

- Hacking, I. 1991. A tradition of natural kinds. *Philosophical Studies* 61:109–126.
- Hull, D. 1976. Are species really individuals? *Systematic Zoology* 25:174–191.
- Hull, D. 1978. A matter of individuality. *Philosophy of Science* 45:335–360.
- Hull, D. 1980. Individuality and selection. *Annual Review of Ecology and Systematics* 11:311–332.
- Kitcher, P. 1984. Species. *Philosophy of Science* 51:308–333.
- Levins, R., and R. Lewontin. 1985. *The Dialectical Biologist*. Cambridge, Mass.: Harvard University Press.
- Locke, J. 1975. *An Essay Concerning Human Understanding*. Ed. P. H. Nidditch. Oxford: Oxford University Press.
- Mayr, E. 1969. *Principles of Systematic Zoology*. Cambridge, Mass.: Harvard University Press.
- Mishler, B., and M. Donoghue. 1982. Species concepts: A case for pluralism. *Systematic Zoology* 31:491–503.
- Plato. 1901. *Opera*, vol. II. Ed. J. Burnet. Oxford: Clarendon Press.
- Putnam, H. 1973. Meaning and Reference. *Journal of Philosophy* 70:699–711.
- Quine, W. V. O. 1969. Natural kinds. In *Ontological Relativity and Other Essays*. New York: Columbia University Press.
- Rand, A. 1990. *Introduction to Objectivist Epistemology*. Expanded, 2nd ed. Ed. H. Binswanger and L. Peikoff. New York: Meridian.
- Sterelny, K., and P. Griffiths. 1999. *Sex and Death*. Chicago: University of Chicago Press.

13 Species Concepts and Natural Goodness

Judith K. Crane and Ronald Sandler

1 Introduction

Philippa Foot (2001) has defended a form of natural goodness evaluation in which living things are evaluated by how well fitted they are for flourishing as members of their species, in ways characteristic of their species. She has argued, further, that assessments of moral goodness (virtue and vice) in humans are, *mutatis mutandis*, of the same evaluative form. (For similar naturalistic approaches see Hursthouse 1999, MacIntyre 1999, Geach 1977, and Sandler 2007). If this natural goodness approach is to provide an adequate explanation of moral evaluation, issues need to be addressed at several levels. First, is this form of natural goodness evaluation of living things biologically and philosophically plausible? Second, can the account be carried over to natural goodness evaluations of human beings? Third, can natural goodness evaluations ground or otherwise explicate *moral* evaluations? This paper primarily concerns the first of these issues. In particular, since organisms are to be evaluated *as members of their species*, how does a proper understanding of species affect the feasibility of natural goodness evaluations? We defend a pluralist understanding of species on which a normative species concept, such as that employed by Foot, is viable and can support natural goodness evaluations. However, given the account of species defended, natural goodness evaluations and, by extension, the natural goodness approach, do not garner justification in virtue of employing a scientifically privileged conception of species. The natural goodness approach does not depend upon naturalism alone. It is only justified given particular metaethical and normative commitments that are independent of naturalism.

2 "Species" in the Natural Goodness Approach

In *Natural Goodness*, Foot's "constructive task is . . . to describe a particular type of evaluation and to argue that moral evaluation of human action is of this logical type" (2001, 3). The particular type of evaluation she identifies, "which is attributable only to living things themselves and to their parts, characteristics, and operations, is intrinsic or 'autonomous' goodness in that it depends directly on the relation of an individual to the 'life form' of its species" (2001, 26–27). 'Life form' is a term introduced by Michael Thompson (1995) and adopted by Foot. It refers to the characteristic features of the lifecycle of members of a species. The idea of a life form and its central role in the natural goodness approach are further explicated in section 4.

Crucial to natural goodness evaluations are "Aristotelian categoricals" (originally discussed in Thompson 1995) of the form 'Ss are F' (or equivalent), where 'S' is a variable for a species and 'F' is a variable for a predicate that provides substantive specification of the life form of individuals of a species—for example, *rabbits are herbivores* or *warblers begin moving south in the autumn*. Aristotelian categoricals are not meant to describe statistical generalities; nor do they describe incidental features of organisms. They are distinguished from statistical and incidental descriptions by their teleological character. For Foot, "Aristotelian categoricals give the 'how' of what happens in the life cycle of that species. And all the truths about what this or that characteristic does, what its purpose or point is, and in suitable cases its function, must be related to this life cycle. The way an individual *should be* is determined by what is needed for development, self-maintenance, and reproduction: in most species involving defense, and in some the rearing of the young" (2001, 32–33). An Aristotelian categorical "speaks, directly or indirectly, about the way life functions such as eating and growing and defending itself come about in a species of a certain conformation, belonging in a certain kind of habitat" (2001, 33).

Aristotelian categoricals provide a standard for individuals of a species, so that "evaluation of an individual living thing in its own right, with no reference to our interests or desires, is possible where there is intersection of two types of propositions: on the one hand, Aristotelian categoricals (life-form descriptions relating to the species), and on the other, propositions about particular individuals that are the subject of evaluation" (Foot 2001, 33). The natural goodness form of evaluation therefore depends upon the viability of Aristotelian categoricals. Implicit in Aristotelian categoricals is a certain conception of species—one in which conspecifics share the life form described by the Aristotelian categoricals. One possible

worry about the natural goodness approach is that what Foot and others mean by 'species' may be importantly different from what biologists typically mean. We maintain that the natural goodness approach does indeed use a nonstandard species concept, but we argue that this worry is nonetheless misguided. In the following section, we take a closer look at species concepts and argue that there can be multiple legitimate species concepts, which allows that the species concept of the natural goodness approach may still be viable.

