Biodiversity and the Value of Positive Engagement with Reality

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Abstract: What makes biodiversity valuable? I offer a new account of the value of one aspect of biodiversity - diversity of sentient animal species. I propose and defend the *Positive Engagement Principle* (PEP): that it is intrinsically valuable that more aspects of reality are positively engaged with by sentient beings. I argue that diversity of sentient animals is instrumentally valuable because it enables a wider range of such engagements through the diverse forms of perception, understanding, appreciation, and action available to animals of different species. I compare PEP with two recent accounts of the value of diversity of animal experiences – Livermore's Heteric Welfarism and James' Lifeworld account – and argue that PEP better captures the distinctive value of world-directed experiences across species.

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1. Introduction

Most people agree that biodiversity is valuable.[1] Grounding this judgement has been more difficult, however. Attempts to do so can be divided into two broad categories, based on whether they see biodiversity as *instrumentally* or *intrinsically* valuable:

(1) **Instrumental Value** – Biodiversity is valuable not for its own sake, but insofar as it facilitates the attainment of things that are valuable in themselves. This is typically conceived in anthropocentric terms – biodiversity is valuable as a means of attaining

[1] Defining biodiversity is difficult, and there is no universally agreed upon definition (Newman et al., 2017 p.2-6; Sandler, 2012 p.9).

benefits for humans, such as ecosystem services and economic benefits (see Faith, 2021; Newman et al., 2017 chapters 2-7; Sandler, 2012 chapter 2; Maier, 2012 chapter 6).

(2) **Intrinsic Value** – Biodiversity is valuable for its own sake, independently of any other intrinsic goods that it might enable. This could take ecocentric, biocentric, or other forms (see Naess, 1989; Taylor, 1986; and Soulé, 1985).[2]

Both approaches face problems. Grounding the value of biodiversity on its instrumental value for humans is vulnerable to Sylvan's (1973) 'Last Man' thought experiment, which suggests that the natural world has value beyond its utility to humanity. Furthermore, if only that which is valuable to humans is valuable, then much biodiversity will not be valuable since it is useless to humanity (Oksanen, 1997 p.542; Koricheva and Siipi, 2004, p.46). Even when some instance of biodiversity is useful, instrumental value defences need to show that conservation is *more* useful than the alternatives (Newman et al., p.193).[3] If on the other hand we consider biodiversity to be intrinsically valuable, we are committed to valuing natural states of affairs which seem eminently *disvaluable* either from an anthropocentric point of view (valuing species harmful to humanity) or from the point of view of sentient animals affected by harmful forms of biodiversity (e.g. valuing parasites despite the severe harms they inflict on animals). While it is not contradictory to value something intrinsically while also recognizing that it is instrumentally disvaluable, there is at least a tension here. If, for

[2] See Newman et al. chapters 8-12 for an overview of intrinsic value defences of biodiversity. Strictly speaking, not all these defences claim that biodiversity per se is intrinsically valuable, even if they do provide environmentalists with argumentative resources to defend the conservation of (some) instances of biodiversity. Taylor's individualistic biocentrism, for example, claims not that biodiversity is intrinsically valuable, but that all individual organisms have inherent value.

[3] Even a nonanthropocentric understanding of instrumental value cannot endorse conservation of all ecosystems as they are – some changes to ecosystems will benefit some species and harm others. As Newman et al. (p.48) put it: "there is unlikely to be any species-general ecosystem service".

example, a new species of bacteria evolved and caused terrible disease in humans it is not obvious that we should say this is intrinsically good (since it increases biodiversity) but instrumentally bad (since it harms humans). Instead, we might think that there is nothing intrinsically valuable in the existence of the harmful bacteria.[4]

In this paper I will not attempt to ground the value of all forms of biodiversity. Biodiversity is an extremely broad category, encompassing at least diversity in genes, species, and ecosystems, and there may be no single way of grounding its value. Rather, it could be the case that different forms of biodiversity are valuable in different ways. My aim is more modest – I will provide a new account of the value of diversity of sentient animal species based on differences in their experiences of, and interactions with, the world. My argument should be understood as describing one way in which diversity of sentient animals is valuable, not as a complete description of the value of biodiversity or of sentient beings. There are two reasons such an account may be useful. First, the value of diversity of sentient animals is underexplored in the literature on biodiversity – to my knowledge only Livermore (2024) and James (2024) have explored the idea that diversity of animal experiences might be valuable. This is a surprising omission – the minds and perceptual systems of animals are as much a result of evolution by natural selection as their bodies, and, if diversity of physical forms is valuable, it is not obvious why a diversity of mental forms would not be. Second, sentience is considered extremely important in ethics and value theory generally, and it would be strange if it were not at all relevant to the value of biodiversity given that this is another key form of diversity in nature.

