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Diversity: A Philosophical Perspective

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Abstract: In recent years, diversity, whether it be ecological, biological, cultural, or linguistic diversity, has emerged as a major cultural value. This paper analyzes whether a single concept of diversity can underwrite discussions of diversity in different disciplines. More importantly, it analyzes the normative justification for the endorsement of diversity as a goal in all contexts. It concludes that no more than a relatively trivial concept of diversity as richness is common to all contexts. Moreover, there is no universal justification for the endorsement of diversity. Arguments to justify the protection of diversity must be tailored to individual contexts.

Keywords: biodiversity; cultural diversity; diversity; ecological diversity; economics; environmental ethics; linguistic diversity; normativity

1. Introduction

Diversity has emerged as one of the major cultural values of our time [1]. In the natural world we are supposed to protect biodiversity, and efforts to do so have spawned the relatively new and fashionable discipline of conservation biology [2–4]. In the social realm we are supposed to protect cultural and linguistic diversity, according to some analyses because there are inextricably linked to biodiversity, and according to others because they are valuable by themselves [1]. Diversity is no longer a purely descriptive term as it was for ecologists (at least officially) when they first began to formulate quantitative measures of ecological diversity in the 1950s [5]. It has become a social goal that we are supposed to embrace, apparently no matter in what context, and as we shall see, often with far too little attention to its justification.

The purpose of this paper is both to explore the conceptual foundations of diversity in these different fields—do they all use the same concept of diversity?—and, in much more detail, to examine critically the normative basis for assuming that diversity is a goal that should be pursued. While technical discussions of diversity (e.g., how it should be defined and operationalized for quantitative estimation) are relatively common, except in the case of biodiversity, there has been little discussion of the justification for endorsing diversity as a goal. It is hoped that this paper will direct some much needed attention to his problem. It is not clear that “diversity” has retained the same meaning as it has transcended its ecological origins, where it was first made precise, to permeate other arenas. Nor should it simply be assumed that, if diversity is of value in one domain, it remains valuable in others.

Two preliminary methodological issues deserve to be explicitly mentioned since they will frame many of the discussions below:

- *Conceptual analysis requires (preferably explicit) assumptions about what determines adequate performance of a concept:* Before we decide whether a concept—or quantitative measure—of diversity is adequate, we need a clear understanding of what it means for such a concept to be adequate. Philosophers usually address this issue by elaborating explicit *adequacy conditions* for concepts: rules that *any* explication of the concept must satisfy. For instance, we may require that any adequate concept of diversity must ensure that a system with more types of entities is more diverse than one that is similar except that it has fewer types of entities (that is, the former has higher *richness* than the latter); we may also require (less uncontroversially) that a system with *rarer* entities is more diverse than another. The strategy of analyzing explicit adequacy conditions will also be followed here; in practice, biologists have also pursued the same strategy, at least in the case of ecological diversity [5].
- *Value judgments require normative assumptions about what is ethically (or aesthetically) desirable:* These normative assumptions, in turn, require justification and, in the case of diversity, they continue to be widely debated by philosophers [6]; in the context of ecological diversity and biodiversity these debates comprise a major part of environmental ethics [4,7,8]. Much of what follows will consist of making these normative assumptions explicit and drawing out their consequences. No attempt will be made here to adjudicate normative differences. However, this is *not* to endorse a vapid relativism that suggests that all normative positions are equally tenable. Rather, the goal here is to encourage the excavation of normative assumptions that underly seemingly factual claims so that these assumptions become subject to suitable scrutiny. Sorting out the relative merits of various normative claims is left for a different occasion (see, e.g., Norton [7], Sarkar [4] and Jamieson [8]).

We begin with ecological diversity because that has been the context for most of the explicit discussions of diversity (including discussion of adequacy conditions) (Section 2., [5]). We then turn to biological diversity (or biodiversity) which has been the focus of much recent attention partly because a quantitative measure of diversity has proven to be essential for systematic planning for biodiversity conservation [9,10] (Section 3.). Finally, we turn to the (comparatively) under-explored areas of cultural and linguistic diversity (Section 4.) and make a brief foray into economics (Section 5.) to buttress the arguments of earlier sections.