3 The Species Problem and Species Pluralism

There is no uniform definition of 'species' in biology, but rather a host of competing species concepts. This has contributed to a family of issues known as "the species problem" (see e.g., Stamos 2003). At one level, this is simply the problem of determining which (if any) of those currently on offer is the correct species concept. The fact that biologists and philosophers of biology have been unable to resolve this question has given rise to the further question of whether there is one correct account of species we should be attempting to articulate (*species monism*), or whether we can accept a plurality of species concepts, each of which is useful in different contexts (*species pluralism*). A third and related question is whether species taxa are real natural categories into which biological organisms are divided based on their fundamental features. *Species realism* accepts this claim, and thus that species are natural kinds. The *conventionalist* position denies that species are natural kinds and suggests instead that species taxa represent convenient and useful ways to organize the living world into groups, but do not reflect the fundamental features of living things. The realist intuition that species are natural kinds is a large part of the motivation for attempting to develop a single species concept that articulates the fundamental features of biological organisms which divide them into natural groups. Whether or not a species concept succeeds in this, it still provides an account of the species category that spells out what *sorts* of features unify a group of organisms into a species and make organisms conspecific. It will indicate where the boundaries are between distinct species taxa and generate a classification of organisms. Different species concepts generate different classifications. Below are some of the most important species concepts used by biologists.

Biological Species Concept A species is a group of interbreeding natural populations that is reproductively isolated from other such groups (Mayr and Ashlock 1991, 26).

Evolutionary Species Concept A species is a single lineage of ancestral descendant populations of organisms which maintains its identity from other such lineages and which has its own evolutionary tendencies and historical fate (Wiley 1978, 18).

Ecological Species Concept A species is a lineage (or a closely related set of lineages) which occupies an adaptive zone (ecological niche) minimally different from that of any other lineage in its range and which evolves separately from all lineages outside its range (van Valen 1976, 233).

Phylogenetic Species Concept A species is a group of organisms, including a common ancestor and all of its descendants (a monophyletic group), that is the smallest diagnosably distinct such group (see Cracraft 1983; Mishler and Brandon 1987).

Phenetic Species Concept A species is a group of organisms with a great deal of overall similarity in their intrinsic characteristics, including both morphological and genetic characteristics (see Sokal and Crovello 1970).

Morphological Species Concept A species is a group of organisms that differs morphologically from others, that is, in terms of measurable anatomical features (see Cronquist 1978; Kitcher 1984; Stamos 2003).

For *species monists* (Ghiselin 1987; Hull 1987; Sober 1984), there can be at most one correct species concept, and thus it is an important task of biological systematics to resolve the dispute among rival species concepts, and to provide a single account of the species category. Monism is not committed to the essentialist claim that there are intrinsic (nonrelational) features that all (or even most) members of a species share, or that are essential to the organisms that make up a species. Ghiselin, Hull, and Sober all reject these forms of essentialism. Monism is committed to the view that the species category ought to be characterized by a single set of features shared by all species taxa. It is also consistent with species monism that the single best way to classify organisms into groups needn't classify them by their fundamental features. But it is hard to see what would motivate monism in that case. If no species concept divided organisms into species based on a set of fundamental features of organisms, it seems unimportant that we use only one species concept. Moreover, given the plurality of species concepts used by biologists, it is not obvious how one of them could be the best if not for the reason that it captures something fundamental about the living world that the others do not.

Species pluralists (Dupré 1993; Ereshefsky 2001; Kitcher 1984, 1987) maintain that we can accept a number of different species concepts, which need not be rivals. Species pluralists are impressed by the fact that different species concepts are used—and are useful—in different contexts. Biologists

with different concerns and different research projects are categorizing organisms in different ways, and referring to different kinds of groups as "species." For example, the Biological Species Concept is most useful when trying to distinguish groups of organisms whose geographic ranges overlap. Where populations do not overlap geographically, we typically need to use other criteria (perhaps linked to reproductive isolation, e.g., bird song) to distinguish or lump together populations of organisms as species. The Biological Species Concept also provides no way to distinguish populations of asexually reproducing organisms into species. Biologists who study such organisms are not concerned about identifying breeding populations, and so would adopt a different species concept. Nor is the Biological Species Concept very useful in paleontology, where we have little information relating to reproductive isolation. Paleontologists are primarily interested in the evolutionary succession of populations with changing patterns of genotypic and phenotypic traits. Thus paleontologists are likely to be interested in discerning similarity groups rather than breeding populations, and may be talking about morphological rather than biological species.

In other contexts, biologists may use the Ecological or the Evolutionary Species Concept, both of which would lump together as a single species populations that do not exchange genetic material due to geographic isolation, so long as those populations occupy the same ecological niche or maintain the same evolutionary tendencies, respectively. If, however, an isolated population becomes subject to different selection pressures, such that it acquires new evolutionary patterns, it would be considered a distinct evolutionary species as well as a distinct biological species. Once it occupies a new ecological niche, it becomes a distinct ecological species. The Phylogenetic Species Concept splits all such populations into distinct species so long as they are monophyletic groups that are diagnosably discernible on a variety of different grounds. Groups that are reproductively isolated but occupy the same ecological niche or have the same evolutionary tendencies may be considered distinct phylogenetic species. In addition, once a population branches off and acquires its own evolutionary tendencies or occupies a new ecological niche, the Phylogenetic Species Concept would not recognize the original population from which it branched as a distinct species since it does not include all of its descendants, though other species concepts would recognize such populations as species.

Species pluralism helps to alleviate the difficulty of competing species concepts since it allows us to accept that these species concepts are

not necessarily rivals. Pluralists believe there may be alternative ways of carving the organic world into populations, each of which generates groups that play a role in biological theorizing and that deserve to be called "species." In addition to helping make sense of the species problem, pluralism is also naturalistically and metaphysically plausible. The monist idea that there is a single best way to divide organisms into species seems inconsistent with biological practice. More importantly, a large part of the motivation for monism is an adherence to the realist idea that organisms are divided into species according to a single set of fundamental features. But this assumption is highly suspect. The fact that there is a variety of species concepts with different practical applications shows that different features can generate useful and explanatory classifications. There is no reason to suppose there is a single set of explanatory features that is "fundamental."