[4] Maier (p.310-311) questions the value of biodiversity which leads to (human) suffering: "If biodiversity is at the heart of the value of nature, then it is at least very puzzling that so much biodiversity is responsible for so much human suffering" (see also p.344). For a general defence of the intrinsic value of diversity (including biodiversity) see Baum and Owe (2024).

My argument is based on the fact that animals of different species differ in their phenomenologies, habitats, and ways of living and interacting with the world. There are many beautiful and pleasant things in the world that ought to be appreciated, facts that ought to be known and understood, achievements or modes of action that ought to be taken and so on. We can think of the world as offering many opportunities for realising welfare and appreciating value of different kinds, only a small number of which are available to animals of any given species. Intuitively it would be a great shame if all these opportunities for wellbeing of various types went unexploited, and if all the beauty and value of the world went unappreciated. I argue for the Positive Engagement Principle – that it is intrinsically valuable that more aspects of the world are positively engaged with by sentient beings. Diversity of animal species is instrumentally valuable insofar as it facilitates this positive engagement. This argument is nonanthropocentric, since biodiversity is valued for reasons that go beyond human interests. Though biodiversity's value is instrumental, my account ties the value of conscious beings to the value of the world rather than to merely human interests or their welfare. This may make it more appealing as an account of the value of diversity of sentient life than anthropocentric instrumentalist or welfarist ones. Since this account is limited to positive engagement, it doesn't value those sorts of biodiversity that involve mostly negative engagements. Predatory animals raise difficulties discussed in section 5.

In section 2 I outline and motivate the Positive Engagement Principle, arguing that it is impersonally better if more aspects of reality are positively engaged with by sentient beings. In section 3 I argue that biodiversity is instrumentally valuable as a means of attaining the intrinsic value of positive engagement with reality and highlight some implications of this view. In section 4 I consider two alternative approaches to valuing diversity of sentient beings

and argue that they face problems which my account avoids. In section 5 I consider some difficulties for my view and indicate areas for further research.

2. The Positive Engagement Principle

Imagine God pauses after the fourth day of His creation. He has made the world - all the inanimate parts as well as all the insentient organisms. He has made a beautiful, intricate, and biodiverse world, which, plausibly, has value. What could be missing? For a welfarist, the answer is obvious - there are no sentient beings and so there is no positive welfare. Is this all that is lacking? Imagine we advise God that His creation is not yet 'very good' since it lacks positive welfare. Could we object if, instead of creating a great diversity of happy sentient beings enjoying the world He has created, He instead creates a vast population of mice, each of whom enjoys a small amount of pleasure, thus adding positive welfare to His world?[5]

If sentient beings were valuable only insofar as they produce positive welfare, then we would have to say that His world, after the addition of the mice, lacks nothing. Likewise, if we thought that biodiversity, even of insentient beings, was all that matters, then it seems that His creation is complete after the fourth day. Intuitively, however, it seems that this world would be much better if it contained a diversity of sentient animals engaging in different ways with the world, appreciating its beauty, knowing and understanding the world, and enjoying the opportunities for welfare that it brings. We can express this idea in the following principle:

[5] Indeed, given their minimal resource requirements, this might be the best way of maximizing welfare on a planet with finite resources (see O'Brien, 2024).

Positive Engagement Principle (PEP)*:* All else being equal, it is impersonally better if more aspects of reality are positively engaged with by sentient beings.

The kind of value I have in mind here is impersonal value. By this I mean that positive engagement with reality is intrinsically valuable without being valuable for any particular being. That is, it is valuable "from the point of view of the universe" (Sidgwick, 1981), in the same way that the existence of species or unobserved beauty are sometimes thought to be valuable.[6] By 'intrinsic value' I mean that positive engagement is valuable in itself, not as a means to some further end, and that it is objectively valuable independently of whether anyone in fact values it. Unlike Moore, I do not mean that something is intrinsically valuable only if it is valued entirely for its intrinsic properties, excluding relational properties.[7] Finally, I intend this in a comparative sense – if more of reality is positively engaged with this is better all else being equal than if less of it is.