2. Ecological Diversity

As many commentators have recently noted, there is no single concept of ecological diversity [5,11,12]. Though attempts to quantify diversity in ecological contexts go back to Fisher *et al.* [13] in the 1940s, whose work was subsequently extended by Preston [14–16], much of the work in the field derives from attempts, starting with Simpson [17] and Margalef [18], to derive quantitative measures (or “indices”) of ecological diversity.

This history is by now relatively well-established [5,12,19] and, over the years, six criteria have been proposed as adequacy conditions for measures of ecological diversity [20]:

1. *Richness*: The number of different types of entities in a system, for instance, species in a community, is a measure of diversity.
2. *Evenness* (or *equitability*): The equality or disparity of the relative abundances of the individuals in the different types, for instance, populations of the different species in a community, measures diversity, with less disparity being interpreted as more diversity.
3. *Abundance rarity* (the level of occurrence): The presence of rarer (less abundant) entities, for instance, species, increases diversity.
4. *Geographical rarity* (the range of an entity): The presence of entities, for instance, species, that are more restricted in range increases diversity.
5. *Distinctiveness*: The presence of more unique entities, for instance, phylogenetically uncommon species, increases diversity.
6. *Abundance transfer*: Diversity increases if the relative abundance of a common entity, such as a species in a community, decreases while that of a rare entity increases by the same amount.

It is easy to prove that, given some minimal assumptions about the system, no single quantitative measure can satisfy all these conditions: satisfaction of conditions (5) and (6) alone leaves richness as the unique measure [11] and using richness alone violates condition (2). (Richness does not depend on whether relative abundances are equitably distributed among the different types; richness only captures the number of types. Thus a community consisting of 90 individuals of type *A* and 10 individuals of type *B* has the same richness, *viz.*, 2, as one consisting of 50 individuals of type *A* and 50 individuals of type *B*. However, once we consider equitability, the former is less diverse than the latter.) The conclusion to draw is that there is no single concept of ecological diversity [5,11,12].

However, what is more important for this paper is that this set of adequacy conditions is the most comprehensive one that has been produced in any context in which the meaning of diversity has been seriously discussed. It will serve as a foil when we examine diversity in other contexts. Meanwhile, the fact that there is no single categorical concept of ecological diversity should engender some worry as to whether there is any clear concept of diversity in other contexts in which, at least superficially, the uses of the concept seem even less precise.

Before we turn to that question, it is worth asking why diversity was viewed to be relevant to ecology. There were some efforts to link diversity measures to ecological processes (e.g., Patil and Taillie [20])

but these did not live up to whatever initial promise that they had, and the project was largely abandoned by the 1980s. However, by and large, what seems to have driven ecologists' interest in diversity in the 1960s and 1970s was a preoccupation with the diversity–stability hypothesis, that more diverse ecological communities were more stable than those that were less diverse [5]. Those who hypothesized this relationship included MacArthur [21] and Elton [22] with the latter, as well as Pimentel [23], providing initially promising empirical support that eventually dissipated. Meanwhile May [24] produced a large number of theoretical models arguing that more complex communities (which were presumably more diverse) were less stable than simpler ones. There are also plenty of cases in which more resilient systems (those that are less prone to collapse under perturbation) are simpler and less diverse than less resilient ones. The matter remains unresolved to this day (and the complex history has recently been reviewed by Sarkar [5]).

