for reasons similar to those above that "it would appear that all theories that generate the intrinsic value of species from the intrinsic value placed on individuals can be eliminated from serious consideration as a support for species preservation."<sup>17</sup>

This conclusion has not been challenged by the individualists. Varner doubts that "an adequate environmental ethic" can emerge out of an account of interests derived from the selectional theory of function because species and ecosystems, which would need to figure prominently in such an ethic, do not have component systems with appropriate selection histories.<sup>18</sup> Regan holds that the rights view often counts against endangered species. He applies his rights view to the following test case:

If, in a prevention situation, we had to choose between saving the last two members of an endangered species or saving another individual who belonged to a species that was plentiful but whose death would be a greater *prima facie* harm to that individual than the harm that death would be to the two, then the rights view requires that we save the individual.<sup>19</sup>

Singer, likewise, is skeptical about prospects for a species preservationist ethic that assigns value independently of the interests of sentient individuals. He writes that

. . . unless or until better grounds are advanced, the only reasons for being more concerned about interests of animals from endangered species than about other

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<sup>17</sup> Norton, *Why Preserve Natural Variety*, p. 168.

<sup>18</sup> Varner, "Biological Functions and Biological Interests," pp. 267–68.

<sup>19</sup> Regan, *The Case for Animal Rights*, p. 359.

animals are those which relate the preservation of species to benefits for humans and other animals.<sup>20</sup>

From the standpoint of the individualists, concern focused on the properties that the individual possesses in isolation from a group seems bound to pull in a different direction from concern for the properties that are held only by virtue of belonging to a special kind of group.

### INDIVIDUALS AND REPRESENTATIONAL GOALS

I believe that individualism has more resources than the above discussion indicates. In this section, I sketch an alternative individualist position. I argue for the moral significance of a property of individual organisms that differs from those that hold center stage in the theories discussed above. I defend moral significance in roughly the same way that Singer and Regan do—on the grounds that it might plausibly make up a large part of a story about what makes humans intrinsically valuable. The first part of my argument focuses on the fitness of this property to play a central role in a moral theory. I then argue that a species preservationist ethic follows from it.

Many organisms are intrinsically valuable because they represent the world and produce behavior appropriate to those representations. This claim should not sound surprising. In human beings, beliefs and desires are representations central to the explanation of behavior. The close relationship between moral considerability and the possession of intentional states is associated with the central role that belief and desire occupy in the folk understanding of the mind. The story about the direction of behavior by internal states does not end with belief and desire, however, for representation-grounded behavior clearly extends beyond humans.

Consider the moral significance of a very liberal conception of representation and behavior developed by Fred Dretske.<sup>21</sup> An important goal of any such analysis is to distinguish mere environment-directed movement from representation-directed behavior. Dretske focuses on internal structural complexity. He holds that representation-directed behavior requires “enough structural complexity and internal articulation to make the internal-external difference reasonably clear and well motivated.”<sup>22</sup> A simple virus fails Dretske’s test because in describing it over a period of time we need only to talk about externally produced change. Clearly, there are environments in which a virus manages to replicate and those in which replication is impossible. However,

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<sup>20</sup> Singer, “Not for Humans Only,” p. 203.

<sup>21</sup> Fred Dretske, *Explaining Behaviour: Reasons in a World of Causes* (Cambridge: MIT Press, 1988).

<sup>22</sup> Dretske, *Explaining Behaviour*, p. 11. Dretske provides much useful discussion of what kind of internal structural complexity is required for behavior.

there is no interesting sense in which input is received from the environment, processed by internal states of the virus, and transformed in some way to produce behavior appropriate to that environment. Specialized internal structural complexity is central to behavior because it enables an organism to select appropriate movements for given environments.