Suppose, for example, that we consider phylogeny fundamental, so that evolutionary history is what demarcates populations into groups: every organism that shares the evolutionary history of a certain population will belong to the same taxon. (This taxon may be at a higher level than *species*, but this ensures that all the descendants of a population will be included in its taxon, and thus that all taxa are monophyletic.) But if we take phylogeny to be fundamental in this way, what do we make of the variety of other features that are used to divide organisms into groups? Can they be subsumed under the explanatory umbrella of phylogeny? This is implausible for several reasons. Features other than phylogeny are used to make finer-grained distinctions between populations than can be done using just phylogeny. Populations with the same evolutionary histories may be distinguished into species by ecological niche or reproductive isolation, for example. Phylogeny alone doesn't explain these differences. Moreover, biological organisms are as inextricably ecologically situated as they are phylogenetically situated, and ecological situatedness is crucial for understanding why organisms and populations have the characteristics they have and behave as they do. Indeed, the ecological situatedness of populations turns out to be important for understanding phylogeny, since environmental changes are crucial in explaining evolutionary history. So it is not the case that phylogeny is more explanatorily fundamental than ecological factors. Yet phylogeny does capture something important about life, which is why the Phylogenetic Species Concept is a powerful and influential species concept.

Perhaps those features that give us finer-grained species divisions are more explanatorily fundamental, since they can explain biological

divisions that coarser-grained species concepts cannot. But things are not this simple. Different species concepts do not straightforwardly differ in terms of making finer- and coarser-grained distinctions among species. They cross-classify organisms into different kinds of groups. The general point is that species have common phylogenies, common ecological niches, common genetic features, are members of common reproductive communities, and so forth. These are all important explanatory features, yet they appear to resist reduction into a single set of fundamental features. The fact that they generate classifications of different kinds of groups, classifications which are incompatible with one another because they cross-classify organisms, suggests that this is not merely a result of our failure to understand the causal structure of the world. No single species concept identifies *the* fundamental causal structure of the biological world because there is no *single* set of fundamental features.

For these reasons, species pluralism is the more plausible view. By accepting species pluralism, it is possible to make room for species concepts that serve a variety of explanatory projects—perhaps even those of ethics. However, no pluralist should accept that all species concepts are equally legitimate. To do so would be to reject a minimal scientific realism in favor of full-blown relativism. Biological reality must place some constraints on what counts as a legitimate species concept. Otherwise species divisions would not need to correspond to anything real and any species concept would be as good as another: we would have to accept "the suggestions of the inexpert, the inane, and the insane" (Kitcher 1987, 190). But what makes one species concept legitimate and another not?

Pluralists have offered a variety of approaches to this question, which are surveyed by Ereshefsky (2001, 158–162). For Kitcher, the organisms of a species must be related to each other by "biologically interesting relations" (1984, 309). There are a variety of such relations, and various biological theories and research areas focus on different ones: to know which species concepts are legitimate, we look to the experts in biology. Those species concepts in current use in accepted biological fields are considered the legitimate ones. Ereshefsky looks to the aims of biological taxonomy, and identifies legitimate species concepts as those that promote those aims. He rejects certain species concepts (e.g., the Phenetic Species Concept) on the grounds that they do not adequately promote the aims of biological taxonomy. Both Kitcher and Ereshefsky see the aims and projects of biologists as privileging certain species concepts over others; Ereshefsky privileges an even narrower set of biological projects than does Kitcher. But an adequate species pluralism should do more than appeal to

expert biologists as the arbiters of legitimate species concepts. It should explain why some species concepts are legitimate while others should be rejected. Below, we attempt to provide a set of necessary conditions for carving the living world into groups that rule out “inexpert, inane, and insane” ways of doing so; but ruling out such species concepts as illegitimate does not require that we privilege a narrow set of biological aims and purposes. These conditions rule out certain species concepts that intuitively ought to be rejected. In the absence of arguments for further necessary conditions, we will regard a species concept that satisfies these conditions as legitimate.

1. A legitimate species concept needs to classify organisms into groups of a certain kind, since the point of a species concept just is to divide and organize organisms. This is something that all species concepts are intended to accomplish. If there are no groups of the kind that a species concept recognizes, the concept fails. For a species concept to be legitimate there must exist groups of organisms that correspond to the names of the taxa generated by the species concept. Such groups must have discernible boundaries, though these need not be precise. Alternative species concepts can differ with respect to whether to count certain groups as species, but as long as those groups exist, the different species concepts might all be legitimate. For example, *syngameons* (or *multispecies*) consist of populations with distinct ecological roles, but which frequently interbreed and produce fertile offspring (Ereshefsky 2001, 4.1; van Valen 1976.) On the Biological Species Concept, the whole population would be considered a species, while on the Ecological Species Concept, the smaller populations, rather than the whole group, would be considered species. There is no question about whether the groups exist, only about whether they constitute species. On the other hand, assuming one version of creationism is false, a species concept that defined a species as *a group of organisms, including an initial pair created by God and all of its descendants*, would not meet this criterion. Nothing corresponds to a species name that alleges to pick out a group of that kind.

2. A legitimate species concept must distinguish organisms into taxa by features that are biological properties of organisms or of groups of organisms. A biological property is a property that only a biological entity (either an organism or a group of organisms) can have. Only biological organisms can have morphological and genetic features with respect to which we can sort them into groups. Interbreeding relations and reproductive isolation are biological properties of populations of organisms, as are evolutionary histories. Weight is not a biological property. If a species concept split

organisms into species A, weighing 50 pounds or more, and species B, weighing less than 50 pounds, it would not satisfy this condition (though it satisfies the first). Even a property like citizenship is not biological as it is not necessary that a citizen of a certain country be a biological entity; in principle, a synthetic robot could attain citizenship. Thus if we were to sort certain organisms into groups by their country of citizenship, those groups would not be biological taxa, and any species concept that generated such a classification would not be legitimate.