But, why bother with the diversity–stability hypothesis? Two answers have been suggested. The *first* is that attempts to “derive” stability from diversity reflects a longstanding Western pseudo-religious assumption of the “balance of nature” [25–27]. Filling in this argument is relatively straightforward and it can be done in a variety of ways. For illustration, consider one variant: We have to assume the global biotic community to be in equilibrium due to the interactions between its constituent species. Presumably, no species is supposed to go extinct because of the divine origin of each species. (Why would the deity create a species if it is to be allowed to become extinct?) Consequently, even a local extinction violates divine will, and the harm done is expressed by a community losing its balance, that is to say, is stability. Whether or not some such argument lies in the distant inchoate background of twentieth-century diversity–stability discussions, historians have so far produced precious little tangible (e.g., textual) evidence of this connection. This is not to deny that the presumed balance of nature may play a deep role in explaining why most ecologists in the twentieth century assumed that communities were typically in equilibrium (e.g., climax communities). Rather, the doubts being expressed here are about the precise role of this assumption in generating the specific hypothesis that diversity begets stability. Note the two normative assumptions that form part of the argument: (i) that the extinction of species—in other words, the decline of diversity—is undesirable; and (ii) stability is desirable. Thus, even if the diversity–stability hypothesis is not itself explicitly normative (as Sarkar [12] has pointed out), the rationale for its exploration relies on normative assumptions.

Both of these normative assumptions are also part of the *second* explanation of why the diversity–stability hypothesis was deemed to be important: if there were such a relationship, it would provide a basis for preserving biological diversity. As Goodman ([28], p. 261) puts it: “The diversity–stability hypothesis has been trotted out time and again as an argument for various preservationist and environmentalist policies. It has seemed to offer an easy way to refute the charge that these policies represent nothing more than the subjective preferences of some minority constituencies.” The normative work in this argument is being done by stability which is accepted, without question, as being desirable. However, the motivation for deploying the argument is to provide a rationale for protecting biological diversity, to which we will turn in the next section.

But, before that transition, it is important to note that all these discussions of the diversity–stability relationship, with virtually no exception [20], used only one measure of diversity: richness. Perhaps the most striking feature of all the work on ecological diversity is that, even after half a century, it

remains unclear what all the other measures of ecological diversity are good for. None has entered into significant—if any—theoretical relationships or seen much practical use.

3. Biodiversity

The term “biodiversity” was introduced in 1986 as a contraction for “biological diversity” during the organization of a (United States) National Forum on Biodiversity [29]. Many commentators have analyzed the synergistic growth of the use of the term “biodiversity” and the growing popularity of conservation biology as an organized discipline which also emerged in the late 1980s [4,30]. Conservation biologists, particularly in the United States, felt that they were creating a brave new science in response to an extinction “crisis” that was supposed to be unprecedented in human history [31]. The rationale for the creation of conservation biology as a discipline was the protection of biodiversity.

This normative goal—conservation—severely constrains how biodiversity should be conceptualized, a problem that was accentuated by the fact that those who introduced the term apparently took its meaning to be obvious and did not deign to define it [29]. As almost every commentator on the subject has noted, producing a precise definition of biodiversity is non-trivial [2,4,29]. In many circumstances, biodiversity is supposed to be constituted by the diversity of ecosystems, species, and alleles (genes), but this proposal cannot be anything more than a choice of pragmatic *surrogates* for biodiversity: for instance, it excludes inter-specific hybrids and, more importantly, it also excludes diversity at all taxonomic levels higher than that of species.

If biodiversity is taken to be all of natural variety at every level of taxonomic, structural, and functional biological organization, the concept cannot be operationalized for conservation in practice [2,32]: the goal of conservation would become *all* biological entities [29]. Consequently, biodiversity *constituents* (sometimes called “true surrogates” in earlier literature [2,4,10,32,33]) must be selected: these are those features of the biological world deemed worthy of protection, and this is a cultural choice. It follows that any definition of biodiversity must incorporate cultural norms [34]: what deserves protection is ultimately not entirely a scientific question even though scientific value may play a role in that decision. For instance, in the contemporary United States, species are typically taken to be the relevant units and the species at risk are prioritized (as reflected in the [US] Endangered Species Act of 1973). In contrast, organizations such as The Nature Conservancy opt for habitat types (sometimes dubbed “ecoregions” in this context) as constituting the units of biodiversity. Which choice is more appropriate is not a scientific question even though the choice will constrain what scientific techniques must be used to achieve the goals of conservation.