The much discussed magnetotactic bacterium is an example of a fairly unsophisticated organism that can meet Dretske's test. This tiny organism prefers an environment of relatively oxygen-poor water. To ensure that it finds this environment, those bacteria living in the Northern Hemisphere possess magnets that direct them in a northerly direction and downwards, taking them away from oxygen-rich water.<sup>23</sup> They achieve this goal because the magnet has the right kinds of sensitivities to environmental properties and is appropriately connected to movement-causing mechanisms. Similarly, certain plants time their flowering to coincide with spring. They are able to do so presumably because they have an internal state that is sensitive to the first burst of warm weather that accompanies spring.<sup>24</sup>

Once we have isolated organisms with the right kind of internal complexity to qualify as behavior-capable entities, is there a systematic way that we can go about sorting out which movements of theirs count as behavior? I offer a quick analysis which appeals to a naturalized teleology and is designed to work for organisms that are representationally less sophisticated than humans.<sup>25</sup> My analysis is useful for understanding the behavior of individuals that make up endangered species. From it, I extract an account of a cognitively simple organism's representational goals or preferences with regard to its environment.

The internal states of many cognitively simple organisms are the targeted results of natural selection.<sup>26</sup> Examining the selection history of an internal structure helps us understand how such structure counts as a director of behavior and what behavior it produces. Genes that code for the representation have been selected for their production of a structure that causes a certain kind of behavior in response to a fairly specific range of stimuli. They are selected because this behavior tends to raise the inclusive fitness of its possessor.<sup>27</sup> When an internal state causes a movement, or lack of movement, that is similar

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<sup>23</sup> See Stephen Gould, *The Panda's Thumb* (London: Penguin, 1987), essay no 30.

<sup>24</sup> Dretske, *Explaining Behaviour*, p. 90.

<sup>25</sup> There is more than one way in which we might account for the behavior of simple organisms. The teleological solution I outline is not Dretske's. His informational theory is defended in Dretske, *Explaining Behaviour*.

<sup>26</sup> Elliot Sober, *The Nature of Selection* (Cambridge: MIT Press, 1984), pp. 97–103, distinguishes between properties of organisms that are targets of selection and those that are mere effects.

<sup>27</sup> Inclusive fitness is a measure of fitness which includes an organism's relatives to the degree which they are related. See Dawkins, *The Extended Phenotype*, chap. 10, for discussion of notions of fitness.

enough to a movement or lack of movement by which earlier copies of the state boosted the inclusive fitness of an organism's ancestors, the result is behavior. In accordance with this teleological conception of behavior, we count a frog's tongue snap response to small, dark, fly-like objects passing through its visual field as behavior because the neural causes have been selected to produce fly catching. The sequence of movements boosted the inclusive fitness of ancestors by helping them acquire nourishment. A blow to the frog's head may initiate a causal chain passing through some of the same states that normally give rise to fly catching. However, because neural states caused by such a blow have not boosted the inclusive fitness of ancestor frogs, we do not consider movement resulting from the blow, for example, falling over, to be directed behavior of the frog.

Slightly more representationally sophisticated organisms produce variable behaviors to deal with inconstant, yet ecologically salient properties. Some fairly constrained learning may have to take place in order for the right behavior to be matched with an appropriate property. In such a case, it would be consistent with the teleological approach to say that representations and movements learned by cognitive machinery in a fashion that boosted the inclusive fitness of ancestor organisms count as behavior. Causal chains which pass through internal states and produce movement, but are not covered by either of the above conditions, in contrast, are mere externally produced movement.<sup>28</sup> This straightforward approach can work for simpler organisms even though it might not work for humans, because, in the case of nonhuman organisms, we do not have to deal with the capacity for significant novelty or the confusing influences of culture on cognitive structure.<sup>29</sup>

In terms of these considerations, it is possible to reconstruct the idea of a cognitively simple organism's "preference" or *representational goal*.<sup>30</sup> A representation is designed to produce a certain behavior in response to certain stimuli. This selected behavior tends to change the organism's environment in a certain way. A food-directed representation, under normal<sup>31</sup> conditions, changes the environment so that the food is inside, rather than outside, the organism's stomach. The biologically normal resultant state of affairs is the aim or representational goal of the organism that possesses the relevantly stimulated representation even if the goal state is not explicitly represented. In terms of this conception, trees and magnetotactic bacteria both have represen-

<sup>28</sup> See Nicholas Agar, "What does the Frog Really Believe?" *Australasian Journal of Philosophy* 71 (1993): 1–12, for a particular way of telling the natural selective story.

<sup>29</sup> Philip Kitcher, *Vaulting Ambition: Sociobiology and the Quest for Human Nature* (Cambridge: MIT Press, 1985), distinguishes between the excesses of human sociobiology and cautiousness of non human sociobiology.