These initial conditions are meant to guarantee that the names of particular species taxa that fall under a species concept refer to groups of organisms that are characterized biologically. Any species concept that generates taxa the names of which either do not refer at all, or refer to groups that are not biological groups, is not a legitimate species concept. It is important that the groups are biological in the sense that they are distinguished by biological properties. But it is not required that the species concept itself be one used in some list of accepted biological fields, or more narrowly, used by biological taxonomists. What should be required is that the species concept has some explanatory function. Suppose, for example, that a species concept divides organisms into those with eyes and those without eyes: the two groups exist, and having eyes is a biological property. The difficulty is that eyes have evolved independently more than forty times (Mayr 1982, 611), so the possession of eyes appears to have very limited explanatory relevance. It provides no indication of evolutionary relationships, reproductive relationships, or ecological situatedness, and very little grounds for making predictions or inferences to other biological properties. In order to rule out such explanatorily weak species concepts, we suggest a third condition:

3. A legitimate species concept must be explanatorily useful. It must help make sense of the world in terms of organizing it, understanding it, making predictions, and so on. The features that divide organisms into species are related to phenomena we wish to explain in such a way as to contribute to an explanation of those phenomena. We wish to explain how species maintain genetic and morphological stability across many generations: interbreeding relations and environmental pressures both contribute to an explanation of such stability. We wish to understand and organize evolutionary history: dividing organisms into monophyletic groups helps to accomplish that. The explanatory usefulness of a species concept need not be restricted to the aims of biologists, however. In this respect, our version of species pluralism is more permissive than either Kitcher's or Ereshefsky's. The groups of organisms picked out by a species concept, and

the features used to differentiate species, must serve to explain something in need of explanation and must organize the world in theoretically useful ways. The organic world plays a large role, and may serve as an explanatory basis, in a variety of phenomena. But there is no reason why classifications of organisms should be restricted to those that contribute to generating biological knowledge. In particular, the natural goodness approach looks to the living world for explanations of *evaluation*, including normative evaluations of human behavior. How such evaluations are possible is in need of explanation, so if a species concept can aid in this—that is, if it helps to explain and enable a form of evaluation that, when properly employed, justifies particular normative evaluations—it would satisfy the third condition.

These three conditions leave room for multiple species concepts that divide the world into different biological groups according to different biological properties. We do not believe it is necessary that a species concept “carve nature at its joints.” The intuitive idea behind this metaphor is that there is a single set of fundamental features that tracks natural biological categories, so that species are natural kinds. A principle motivation for our version of species pluralism is that it makes little sense to pick out one of the sorts of features that systematists use to classify organisms as distinctly fundamental. Different species concepts identify different biologically significant features to classify organisms, and their significance is not reducible to or derivative from one type of feature. As a result, no single species concept isolates the “fundamental” properties of the living world. If no species concept does this, there is little motivation to adopt a monist approach to species, and little reason to think of species as natural kinds. If we wish to speak of nature’s “joints” we should say there is no single set of biological joints in nature, but rather many, which cross-cut the beast. (The “joint” metaphor begins to break down here. The organic world can be carved along a variety of dimensions, so long as we carve it into biological groups—we might say, so long as we wind up with cuts of meat of some sort or other.)

A final consideration regarding the legitimacy of species concepts concerns the relevance of the species *rank*. Biologists who frame species concepts are often concerned with the question of which groups deserve to be ranked at the level of ‘species’ proper, as opposed to higher or lower taxonomic categories. The Biological Species Concept is particularly strong at identifying groups at the species rank (at least for sexually reproducing organisms), since it identifies reproductively isolated populations as being of special importance. For the Phylogenetic Species Concept, however,

rank is less important: “species” are the groups at the tips of the branches of the phylogenetic tree. One can make divisions at the tips of the branches as fine as one likes, many of which are of little theoretical importance. (In fact, which groups are at the tips of the branches is transitory; over time, many of them will be displaced by their descendant populations.) The conditions for the legitimacy of species concepts outlined above do not include that a species concept picks out groups that qualify as occupying a special taxonomic rank, which alone deserves the name ‘species’. The groups need only be real, biological groups of a certain kind, such that identifying groups of this kind is explanatorily useful.

4 Natural Goodness in Nonhuman Organisms

Foot adopts Thompson’s (1995) notion of “species” or “life form” in grounding the natural goodness approach. Although it clearly has a basis in biology, Thompson does not see his species concept as one that is necessarily used by biologists, which is why he prefers to speak of “life forms.” What exactly is the species concept that Foot and Thompson are using, and is it a legitimate species concept? Neither Foot nor Thompson adequately answers these questions. They find the legitimacy of their species concept in the fact that it is used in ordinary language, “natural history” descriptions of living things—the sort expressed in television nature programs and by naturalists more generally. We spell out below what we believe to be the species concept implicit in the natural goodness approach, demonstrate its role in generating evaluations of organisms, and show that it is a legitimate species concept, even if not one used by most biologists. Since this species concept helps to explain (and enable) a form of evaluation that generates normative evaluations of organisms, we call it the *Axiological Species Concept*.

4.1 The Axiological Species Concept

The idea of a *life form* is central to the Axiological Species Concept. Thompson appears to use ‘life form’ interchangeably with ‘species’; as Foot uses ‘life form’, it refers to a feature shared by members of a species. Our usage of ‘life form’ more closely follows Foot’s. We take a life form to be constituted by the set of Aristotelian categoricals that specify what characteristically happens in the lifecycle of members of a given species. Foot’s examples of Aristotelian categoricals include *rabbits are herbivores*, *cats have four legs*, *the deer is an animal whose form of defense is flight*, and *the peacock has a brightly colored tail*.

Foot and Thompson emphasize that Aristotelian categoricals are not meant to be universally quantified, since taken in that way most of them are clearly false. For Foot, the Aristotelian categoricals that constitute a life form are teleological, for only such categoricals will yield evaluations. *The blue tit has a round blue patch on its head* will not yield evaluations about individual blue tits, because, as far as we know, “the colour of the head plays no part in the life of the blue tit” (2001, 30); hence there is nothing defective about a blue tit without said blue patch. In an Aristotelian categorical, there is an “expectation of an answer to the question ‘What part does it play in the life cycle of things of the species *S*?’” (2001, 32). Aristotelian categoricals purport to describe the characteristics that members of a species have *in order to*, for example, maintain themselves and reproduce in their distinctive way (i.e., the way described by the Aristotelian categoricals). The teleological character of the Aristotelian categoricals also ensures that they are not merely descriptions of what is statistically normal; they do not “come from the counting of heads” (2001, 31). Even if a minority of species members reaches maturity and acquires many of the features or engages in many of the behaviors described (consider e.g., sea turtles), the Aristotelian categorical is still thought to be true.