But, why protect biodiversity at all? Once again, this is a normative question. Attempts to answer it continue to generate controversy within environmental ethics [8]. Two broad strategies can be distinguished: those that attribute to biodiversity *intrinsic* value independent of all human considerations [35]; and (ii) those that are *anthropocentric* in the sense that the protection of biodiversity is supposed to serve human interests [4,7]. These human interests can either consist of immediate “felt” human preferences (generating *demand* values that influence market choices), or they may refer to the power of biodiversity (and other natural or cultural features) to transform human preferences [4,7]. Most environmental philosophers will presumably agree that an adequate rationale for biodiversity conservation cannot be entirely built on the basis of felt preferences producing demand values that may be traded in

the marketplace [4,7,36]. There is little doubt that many features of biodiversity have such demand values, for instance, species that can serve as food or be used for medicinal purposes. But, there are plenty of species for whom it is hard to envision any such use and there are many others, for instance, disease agents, vectors, and reservoirs, for which any felt preference would be negative [4,36]. Demand values cannot justify the conservation of these species. By and large, philosophers have also found attributions of intrinsic value to be conceptually incoherent (though there are notable exceptions [35]). Relying on the transformative power of biodiversity also has attendant problems, for instance, because many other features of the world, including cultural objects, may trump biodiversity with respect to transformative power [4,37]. Thus, while there is widespread consensus that the protection of biodiversity is important, the reasons continue to be debated by philosophers (and other conservationists) and a final resolution does not seem immediately forthcoming.

The fact that the goal of conservation biology is to protect biodiversity also imposes constraints on what may count as an adequate *measure* of biodiversity for operational use in the field. While these constraints have never been formalized as adequacy conditions quite as precisely as those for ecological diversity (§ 2.), two important roles for measures of biodiversity are easily demarcated, and both form part of what has come to be called *systematic conservation planning* [9,10]:

1. Biodiversity measures must be quantifiable and subject to sufficiently precise measurement to allow the prioritization of habitat units (*e.g.*, land parcels) for conservation on the basis of their biodiversity content, that is, their ability to represent biodiversity [38].
2. Moreover, because conservation for biodiversity is just one of several normatively salient demands on land—its use for habitation or production being some of the others—, an adequate measure of biodiversity must result in the economical (sometimes called “efficient” [39]) prioritization of habitat units, that is, it must try to optimize the representation of biodiversity in the areas designated for conservation.

These seemingly innocuous requirements are sufficient to rule out richness as the relevant measure of biodiversity (though some philosophers continue to emphasize its conceptual importance [40]). Suppose we have three habitat units, *A*, *B*, and *C*, of which (because of economic constraints) only two can be designated for conservation. Suppose *A* and *B* have very high richness (say, of species) but share most species in common whereas *C* has low richness but a suite of species that are unique to it. It makes more sense to protect *A* and *C* or *B* and *C*, rather than *A* and *B* in spite of their higher richness—*C* complements *A* or *B* so as to ensure the maximum representation of biodiversity in a minimal area to be set aside for conservation. This insight, which has been called the “principle of complementarity” [41], has been a cornerstone of systematic conservation planning [42] since its introduction in the 1980s [41,43,44]. For some, complementarity is the proper measure of biodiversity [2,32].

The relationship between complementarity and earlier measures of ecological diversity takes us to developments within ecology in the 1960s that occurred in parallel to those discussed in Section 2. but had no influence on the diversity–stability debate. All potential measures of diversity discussed there concern the diversity *within* a study area. In 1960, Whittaker [45] distinguished this measure of diversity, which was called α -diversity, from a measure that quantified the diversity *between* study areas, *viz.*, β -diversity; these were distinguished from γ -diversity, the total diversity of the region. (Informally,

γ -diversity is the result of aggregating α - and β -diversity across a region.) Complementarity is then seen as a measure of β -diversity, as Magurran [46] has pointed out. (Complementarity has also been used in algorithms to prioritize areas for conservation [47] but those developments are beyond the scope of this discussion. In that context there are some subtle technical differences between complementarity and β -diversity [12].)