<sup>30</sup> Because of such authors as Singer, the term *preference* has come to have strong associations with consciousness. In contrast, I use the term as a synonym for "representational goal."

<sup>31</sup> *Normal* here should not be understood statistically. Rather, it refers to conditions under which a given structure was selected. See Millikan, "In Defence of Proper Functions."

tational goals. They have internal states that bring about certain changes in the environment on receipt of certain information. Cognitively more complex organisms have structures sensitive to a wider range of environmental properties. This complexity gives them a greater range of representational goals. The difference between organisms that have limited representational sensitivities and those whose representations respond systematically to very many properties plays an important role later in this discussion.

It might seem that I am vulnerable to the same objection that I leveled against Taylor and Varner above: that in selectionally describing representations I end up privileging genes over organisms. This criticism, however, does not apply because of the role the biofunctional account plays in my position. I use Dretske's nonhistorical account to separate morally considerable systems capable of producing behavior from those that cannot. The teleological story plays a subsidiary role. It is my best guess as to how to begin filling in the content of the representational causes of this behavior and thereby getting a determinate picture of the interests of an organism. In this way, we learn what kind of treatment is appropriate toward those organisms that we have already determined are, in some way, morally considerable.

Some may see a problem with assigning moral significance on the basis of the possession of internal states that are the targeted results of natural selection. They may claim that these structures serve nature's goals rather than the organism's. To be sure, talk of "nature's goals" is highly metaphorical, but it is, nevertheless, useful language that can be used to express a representation's dependence on earlier copies of that representation which boosted the inclusive fitness of their possessors in a specific way. This kind of historical explanation can certainly coexist with an explanation tracing behavior to current aims or goals of the organism; the truth of a selectional explanation does not prevent the representation from allowing its possessor a degree of *current* independence from its environment. Evolutionary psychologists claim that human representations are, in large part, also explainable either directly in terms of natural selective history or as products of naturally selected structures.<sup>32</sup> These claims should not be seen as a threat to positions attributing moral significance to the guiding role of very sophisticated internal structures because the structures in question still accord their present-day human possessors a high degree of independence, or at least distance, from the blind forces of the environment.

It might seem that the notion of internal direction of behavior stands at a significant disadvantage to "self-consciousness" and "sentience" as an anchor for a moral theory. It is less familiar. Our well-worn moral concepts appear to

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<sup>32</sup> See the articles in J. Barkow, L. Cosmides, and J. Tooby, eds., *The Adapted Mind: Evolutionary Psychology and the Generation of Culture* (New York: Oxford University Press, 1992).

bear a closer affinity to "self-consciousness" and "sentience" than to a notion of representation and behavior which applies to both trees and bacteria. As a result, distinctions argued in terms of internal direction of behavior may receive less intuitive support than distinctions made in terms of more familiar concepts.

Even so, I think that this new concept has certain advantages. In particular, it picks out something which a little intuition massaging can reveal is of clear moral significance. Entities that are not covered by the definition have no plans or goals with regard to their environments. Things happen to them; they do not originate behavior. If you throw a stone into the sea or remove a virus from a person's gut, there is no interesting sense in which you disrupt behavior or stand in the way of the achievement of some representational goal. To repeat, representations funnel causal influences of the environment in a way that accords their possessors a manner of autonomy from the environment. Because of the internal sophistication of a magnetotactic bacterium, scooping it out of its aquatic environment threatens a representational goal.

If a concept grounded in representational complexity were to supplant more familiar notions, the natural sciences might play a greater role in environmental ethics. Such concepts as "rationality" and "language user" have their clearest application in terms of human behavior. It is unclear how broadly they apply across the nonhuman living world.<sup>33</sup> By contrast, the notion I have outlined has clear application throughout the nonhuman living world and the fertile sciences of neurobiology, ethology, and neuroethology among others, and promises to give us the information that we require about the complexity and environmental sensitivities of the internal structures of a range of organisms to apply this notion in moral philosophy.<sup>34</sup>

For the reasons listed above, I identify an organism's interests with the satisfaction of its representational goals: an organism's behavior is directed toward the satisfaction of its representational goals. When we assign a set of interests that is not appropriately sensitive to these goals, we impose on the organism a set of priorities in all likelihood determined by a human preference hierarchy. For example, the avoidance of suffering is a significant goal for humans. Consequently, it rates very highly in moral theorizing about humans. However, the avoidance of suffering matters to a nonhuman organism only if it figures as a representational goal of that organism. Because pain is an indicator of bodily damage, we would expect natural selection to have hardwired into a cognitively simple organism the avoidance of pain as a goal. One thing

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<sup>33</sup> However, for defence of the attribution of unpleasant subjective experience to animals, see Marian Stamp Dawkins, *Animal Sufferers: The Science of Animal Welfare* (London: Chapman and Hall, 1980).