Given the nature and role of Aristotelian categoricals in natural goodness evaluations, we suggest the following species concept is operating in the natural goodness approach:

Axiological Species Concept An axiospecies (or axiogrouping) is a biologically related group of organisms that shares a life form, as described by a set of Aristotelian categoricals.

“Biologically related group of organisms” indicates that the *grouping criteria* for this species concept are biological. Grouping criteria separate organisms into groups, draw boundaries between groups, and determine whether an organism belongs to a particular group (Mishler and Brandon 1987). In this case, members of a group must be related by interbreeding relations, parent-offspring relations, sharing the same ecological niche, monophyly, or any set of biological features that groups organisms together as a biological unit. The Axiological Species Concept is not specific with respect to which biological features may be used to identify the boundaries of an axiospecies. It requires only that the features be recognizable by biologists as delineating biologically significant groups. This captures the sense in which the notion of ‘species’ used by the natural goodness approach is grounded in biology. The natural goodness approach attempts to ground an account of evaluation in biologically significant groups.

Grouping criteria are necessary but insufficient conditions for a group of organisms to constitute a species. Grouping criteria are distinguished from *ranking criteria* (Mishler and Brandon 1987), which determine which groups may be ranked as groups of the right sort. The ranking criteria for the Axiological Species Concept determine which groups of organisms identified by the biological grouping criteria qualify as axiospecies, and which are merely biologically significant groups. The sharing of a life form is the ranking criterion in the sense that only those biologically related groups of organisms that share a life form, as expressed by a set of Aristotelian categoricals, count as axiospecies. In order for a biological group to share a life form, the members of the group must share certain goods or ends, such as self-maintenance, reproduction, and sociability, which are realized in characteristic forms and achieved by characteristic means. (It is easy to slip here into talking about goods *for a species*, but neither we nor Foot believe it is plausible that a species as a whole has a good. The goods we are referring to should be understood as goods for the members of a species [Sandler and Crane 2006].) If it is characteristic of the members of a biologically related group to strive toward a state/activity *G*, such as self-maintenance or reproduction, then *G* counts as a good for the members of the group. “Striving” means expending energy toward, varying behavior in manners required to achieve, and so forth. It consists of displaying forms, processes, and behaviors, under certain conditions, which are conducive to achieving *G*. In saying that certain strivings are characteristic of members of a group, we do mean to be saying that the large majority of members of the group strive toward *G*, and in characteristic ways—though these may (and often will) be indexed to sex, life-stage, or environment, for example. Foot is quite right that the Aristotelian categoricals do not depend on the “counting of heads” in that we do not count how many species members *achieve* their ends. But we do count the strivings—the forms, processes, and behaviors—to determine the ends of the members of the group, and how they are characteristically pursued and (when accomplished) attained.

As we understand the Axiological Species Concept, the life form of a species is shared by *all* organisms belonging to the group, as determined by the biological grouping criteria, even though the particular Aristotelian categoricals are not true of all members of the group. Some members may fail in achieving the ends, or fail to exhibit the characteristic forms, processes, and behaviors by which group members typically strive toward the ends—but they all share the same ends, and hence have a common life form. It is because the life form applies to all members of the group that

we can identify an organism as a member of a group (by the appropriate biological criteria) and then evaluate it in terms of the life form of that group.

In our discussion of species concepts in section 3, we noted that it is not a necessary condition for legitimacy that a species concept identify groups that occupy a special taxonomic rank, one that alone deserves to be called "species." Some species concepts do aim to do this, but the species rank has no special status for the Phylogenetic Species Concept, for example. An interesting feature of the Axiological Species Concept is that the species rank, as typically understood in biological systematics, is not privileged as the only level at which organisms may be evaluated. The Axiological Species Concept does aim to identify biological groups of a special sort, and uses life form as a ranking criterion to identify them. A biological group that satisfies that ranking criterion will generate evaluation standards, and it is groups that generate evaluation standards that the Axiological Species Concept aims to identify. Biological groups with discernible life forms will not all be at the *species* level, as typically understood in biological systematics. There are Aristotelian categoricals about placental mammals, to the effect that placental mammals have a characteristic way of reproducing, and about mammals generally, that they have a four-chambered heart. To make this point clear, it will be useful to refer to the biological groups that generate evaluation standards as "axiogroupings" rather than "axiospecies." In fact, none of Foot's examples are at the species level—deer, rabbits, and cats are all at higher taxonomic levels. Axiogroupings will also be at lower taxonomic levels. Foot is explicit that "the Aristotelian categoricals must take account of subspecies adapted to local conditions" (2001, 29). Foot's peacock example is particularly interesting. Peacocks do not constitute a species in standard taxonomies, partly because there are several species of peafowl. (Peafowl do not constitute a genus, either, but a group consisting of two genera, *Pavo* and *Afropavo*.) But the Aristotelian categorical is about just the males of this group, the peacocks, and their brightly colored tails. What makes peacocks an axiogrouping is that that they comprise a biologically related group of organisms (not related by interbreeding relations or monophyly, but by morphology or occupying a similar ecological niche, perhaps) which have a discernible way of achieving their ends—particularly that of mating with peahens. Individuals may be evaluated in virtue of belonging to such an axiogrouping, and evaluations can be generated from any of the axiogroupings to which an organism belongs. (The natural goodness approach therefore accommodates Copp and Sobel's (2004) point that there is no reason to

focus on the particular "species" to which an organism belongs, rather than the other kinds to which it belongs, when determining evaluation standards.)