Returning to the adequacy conditions of Section 2., the two listed earlier in this section replace richness and lead to complementarity. (However, richness does remain relevant when complementarity is used, but as a measure of γ -diversity since the goal of using complementarity is to maximize the total number of entities such as species in a conservation area network by exploiting the β -diversity between units of the network.) Three of the other adequacy conditions listed there have also played a role in devising biodiversity measures: evenness [48], (phylogenetic) distinctiveness [49], and, especially, geographical rarity [47,50–52]. However, with the exception of geographical rarity, these criteria have had minimal influence compared to complementarity.

Where does this leave us? At the conceptual level, richness (within habitat units) cannot provide an operational measure of biodiversity even when the representation of the total richness of a region is the goal for a conservation area network. Complementarity fares better. While the definition and use of complementarity do not require explicit normative commitments—thus, in that limited sense, biodiversity is not a normative concept (the contrast here is with Callicott *et al.* [53] and Roebuck and Phifer [54])—there is a much deeper sense in which norms are embedded in any practical measure of biodiversity: the constituents of biodiversity that we choose to protect necessarily reflect cultural norms about what is worth protecting. This does not mean that the choice of biodiversity constituents is arbitrary or not open to challenges or unimportant. What it does mean is that discussions of the appropriateness of biodiversity constituents will involve arguments about norms of the same sort used in discussions of ethics, politics, *etc.* These discussions must determine what a culture most values in the natural (non-human) world around it. Scientific facts will often be only marginally relevant. Finally, normative considerations are also obviously relevant to why biodiversity should be conserved at all—but this is a well-known and much-studied problem within environmental ethics.

4. Cultural and Linguistic Diversity

Possibly spurred by the popular attention to biodiversity and its protection [55], by the early 1990s, several studies began to report that there was widespread ongoing erosion of cultural [56,57] and linguistic [58–61] diversity. For some, there was yet another “crisis” [55], similar to the putative extinction crisis that dominated discussions in early conservation biology. By the early 2000s, the protection of cultural and/or linguistic diversity had emerged as a loosely organized socio-political movement with the endorsement of many transnational bodies including the influential United Nations Educational, Scientific, and Cultural Organisation (UNESCO) [62–65]. Meanwhile, a wide variety of studies showed that biodiversity and cultural and linguistic diversity were typically subject to the same threats, most notably, the use of modern technology to access and destroy what used to be inaccessible habitats with unique biological and cultural features [1].

In these discussions, two possibilities should be distinguished:

- *Cultural and linguistic diversity may be geographically coincident with—or even more strongly connected—with biodiversity*: Protecting cultural and linguistic diversity then gets its justification from the same arguments as those for protecting biodiversity (§ 3.). The rationale for this position comes from a wide variety of studies mapping cultural and linguistic diversity to show that, at least at a coarse spatial resolution, patterns of cultural or linguistic diversity match the spatial distribution of biodiversity [66–69], in particular, by showing a surprising latitudinal gradient (with diversity interpreted solely as richness) [70]. Further, if the persistence of biodiversity and cultural diversity (including linguistic diversity) are *causally* linked, as some studies have purported to show (reviewed by Maffi [1]), then the protection of cultural diversity becomes a co-requisite of the protection of biodiversity. However, even if this geographical coincidence is no more than a result of historical contingency, the protection of cultural diversity would contribute to the protection of biodiversity. No new normative justification for cultural and linguistic diversity *per se* is required.
- *Cultural and/or linguistic diversity is itself the target of what should be preserved* [71–73]: This possibility is more interesting because it requires new arguments for the protection of cultural and linguistic diversity independent of those for the protection of biodiversity (§ 3.). One possible option is to co-opt the transformative power argument for biodiversity and argue that cultural and linguistic diversity have transformative power. Though no one seems to have explicitly made such a claim, three related arguments have been offered in the literature in defense of cultural and linguistic diversity:
 - Maintaining cultural and linguistic diversity keeps a variety of future options open for the human species as a whole [67]. The argument here can be viewed as also being similar to that for biodiversity conservation based on the transformative power of biodiversity. Moreover, the next two arguments spell out why these options may be valuable.
 - A decrease of linguistic diversity is supposed to decrease the “adaptational strength” [74] of the human species as a whole because it decreases the common pool of knowledge available to respond to environmental challenges. Similarly, a decrease of cultural diversity may lead to the formation of undesirable cultural “blind spots” because existing cultural models may prove inadequate to cope with future challenges.
 - In a variant of the last argument, cultural and linguistic diversity allows the “pooling” together [74] of disparate resources to generate more reliable knowledge than what could otherwise be obtained.