<sup>34</sup> For an example of this kind of work, see neuroethological analyses of representing structures, especially in frogs and toads, in J. P. Ewert and M. Arbib, eds., *Visuomotor Coordination: Amphibians, Comparisons, Models, and Robots* (New York: Plenum Press, 1989).

that we cannot assume, however, is that this representational goal carries the same importance in relation to other goals of nonhumans as it does in humans. In what follows, I propose a strategy for sorting out the relative importance of an organism's goal.

My theoretical framework involves two principles. The basic principle is

- (1) We respect an organism by respecting the representational goals of that organism.

I have argued that the idea of a representational goal of a tree is intelligible and, further, that the interests of a tree are identical with its representational goals. If so, then we can recognize a very wide range of competing goals in nature. A theory with (1) as its starting point, however, is clearly unworkable unless we can find some way of weighting goals. Although value is distributed very broadly, it is not distributed equally. Focusing on the nature of the behavior-directing states provides the resources to state a principle that resolves many of these conflicts.

- (2) A representational goal of an organism is worthy of respect according to both its importance or degree of *causal salience* for the organism and the level of overall representational sophistication of the organism that possesses it.

One factor in weighting a representational goal is the importance of that goal to its possessor. There are a variety of ways in which we might decide upon the significance of a human goal. One story privileges goals which result from extended critical reflection. In cognitively simpler organisms in which such reflection is limited, if present at all, the importance of a goal may only be a matter of its causal salience. This causal salience should be relativized to a fairly specific environmental context; the most causally salient goal in a given situation is the goal that has the strongest impact on behavior in that situation. We can construct a hierarchy of goals relative to a given situation in accordance with the likelihood of producing correlative behavior. In a worm-filled environment the most salient goal of a bird might be obtaining food. Add a cat to this environment and predator avoidance may become more causally salient and therefore more likely to have impact on behavior. In some situations I describe below, causally salient self-directed representational goals are overridden by more salient other-directed goals.

Another factor in the weighting of preferences is the representational sophistication of their possessor. I argued above that representation-guided movement is important because it allows a degree of independence from the environment. Greater representational sophistication allows greater independence. How might we assess representational sophistication in a given indi-

vidual? The range of environmental properties that the organism's internal states are sensitive to might be a rough measure. Some organisms are only sensitive to a narrow range of food, predator, and mate clues. This range has direct consequences for the diversity of behavior and therefore the degree of independence of the organism from its environment. Of course, the range of property sensitivities yields only an approximation of cognitive sophistication. Organisms with smaller ranges of sensitivities can count more in terms of moral considerability by virtue of the fact that they perform very sophisticated internal processing of input. This internal processing increases freedom from the environment.

In accordance with Dretske's requirement, things which are not directed by internal states—for example, viruses, are not treated as being valuable as individuals and are therefore not located anywhere on the continuum I have sketched. The organisms that must be accounted for are on a continuum with magnetotactic bacteria at one end and humans on the other. Assuming that they are of similar psychological importance or causal salience, a single representational goal of mine is more worthy of consideration than a representational goal of a magnetotactic bacterium to the degree to which I am more representationally sophisticated than it is. Distributed along this moral continuum are the goals of mosquitoes, lizards, rats, and gorillas.

My second principle illustrates the greater flexibility of moral theories founded on representational sophistication over theories based on consciousness, self-awareness, and being alive. Although we may not be immediately disposed to identify the degree of representational sophistication as what matters about a particular organism, the picture I advocate accords with our untheorized intuitions about the graduated nature of the importance of creatures capable of representing. Our intuitive judgments don't assign value equally to all living things, as Taylor might have us do. Yet, consciousness and self-awareness have an all-or-nothing quality that goes too far the other way, preventing us from assigning any more moral weight to a lizard than we might to a piece of chalk. An account built on representational sophistication, in contrast, promises to provide a continuum of discriminations that we pre-theoretically intuitively feel is right about the moral worth of all organisms.