By 'aspects of reality' I mean all the physical things that exist, including inanimate objects like mountains, rivers, seas, stars; living things, such as plants, animals, people; complex systems made up of those things, such as ecosystems; the basic physical building blocks of all these macroscopic things such as matter, photons, chemical elements; the underlying laws of nature that make these things possible; abstracta, such as numbers, ideas, laws of logic etc. That is, more or less, the totality of things that make up reality or the world. It's plausible that the world, even in the absence of sentient beings, has some impersonal value, perhaps in virtue of its beauty and complexity. Without conscious creatures who can appreciate the

[6] The possibility of impersonal value is contested, but I cannot do justice to this debate here. The most prominent supporter of impersonal value is Moore (1903/1993). On the distinction between prudential value and impersonal value see Lin (2025). For a critique of the possibility of impersonal value in general and in relation to biodiversity see Kraut (2012, especially chapter 23). Following Moore, I take beauty to be a kind of objective impersonal value.

[7] See O'Neill (1992, p.120-121) and Sandler (p.16-20) on the various meanings of 'intrinsic value'.

world, however, its value seems minimal, unrealised. Once there are conscious beings who can positively engage with that world, it seems that there is much more value. Indeed, it is plausible that the value of the whole (world + positive mental states of conscious creatures appreciating that world) is greater than the sum of its parts.[8]

By 'positive engagement' with reality I mean the various ways in which sentient beings can connect with valuable aspects of reality that are fitting, and which plausibly increase the welfare of those beings. Fitting engagements are those which appropriately respond to the value of the world. Knowledge is a clear case – the world is full of things to be known and understood, and the fitting response to this is to know and understand the world better. Likewise, the world contains beautiful things, and the fitting response is to appreciate and enjoy them. Unfitting responses would be to cultivate ignorance or to hate and destroy beautiful things. Other examples of fitting engagements with valuable things open to animals might include loving and taking care of one's offspring, exploring one's environment, or building a nest. I cannot give a full account here of why these engagements with reality are fitting. The best I can say is that they respond properly to the value of those things – taking care of one's offspring is a fitting engagement as it properly responds to their value, whereas destroying or neglecting them do not.

As I have articulated it so far, positive engagement with reality requires three components (1) objective value in the world (a beautiful flower for example) (2) a fitting response to that valuable thing (e.g. appreciating or enjoying the flower) and (3) a tendency to increase the welfare of the being who so engages with reality. Of course, it is also possible to have fitting responses to things of negative value which tend to decrease the welfare of the being who has

[8] See Moore (1903/1993) on organic unity.

this response. Think of grief at the loss of a loved one or fear at the presence of a predator for example. Clearly it is fitting to respond with grief to the loss of a loved one and very plausible that this is better than responding with indifference or joy. This fitting response to negative value may have some sort of conditional value – if (bad thing) then it is appropriate to (respond with negative feeling). This combination of (bad thing) + (fitting response) cannot make the world better than it would have been if the bad thing never occurred – i.e. if the beloved did not die. Things seem different in the case of positive engagements – (good thing) + (fitting response to good thing) seems to make the world impersonally better than it would have been if the good thing existed but there was no positive response. It is this additional value, the value of appreciating and engaging with valuable aspects of the world, which I am primarily concerned with in this paper.

For my account it is vital that the being in question need not be explicitly aware of the value that they are responding to. A bee need not understand the concept of beauty to appreciate the beauty of the flowers it pollinates – the mere feeling of attraction and pleasure in the engagement with the beautiful object, without an awareness of the concept of beauty, is sufficient.[9] Furthermore, some responses may only be fitting for beings of certain kinds – it may be, for example, that there is something beautiful or valuable in the 'scentscapes' enjoyed by dogs, and so it is fitting for them to engage in sniffing behaviour which would not be fitting for beings (like humans) who are insensitive to the beauty enjoyed by the dog.