No matter how plausible these arguments may seem, in the absence of detailed case studies illustrating these points (and the ones presented so far have been little more than promissory notes), is impossible to judge their force. Proponents of these arguments need to engage in much more empirical work than what has so far been reported in the published literature.

But even if the requisite empirical work sustains these arguments for the maintenance of cultural and linguistic diversity, there is room for some caution, especially with respect to cultural diversity. Unless we are willing to endorse a catholic cultural relativism, does the protection of cultural diversity include the protection of slavery *if* that is the only feature that distinguishes a candidate culture for protection

from those that are not in danger of extinction? Or protection of discrimination based on gender or clan? Protection of xenophobia? Even within a culture, does diversity of social structures necessarily merit protection? For instance, in the dominant Hindu culture of contemporary India (assuming, perhaps controversially, that it can be individuated in this fashion as a single culture), the complex structure of the caste system (*varna* and *jati* [75]) presumably adds some diversity that is not recognized by the Indian legal system (which outlaws caste). But, is this diversity desirable? We need a discussion that is more nuanced than a blanket endorsement of cultural diversity. This is not to suggest that these difficulties cannot be navigated (cultural anthropologists have long been aware of them)—rather, it is to point out that there has as yet been insufficient explicit discussion of these issues even in recent reviews of the field (e.g., Maffi [1]). Meanwhile, there has been several ongoing attempts to construct appropriate measures of cultural and linguistic diversity (e.g., Loh and Harmon [76]); what they contribute remains to be seen in the future.

The discussion of this section has so far ignored what is perhaps the most compelling normative argument for the protection of cultural diversity: that protecting human rights requires the protection of cultural diversity (including, where relevant, linguistic diversity). In many areas of the world local residents—very often, but not always, indigenous groups—are facing resource confiscation and deprivation by national and transnational agencies, including state and corporate actors. (Trans-national biodiversity conservation has also contributed to these practices [77].) Resistance has almost always focused on land and other resources, often coupled with a demand for cultural “rights”, that is, the preservation of cultural practices (including language). (Given the scope of this paper, difficult philosophical problems associated with concepts of *group* rights, as well as the question whether political legitimacy is best conceptualized in terms of “rights”, itself a recent Western innovation, will be ignored. They do not affect the thrust of the argument.)

Nothing that has been said above calls the pursuit of human rights into question, or decreases the emphasis on the protection of cultural (and linguistic) diversity as part of human rights. The point, though, is that what is normatively at stake in these arguments is a respect for human rights; the protection of cultural and linguistic diversity is a *consequence* of this goal. Diversity does not provide the normative basis; rather, in these arguments, normative justification is provided by the imperative to protect human rights. (Note that this justification has the added advantage of allowing criticism of cultural practices which may also be in conflict with human rights—slavery, discrimination, *etc.*)

5. A Further Note of Caution: Economics and Diversity?

The worries raised towards the end of the last section can be highlighted by turning briefly to the economic organization of societies. The argument here will invoke several of the adequacy conditions listed in Section 2. There are obviously many different ways in which societies can plausibly be divided into a number of salient economic groups, e.g., by professions (guilds), consumption preferences, or mobility, but a classification by wealth (for the sake of this argument it does not matter what measure of wealth is used) is useful in many contexts [78]. Then, if diversity includes richness, a diverse society would be one where there are many different wealth classes; and, if diversity includes equitability, a society would be most diverse if an equal number of individuals were distributed into each class, including those at the top and bottom. Further, if diversity also includes (abundance) rarity, a society with many individuals in

dire poverty would be more diverse than one with fewer such individuals (so long as poverty is relatively rare).