Clearly both principles are in need of considerable qualification and elaboration. However, I am confident that both could be integrated into a broadly consequentialist framework. This kind of maximizing approach allows us to see how one preference of a cognitively sophisticated organism counts for more than a preference of a cognitively simple organism, although, of course, a large number of goals of cognitively simple organisms could collectively outweigh a preference of a single representationally more sophisticated organism. We should also allow that a relatively frivolous and ephemeral preference of a cognitively sophisticated organism might be outweighed by a very salient representational goal of a simpler organism.

## A SPECIES PRESERVATIONIST ETHIC

The individualists I have discussed construe the interests of organisms as largely self-regarding. For Singer, organisms prefer that they go on living, not endure pain, and so on. Regan thinks that self-consciousness puts a barrier of rights around the individual protecting it from harm. According to Taylor, respect for an organism is respect for the life processes of that organism. I have so far argued that we should respect the salient representational goals of an organism according to the overall representational sophistication of that organism. In what follows, I argue that the good of a cognitively simple organism is often best understood in terms of what happens to other organisms, rather than just to it.

One view about how natural selection works might allow us to make a quick jump from the significance of representational goals to a species preservationism. According to this story, evolution by natural selection is essentially the story of the struggle of species against species. The goal of all adaptations of individual organisms is to boost the survival chances of their species.<sup>35</sup> If so, then we should expect the same of psychological adaptations. Because natural selection builds simple organisms with the very salient representational goal of preserving the species, respect for species follow from respect for individual representational goals.

Sadly, however, this view has been discredited. Pointing to widespread intragroup and intraspecies competition, G. C. Williams has effectively argued against selection for entities larger than the individual.<sup>36</sup> Because individuals that boost their own reproductive ends at the expense of their species are most often fitter than their altruistic conspecifics, selection in favor of group or species adaptations is usually overwhelmed by selection targeted at the individual. As a result, we need to find a less direct route from selectionally endowed goals to species preservationism. Representational goals that are favored by individual or gene-targeted selection have to be found. In what follows, I make a few educated guesses about the likely content of some of the more salient goals in cognitively simple organisms.

Most of the representations of cognitively constrained organisms came to be selected by boosting the inclusive fitness of ancestors; they guided them in ways that helped them find food and mates, helped relatives, and so on. We can guess that the most salient goal in a given situation is the one that most reliably boosts the inclusive fitness of ancestors. The same cannot always be said for humans, however. Culture and the capacity for cognitive novelty have led to

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<sup>35</sup> See Richard Dawkins, *The Selfish Gene* (Oxford: Oxford University Press, 1989), chap. 1, for some introductory discussion of this view.

<sup>36</sup> Dawkins' *The Selfish Gene* is the most famous popularization of these arguments. Williams, of course, is a proponent of the gene rather than the individual as unit of selection.

a proliferation of representational goals. Goals that have no disposition to boost inclusive fitness in any realistic environment have been inserted into the hierarchy of importance or salience. An example is the desire to play video games all day.

A large number of human representational goals are self-directed. The most important goals of many people cannot be fulfilled without the ongoing existence of their bearer. Examples are the desire to be the highest paid lawyer, to own the largest Picasso collection, to see your grandchildren grow up, and so on. Consequently, in these cases, the respect required by (1) very often is directed at the individual. This problem, I believe, results from assuming, as the individualists do, that cognitively simpler organisms have interests that are equally self-directed. In organisms in which natural selection has a tighter leash on representation, self-sacrificing goals are often more causally salient. There are many circumstances in which the inclusive fitness of an organism is reliably boosted by self-sacrificing behavior. The pied stilt, close Australian relative of the black stilt, exhibits very dangerous "broken wing" behavior when its nest is threatened by a predator. The aim of this feigning of injury is to make it, rather than its eggs or young, the main target of the predator. This behavior evolved because stilts that risked their lives tended to leave more descendants than those who were more cautious. Sterile worker bees care for the genetically identical offspring of the queen. A bee will die in front of an invader to the hive in order to slow its progress. Bees that "commit suicide" in this way make it more likely that there will be later generations of genetically identical bees. These examples merely scratch the surface of self-sacrificing, but inclusive fitness boosting, behavior in nature.<sup>37</sup>