4.2 Evaluations of Organisms

The Axiological Species Concept generates evaluations of organisms because the Aristotelian categoricals that constitute life forms yield *norms* for individual members of an axiogrouping. While the Aristotelian categoricals are not themselves universally quantified, they apply to all members of the group in the sense that all members of the group have a common life form, including common goods. It is the fact that all members of a group *F* have a set of common goods that allows the derivation from the Aristotelian Categoricals to universally quantified norms stating that all members of group *F* are *supposed to* have characteristic *C*. The norms are true of all members of the group, in the sense that they are a basis on which any member of the group may be evaluated. Given the norm that *all warblers are supposed to begin moving south in the autumn* and given that a particular bird is a warbler (based on the biological criteria), we are in a position to evaluate that particular bird with respect to its migratory behavior.

A crucial part of the derivation of the norms from the Aristotelian categoricals is the attribution of the life form, including a set of goods/ends *G*, to all members of the group. How is the extension of the life form to those that do not display its characteristics justified? The Axiological Species Concept is bounded by biological criteria. The shared life forms apply to all members, as determined by the biological criteria. This sort of extension is not unusual. Under the Biological Species Concept, infertile organisms are considered members of a breeding community, and thus members of their parents' species, though they do not interbreed with other members. Under the ecological species concept, individuals (even populations) born and raised in captivity, which live under quite different ecological conditions and fill quite different ecological niches from their wild counterparts, are nevertheless considered conspecific with them. Similarly, under the Axiological Species Concept, organisms are conspecific if they are members of a biological group with a characteristic life form, even if one of them does not fully exhibit that life form.

The Aristotelian categoricals and the norms derived from them are not intended to be statistical generalities, and it should be clear that they are not. Even in cases in which a minority of species members displays the attribute, such norms may be generated. Only a small minority of sea turtle

hatchlings successfully make it alive to the open ocean once hatched. Nonetheless, this is what they are *supposed* to do, and arriving at the ocean counts as a good for all of them, as can be seen by the fact that this is what the large majority of them attempt to do. The norms are not descriptions of what would be *beneficial* to individual organisms, either. The behavior of worker bees is often not in the interest of individual worker bees, but still falls under the norm of what such bees should do. Consider too, tigers living in big cat sanctuaries. Many of these animals have never lived in the wild and could not survive in their natural habitat. While certain natural behaviors may be of no benefit to these individual tigers in their current environment, which contains neither prey nor predator, such tigers are still subject to the evaluative claims that they are not functioning as they should. They are defective tigers, which is why they have been placed in such sanctuaries.

An important feature of the Axiological Species Concept is that it relies on biological criteria for an organism's belonging to an axiogrouping, and generates distinct criteria for evaluation of an organism based on the life form of its axiogrouping. The criteria for being an *F* are distinct from the criteria for being a *good F*. If the membership criteria and the evaluative criteria were not distinct, there could be no evaluative discrimination among members of an axiogrouping. Only an organism previously determined to be an *F* can be evaluated as a good or a defective *F*.

4.3 The Legitimacy of the Axiological Species Concept

The Axiological Species Concept is not on the standard list of species concepts used by biologists. While it does defer to standard biological ways of grouping organisms in its grouping criteria, it also contains a distinct ranking criterion, one that is explicitly teleological and is meant to identify those biological groups that generate evaluation standards for their members. Given the teleological component and the focus on evaluation, the Axiological Species Concept is not likely to be useful for most purposes for which biologists need a species concept. Since the natural goodness approach is thinking of "species" rather differently than biologists do, it seems that it could not get off the ground were species monism to be true: the Axiological Species Concept is not a plausible candidate for the single best way to classify biological organisms. Fortunately, as we have argued, species pluralism is the more plausible position. Provided the Axiological Species Concept satisfies the necessary conditions for legitimacy, it can reasonably be accepted along with other species concepts.

In order for a group to constitute an axiogrouping it must be a biological group. That is, it must be a group of organisms related by biological features, recognizable by biologists as a biologically significant unit. This is sufficient to satisfy the second condition that the taxa recognized by a species concept be biological groups. In order to satisfy the first condition, it must be the case that there exist biological groups of the kind described by the Axiological Species Concept. There must be biological groups with shared life forms expressible by Aristotelian categoricals that describe the ways in which organisms within the group characteristically achieve certain goods/ends. In picking out biological groups with shared goods/ends, the Axiological Species Concept aims to carve nature at its *teleological* joints. It looks for characteristic forms, processes, and behaviors that are conducive to characteristic realizations of ends like self-maintenance and reproduction, and identifies as axiogroupings those biological groups with such common ends and characteristic ways of attaining them.

If there are teleological features in nature—for instance, the goods and ends implicit in Aristotelian categoricals—then the Axiological Species Concept aims to use them to pick out groups of organisms that are subject to normative evaluation. If there is no teleology in nature, then the Axiological Species Concept fails. One reason for thinking there are such goods and ends is that we can observe organisms striving to attain them. Living organisms display certain forms, processes, and behaviors that involve expending energy and altering behavior in characteristic ways toward the attainment of ends. We do not observe such strivings in non-living natural phenomena. As these forms, processes, and behaviors are characteristic of certain biological groups, there are groups of organisms that correspond to the names of axiogroupings, including the peacocks, the cats, and the placental mammals.

The explanatory power of the Axiological Species Concept is shown by the fact that it is used to explicate how organisms are (and can be) evaluated as being good or defective members of their kind—that is, it explains the form of evaluation. (It does not itself justify any *particular* normative evaluations of individuals. Such evaluations are generated or justified when the form is employed to evaluate particular individuals as members of the axiogroupings to which they belong.) This is sufficient to meet the third condition. A skeptic may doubt that there is anything here to be explained. Perhaps the claim that *warblers are supposed to begin moving south in the autumn* is reducible to a non-normative claim, or perhaps it is not really a coherent statement. We have argued that these norms are reducible neither to statistical generalities nor to descriptions of what

would be beneficial to individual organisms. If the skeptic is left maintaining that these norms are simply not coherent, the defender of Axiological Species Concept has a clear advantage. Such claims certainly appear to be coherent: we make them all the time, and have no trouble discerning their content. The Axiological Species Concept, and the teleological features it employs, explain what makes such norms possible, and in a naturalistic way. In addition, there is much more at stake than normative judgments about nonhuman biological organisms. Moral philosophers have struggled to make sense of moral facts. If one category of moral evaluation—evaluations of human character—is a variety of natural goodness evaluation, then the Axiological Species Concept has an explanatory role in the area of ethics.