Is diversity still desirable? If so, we are in conflict with yet another normatively salient goal which is also a type of equitability: that, by and large, wealth should be evenly distributed in a “good” society [79]. If poverty is relatively rare, we should also be committed against poverty reduction since that would typically violate the adequacy condition of abundance transfer (§ 2.). In fact, the goal of diversity may be in conflict with every principle of distributive justice [80,81]. The point, here, is not to argue for or against egalitarianism. Rather, the point is to bring to attention the normative commitments that would be implied by any blanket endorsement of diversity in *all* cultural contexts.

It should also be mentioned that mathematical economists have also produced searching analyses of diversity, often using adequacy conditions similar to those in Section 2., and sometimes explicitly relating these analyses to ecological diversity and biodiversity. These analyses are beyond the mainly normative interests of this paper; Weitzman [82] and Nehring and Puppe [83] provide a useful entry into that literature.

6. Discussion and Conclusions

Conceptually, one running theme through these discussions is that richness is a critical component of diversity. Even in the context of biodiversity, where it has to be replaced by complementarity in the context of systematic conservation planning, richness as γ -diversity remains relevant, underscoring the emphasis on richness that some philosophers have defended [40]. It remains surprising how little attention has been paid to the other adequacy conditions originally elaborated in the context of discussions of ecological diversity (§ 2.) with, perhaps, the exception of geographical rarity in the context of biodiversity. This means that the extent to which there is a concept of diversity that transcends disciplinary boundaries, it is restricted to richness. This may suffice for guiding the practical task of protecting diversity in most of the relevant contexts is not otherwise of much interest. (From a conceptual perspective, richness is a rather trivial concept of diversity because it merely involves counting the number of types in a system.)

Moreover, except for the use of complementarity and other measures of biodiversity to prioritize areas for conservation during systematic conservation planning (§ 3.), diversity concepts in no discipline have been embedded in a broader framework of theory or practice. (In ecology, this was once an explicit goal, particularly in the context of the diversity–stability hypothesis, but work towards that end has largely stalled in recent decades, given the stalemate in the diversity–stability debate.) In other words, at the conceptual level, there is at present no clear answer to the question: what use is “diversity”?

Concepts of ecological diversity do not necessarily have normative commitments embedded in them even if the interest in diversity (because of the putative diversity–stability relationship) has its origin in normative assumptions. In sharp contrast, operationally adequate concepts of biodiversity (that is, how it must be specified for the purpose of conservation) must reflect normative commitments by a culture about what in the natural world it deems worthy of pro-active protection. As noted earlier (§ 3.) biodiversity conservation is not the only normatively salient use of habitats and choosing to protect biodiversity almost always compromises other worthwhile social goals. This point deserves emphasis because it so far has not received adequate attention and, as a result, there has often been insufficient

attention to how biodiversity constituents are chosen (for instance, as the focus of legislation such as the [US] Endangered Species Act). It should be emphasized that this normative aspect of biodiversity is independent of the well-known normative issue of why biodiversity should be protected in the first place, which was also discussed earlier (§ 3.).

With respect to the protection of diversity as a norm for social policy, arguments for the protection of diversity are not easily (if at all) transferable from one context to another. For ecological diversity, the question is not relevant. In the case of biodiversity, many arguments have been offered but none has satisfied all its critics. Perhaps the only one that carries over to some extent to the protection of cultural (including linguistic) diversity for itself (that is, not because of its relation to biodiversity) is that the availability of diversity potentially has transformational power, broadening possibilities for a society (§ 4.). It should also not go unnoticed that the arguments for the protection of cultural diversity, however plausible, are yet to be backed by detailed case studies which would do much to clarify the situation. Moreover, the pursuit of cultural diversity raises other ethical dilemmas which need to be explicitly addressed if a vapid cultural relativism is to be avoided. The final conclusion to draw is that there is a necessity for much further discussion before we provide a blanket endorsement of promoting diversity irrespective of context.

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