In preventing a worker bee from killing itself by stinging an invader to the hive or stopping a pied stilt from performing its very risky broken wing behavior in front of nest-bound predators, we would act in a way which seems protective of the individual. The individualists discussed earlier might approve; the pied stilt's broken wing behavior puts at risk the mother to save the less sentient eggs or offspring. I prefer the reverse analysis, however. The causal salience of self-sacrificing goals over self-preserving goals means that the kind of intervention that might be preferred by Singer and Regan would not respect the relevant representational goals. In these situations self-sacrificing goals are more salient than self-preserving goals and therefore are worthy of greater consideration. In saving their lives we don't show the bee and stilt the right kind of respect.

The cases of biological altruism described above are interesting examples of a salient representational goal that is essentially other-organism involving. I think that recognizing the cross-situational salience of another other-organ-

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<sup>37</sup> Williams, *Adaptation and Natural Selection*, and Dawkins, *The Extended Phenotype*, have examples and explanations of biological altruism.

ism-involving goal allows us to ground a species preservationist ethic. Sexually reproducing organisms need to find conspecifics with which to mate in order to pass on their genes. Representations in these organisms are shaped so as to help them achieve this task. Internal structures are linked with behavior and perception so as to produce certain movement toward mates or mate-attracting displays in response to specific perceptual clues. This goal, which essentially involves other organisms of the same species, may be a candidate for the most globally salient goal in many sexually reproducing organisms. We can conclude that failure to satisfy this goal may, *by its own lights*, be the worst thing that can happen to an organism. E. O. Wilson's description of the Bachman's warbler offers a compelling example of an individual suffering from this kind of harm. Wilson gives an account of a birdwatcher sighting what must have been one of the last Bachman's warblers, a male, singing to attract a mate. During the two hours for which it sang nonstop, no female appeared. Wilson continues:

... the male returned to the same spot the next two springs. No female ever joined him. The extraordinary exertions of the Bachman's male were a sign that he was in prime breeding condition, but he was destined to go undiscovered by any female of the same species.<sup>38</sup>

This individual may have led a relatively painless and long, by warbler standards, life. According to the analysis I favor, however, it suffers greater harm to its interests than any stilt injured while performing broken wing behavior or any bee that dies to bar the way of a hive invader. The stilt or the bee may, in death, satisfy many causally salient goals. By contrast, represented aims that are among the most important for the warbler remain forever unsatisfied.

Recognizing the other-directed nature of the goals of cognitively constrained organisms allows us to find a different individualistic answer to Sober's  $n + m$  question. Imagine we have a choice between two options. Option A involves the killing of five of the endangered black stilt. Option B instead involves the deaths of five of the relatively plentiful pied stilt. Let's assume that both kinds of stilt are very similar in terms of their level of representational sophistication. If so, then both options are very likely to share elements of harm. Self-involving goals of both birds are equally frustrated. However, when we look beyond the individuals killed, we recognize that option A involves much greater damage to individual interests than option B. The damage is to the represented interests of other members of the birds' populations or species. Because pied stilts are plentiful, killing five does not have a real impact on the ability of the remaining individuals to mate successfully. By contrast, killing

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<sup>38</sup> E. O. Wilson, *The Diversity of Life* (London: Penguin, 1992), p. 230.

five black stilts has a serious impact on the chances of other stilts to breed. Further, a small reduction in the ability of current stilts to produce offspring translates into a much greater reduction in the chances that their offspring will produce offspring.