In spelling out the Axiological Species Concept implicit in the natural goodness approach, we have shown that the approach is naturalistically and philosophically coherent and plausible. We have not shown that the natural goodness approach is the only possible approach to generating normative claims regarding individual organisms. (For an alternative approach, see Post 2006.) Nor have we shown that it is superior to the alternatives, such as an interest-based approach. But that the natural goodness approach is biologically and philosophically tenable implies that it needs to be considered alongside other possible approaches.

5 Transitions: From Nonhumans to Humans and From Health to Morality

The natural goodness approach is not undermined in virtue of employing the Axiological Species Concept, even if this is not a species concept typically used by biologists. This is not to claim that the Axiological Species Concept can do all the work the natural goodness approach aspires to accomplish. In addition, it must be established that the biological group *Homo sapiens* (or something very close to it) is an axiogrouring—that is, has a life form describable by Aristotelian categoricals which enables natural goodness evaluation of individuals of the group. Further, it must be established that this form of evaluation can be a significant part of the basis for moral evaluations. A full defense of the natural goodness approach is beyond the scope of this paper, but we offer the following sketch of how these challenges might be met.

It is clear that there is a biological group *Homo sapiens*, one that is delineated (at least) by genetic and phylogenetic criteria. Aristotelian categoricals will be as appropriate to this biological group with respect

to physiology or biological functioning (including the physiological components of cognitive and psychological functioning) as they are to groups of nonhumans—for instance, *human beings have clotting factors in their blood*. This enables natural goodness evaluations of human beings with respect to health: a human being whose blood lacks the proteins necessary for blood coagulation is a poor specimen (in that respect) of its species, in the same sense that a rhododendron that never flowers is a poor specimen (in that respect) of its species.

But there are complications in the transition of natural goodness evaluations from nonhumans to humans. The aspects of human individuals which are relevant to promotion of goods for individuals of the species (e.g., self-maintenance and reproduction) are not limited to bare biological functioning, but include as well desires, emotions, and actions (from reason and from inclination) (Hursthouse 1999). Moreover, the goods constitutive of human flourishing are more diverse than those of rhododendrons, or even porpoises. They include survival, self-maintenance, reproduction, and sociability—but also autonomy and knowledge, for example (Sandler 2007). In addition, the ways in which the goods are realized (and pursued) by human beings are not nearly so circumscribed by our biology as they are with other species. Our biology constrains us to some extent—for instance, human infants cannot survive on their own and we all require some interpersonal relationships. But human social systems and approaches to raising children have varied widely over time, among cultures, and between individuals, and they continue to change and develop. Human beings have the capacity to imagine a way of going about or realizing something, judge it as good, devise ways to attempt to accomplish it, and, if it works, pass it on to others (actively or passively) (Foot 2001; Sandler 2007). Therefore, although human beings do not have a characteristic way of realizing goods in the same sense as do other species, we do characteristically go about the world in a *rational way*. As Hursthouse explains, “A ‘rational way’ is any way that we can rightly see as good, as something we have reason to do” (1999, 222). These (and other) complications require the “*mutatis mutandis*” qualification when transitioning natural goodness evaluations from nonhumans to humans; however, they are not alterations to the *form* of evaluation. Individual humans are still to be evaluated on how conducive their parts, processes, and behaviors are to realizing the ends appropriate to their life form. This is true even as, for the reasons above, what constitutes both these ends and the characteristic pursuit of them is not solely determined by biological facts about *Homo sapiens*, but rather as well by the rationality, culture, and technology which

our biology enables, yet which shape and provide novel possibilities for our life form.

The transition from evaluations of health (i.e., biological functioning) to moral evaluations is also complicated. A person who has hemophilia is not a *morally* poor specimen in virtue of that condition. Moral evaluations (i.e., evaluations of virtue and vice) involve evaluating those aspects of human beings that remain after the bare biological parts and processes are separated out—namely, their emotions, desires, and actions (from both reason and inclination). But even this does not fully accomplish the transition. What is additionally required is provided by the “rational way” human beings characteristically pursue and realize the appropriate goods. (Again, characteristic features need not be exhibited by all members of the biological group. That *Homo sapiens* characteristically goes about the world in a rational way does not imply that nearly all people act rationally nearly all of the time.) That there is a variety of character traits that a human being might have and that our characteristic way of going about the world is rational provides the basis for evaluating character traits in light of their conduciveness to promoting endorsable (rightly-seen-as-good) realizations of the goods of the human life form (Hursthouse 1999; Sandler 2007). This is moral evaluation—or very close to it.

These several transitions place considerable weight on how our rationality modifies the approach from nonmoral evaluation of nonhuman organisms to moral evaluation of humans. Given the relationship between rationality and morality, it could not be otherwise. However, it does raise the question of how much work the natural goodness approach is ultimately doing once the transition is complete, and whether in the process of transition all the heavy normative work is ceded to an independent account of rationality (Thompson 2008). To be sure, the natural goodness approach applied to human character evaluations (as briefly sketched above) is not as tightly tied to biology as is normative evaluation of nonhuman organisms. Evaluations of human character traits are not merely biological appraisals. The ends constitutive of human good are not fixed by the biological facts about us. Human virtue is not reducible to good biological functioning. Nevertheless, significant aspects of the natural goodness approach remain. These include the form of evaluation (i.e., that aspects of the organism are evaluated according to their conduciveness to promoting certain ends), as well as that the biological facts about us significantly (albeit not exclusively) inform the content of the ends (i.e., human flourishing) and what constitutes endorsable forms of pursuit and realization of those ends. Moreover, that this account does not reduce

evaluation of character traits to evaluations of biological function helps it avoid some common objections to naturalistic accounts of virtue: that there are frequently situations in which being an imperfect biological specimen of *Homo sapiens* is not detrimental, or may even be conducive, to a person living well; that people often have worthwhile goals other than, or even inimical to, their biological flourishing; and that naturalistic accounts must countenance (or even require) us to act aggressively, vengefully or xenophobically, for example, if humans characteristically have impulses to act in these ways (Sandler 2007, 2008).