What if we are talking about the individuals belonging to a tiny remnant of a species? A great deal of public interest in New Zealand has focused on the black robin, once officially classified as the rarest bird in the world. In 1976 its total population consisted of seven individuals, including only two breeding pairs. Very skillful intervention succeeded in boosting this level to a 1992 figure of 128 individuals.<sup>39</sup> At first glance, the approach that I advocate does not seem to assign much value to this very small population. Because we have so few individuals, extinction presumably involves the frustration of a correspondingly small set of representational goals. Recognizing the other-directed nature of the representational goals of cognitively simple organisms, however, helps us to see that allowing these last individuals to die may involve harming them to a much greater degree than killing two individuals belonging to plentiful species. As we have seen, a common way of boosting inclusive fitness is to care for relatives. Individuals whose psychology is shaped in this way have goals regarding the welfare of genetic relatives. Two individuals belonging to a healthy population need not have these goals frustrated. The actions of others can lead to the satisfaction of some goals. By contrast, the last two individuals of a species have their representational goals utterly thwarted if they are killed. We might also consider expired relatives of the individuals belonging to this remnant. Some of their other-directed representational goals can still be satisfied by survivors.

I have argued for a conception of individual interests which involves other organisms. Have I successfully shown that intrinsic value can be assigned to species? There is a complex definitional issue here. *Species* is a contested word. On my account, value attaches via concern for the goals of individuals falling under a certain conception of species. This is the biological species concept of Ernst Mayr.<sup>40</sup> For Mayr, the idea of reproductive isolation is central; a species is a collection of actually or potentially interbreeding organisms.<sup>41</sup> My individualistic preservationist ethic protects biological species. An individual's interests extend to all other organisms that are relatives and beyond to all of those that it might mate with and those that might produce

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<sup>39</sup> See Gaze, *Rare and Endangered New Zealand Birds*, pp. 61–63. For a detailed description of the miraculous preservation effort, see David Butler and Don Merton, *The Black Robin: Saving the World's Most Endangered Bird* (Auckland: Oxford University Press, 1992).

<sup>40</sup> Ernst Mayr, *Animal Species and Evolution* (Cambridge: Harvard University Press, 1963).

<sup>41</sup> More recently, Mayr has narrowed his definition. He now requires that the organisms that make up a species actually interbreed. See E. Mayr and P. Ashlock, *Principles in Systematic Zoology* (New York: McGraw Hill, 1991).

offspring that its offspring might mate with. Thus, the individual's interests mark the boundaries of the Mayrian biological species to which it belongs.

The closeness with which my extension of individual value tracks biological species can be seen when we examine criticisms of Mayr. One problem revolves around occasionally interbreeding individuals that we intuitively say belong to different species.<sup>42</sup> Examples are the black and pied stilts. Differences in coloration, behavior, and relative geographical isolation lead us intuitively to say that they are two different species of stilt. Yet, black and pied stilts sometimes interbreed. As it turns out, this interbreeding is thought by many to represent a serious threat to one of the species; black stilts are literally breeding themselves out of existence.<sup>43</sup> My analysis approaches the apparent threats of predation and cross-species interbreeding in very different ways. Because the union of black and pied stilt produces offspring that are fertile, the interests of individual black stilts can extend to cover local pied stilts and vice versa. Anthropocentric grounds need to be introduced as a basis for keeping the black and pied stilts apart.

There is one important way in which a species preservationist ethic built on my individualistic foundations stands at a significant disadvantage to one built on Taylor's or Varner's, for example. The Dretsikian conception of representation and behavior which I have appealed to covers many more organisms than a more restrictive intuitive account. Nevertheless, the reasons I have given do not in any way contribute to any justification of the preservation of species that have no representational capacity or even those that are only minimally representational; the goals of the barely cognitive count for almost nothing alongside of human goals that can only be satisfied by habitat and ecosystem destruction. I hold that extending concern to all representational organisms can help us with the inanimate and scarcely animate living residue. A typical ecosystem is made up of a very varied set of individuals. Natural structures that are not straightforwardly essential parts of our environments are much more likely to make up key parts of the environment of some significant representing organism. It is important to realize that the inanimate environment is just as important to the representational goals of an organism as are the conspecific individuals that, in part, constitute their animate environments. A polluted habitat can thwart as wide a range of representational goals as easily as the lack of a mate.

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<sup>42</sup> See Elliot Sober, *The Philosophy of Biology* (Cambridge: Cambridge University Press, 1993), pp. 153–59, for brief discussion of this objection.

<sup>43</sup> Researchers debate whether the main threat to the black stilt is predation or cross-species breeding. King, *Immigrant Killers*, suggests that black stilts only breed with pied stilts when there are no other black stilts to be found. If so, then Mayr's definition might separate them on the grounds that pied and black stilt only breed in an abnormal environment.