It is hoped that the foregoing sketch of a path forward motivates the sense that the natural goodness approach can be successfully transitioned from nonmoral evaluations of nonhuman organisms to moral evaluations of humans. If it can, then the Axiological Species Concept has an explanatory role in how a form of moral evaluation of human beings—that is, character evaluations—is possible.

6 Conclusion

In order for the natural goodness approach to explain how living things are evaluated as having intrinsic goodness, it must employ a normative conception of species, which we have articulated as the Axiological Species Concept. Given the plausibility of species pluralism, the use of such a species concept is not objectionable. That the Axiological Species Concept is in fact a legitimate species concept is shown in part by the fact that it picks out real groups of organisms that are characterized biologically and that share a common life form. Further, the Axiological Species Concept provides an explanatorily powerful way of dividing the living world into groups, by focusing on its teleological features. We have shown that the Axiological Species Concept makes possible a form of normative evaluation of living things as members of their species. This form of evaluation, *mutatis mutandis*, may be applicable to evaluation of human beings, including evaluations of human character traits. The Axiological Species Concept therefore enables the natural goodness approach. It does not, however, entirely justify that approach. Given the pluralist account of species, there is no basis in biology or metaphysics for privileging this species concept as more “true” or “real” than other viable species concepts. Nor is there a basis in biology or metaphysics for privileging the natural goodness evaluations it enables as the model for moral evaluations (Copp and Sobel 2004). The justification for modeling ethical evaluations on natural goodness evaluations must come from commitments in ethics, not biology. For

example, the justification can come from an ethical naturalism which maintains that human flourishing should be understood from an ethological perspective (not that of one's genes or ecosystem), that virtue and vice concern emotions, desires, and actions (not bare physiological functioning), and that ethical norms have a certain level of generality (even if indexed to environment/culture, which natural goodness evaluations accommodate). Therefore, while it has been established that the natural goodness approach is not problematic in virtue of its use of the Axiological Species Concept or Aristotelian categoricals, and that these provide a naturalistic ground for evaluations of natural goodness, we have not given a full defense of the natural goodness approach as an explanation of moral evaluation.

Acknowledgments

For helpful comments and discussions, we wish to thank John Dauley, Robert Epperson, Joseph LaPorte, Skip Larkin, Greg Littmann, Chris Pearson, Matthew Slater, Jim Stone, Jay Odenbaugh, and three anonymous referees.

References

- Copp, D., and D. Sobel. 2004. Morality and virtue: An assessment of some recent work in virtue ethics. *Ethics* 114:514–554.
- Cracraft, J. 1983. Species concepts and speciation analysis. *Current Ornithology* 1:159–187.
- Cronquist, A. 1978. Once again, What is a species? *Biosystematics in Agriculture: Beltsville Symposia in Agricultural Research* 2:3–20.
- Dupré, J. 1993. *The Disorder of Things: Metaphysical Foundations of the Disunity of Science*. Cambridge, Mass.: Harvard University Press.
- Ereshefsky, M. 2001. *The Poverty of the Linnaean Hierarchy*. Cambridge: Cambridge University Press.
- Foot, P. 2001. *Natural Goodness*. Oxford: Oxford University Press.
- Geach, P. 1977. *The Virtues*. Cambridge: Cambridge University Press.
- Ghiselin, M. 1987. Species concepts, individuality, and objectivity. *Biology and Philosophy* 2:127–143.
- Hull, D. 1987. Genealogical actors in ecological roles. *Biology and Philosophy* 2:168–183.
- Hursthouse, R. 1999. *On Virtue Ethics*. Oxford: Oxford University Press.
- Kitcher, P. 1984. Species. *Philosophy of Science* 51:308–333.
- Kitcher, P. 1987. Ghostly whispers: Mayr, Ghiselin, and the “philosophers” on the ontological status of species. *Biology and Philosophy* 2:184–192.
- MacIntyre, A. 1999. *Dependent Rational Animals: Why Human Beings Need the Virtues*. Chicago: Open Court Press.
- Mayr, E. 1982. *The Growth of Biological Thought*. Cambridge, Mass.: Belknap Press.
- Mayr, E., and P. D. Ashlock. 1991. *Principles of Systematic Zoology*, 2nd ed. Columbus: McGraw-Hill.
- Mishler, B. D., and R. N. Brandon. 1987. Individuality, pluralism, and the phylogenetic species concept. *Biology and Philosophy* 2:397–414.
- Post, J. E. 2006. Naturalism, reduction, and normativity: Pressing from below. *Philosophy and Phenomenological Research* 73:1–27.
- Sandler, R. 2007. *Character and Environment*. New York: Columbia University Press.
- Sandler, R. 2008. Natural goodness, natural value, and environmental virtue: Responses to Katie McShane and Allen Thompson. *Ethics, Place, and Environment* 11:226–235.
- Sandler, R., and J. K. Crane. 2006. On the moral considerability of *Homo sapiens* and other species. *Environmental Values* 15:69–84.
- Sober, E. 1984. Sets, species, and evolution: Comments on Philip Kitcher's “Species.” *Philosophy of Science* 51:334–341.
- Sokal, R., and T. Crovello. 1970. The biological species concept: A critical evaluation. *American Naturalist* 104:127–153.
- Stamos, D. N. 2003. *The Species Problem*. Lanham, Md.: Lexington Books.
- Thompson, A. 2008. Natural goodness and abandoning the economy of value: Ron Sandler's Character and Environment. *Ethics, Place, and Environment* 11:218–226.
- Thompson, M. 1995. The representation of life. In *Virtues and Reasons*, ed. R. Hursthouse, G. Lawrence, and W. Quinn. Oxford: Oxford University Press.
- van Valen, L. 1976. Ecological species, multispecies, and oaks. *Taxon* 25:233–239.
- Wiley, E. O. 1978. The evolutionary species concept reconsidered. *Systematic Zoology* 27:17–26.