[9] I assume bees are sentient. See Birch (2024). Whether nonhuman animals have a sense of beauty is a contested question I cannot pursue here. Following Darwin, Prum (2012) argues that aesthetic preferences play an irreducible role in evolution, particularly in sexual selection and the co-evolution of pollinators and flowers. For scepticism about whether animals can truly perceive beauty, see O'Hear (1999, ch. 7). Much animal behaviour would, however, be difficult to explain without attributing at least some form of aesthetic preference. In any case, even if nonhumans cannot perceive beauty, aesthetic appreciation is only one mode of positive engagement with reality.

In the case of knowledge, understanding, and beauty it is clear when a response is fitting. What about simple pleasure? Is it fitting to enjoy the taste of a strawberry, for example? Or to enjoy the scent of grass? It may be that these things are objectively valuable, and beings who take pleasure in them are fittingly engaging with reality. Alternatively, it might be the case that some things are neither valuable nor disvaluable, yet it is still good that sentient beings of some kind enjoy them. In the case of pleasure, we might then think that, so long as the pleasure is not obviously 'unfitting' – taking pleasure in the suffering of another for example – that this counts as a positive engagement with reality. An analogy with love might help. It is good and fitting for a lover to appreciate the objectively valuable properties of their beloved – their kindness for example. It is also good for them to love some of those properties of the beloved which are neither valuable nor disvaluable – that they pour orange juice on their cereal, for example. If reality as a whole is good, then, as in the case of loving a person, it might be good for sentient beings to enjoy not only the objectively valuable aspects of the world, but also those aspects which are neither valuable nor disvaluable. If something like this is true, then taking pleasure in things that are not objectively valuable counts as a positive engagement with reality, while enjoying objectively bad things – like the suffering of others, would not.[10]

It is important at this point to indicate what my claim is not. First, PEP does not entail that it is always better that we maximize aggregate welfare. Maximizing aggregate welfare and promoting positive engagement with reality overlap in some ways, but they are different and can easily come apart. For example, it might be the case that a world full of trillions of happy mice contains more welfare than a world with a smaller population of highly diverse sentient

[10] My account of fittingness should not be confused with fitting attitude theories of value. On such views, facts about fittingness are explanatorily prior: something's being valuable consists in its being fitting to value (Howard, 2023). My view reverses this order. I take objective value to be basic, and regard fittingness as derivative - a response is fitting because it appropriately responds to value.

beings who positively engage with much more of reality. PEP would prefer the latter world, while the principle of maximizing welfare would prefer the former. Secondly, PEP does not entail that a world with a greater diversity of positive experiences is always better than one with less diverse experiences. Rather PEP concerns positive engagement with *reality* – nonveridical experiences such as the experiences of sentient beings in digital worlds or merely hallucinatory experiences may well have value too, but PEP is concerned only with veridical experiences (and other forms of genuine positive engagement) with an objective reality.

How can we argue for PEP? As a basic claim about what is intrinsically valuable, its value cannot be deduced from more fundamental values. The general approach when arguing for a basic value claim is to appeal to intuitions, engage in reflective equilibrium, show that the basic value claim in question has greater explanatory power than alternatives, and argue that it leads to less counterintuitive implications than rival basic value claims do. In the rest of this section then I will (1) present a thought experiment to pump the intuition that PEP matters and can explain value judgements that cannot be explained by the value of biodiversity simpliciter or welfarism (2) argue that this fits well with our other considered judgements and (3) suggest that PEP can play a bridging role between holistic theories and welfarist ones.

The Sunlit Land of the Blind

There is a planet called Caecus, orbiting a distant star. It is a beautiful world, with lush green forests, sapphire-blue seas, and purple snow-capped mountains, all bathed in soft yellow sunlight. It is populated by animals of many species. Their world affords them many opportunities for welfare – abundant good tasting food, the scents of flowers, the sound of

waves crashing against the shore, not to mention the deep pleasures of interacting with their companions. Theirs is a good world, and they lead good lives. They are all, however, blind. This doesn't bother them – they've evolved that way. Through some quirk of evolutionary caprice, none of the animals on Caecus ever evolved the eye. They have no need for vision, and they live well and happily without it.

There is another planet in a neighbouring solar system called Lux. By an unlikely coincidence, Lux is extremely similar to Caecus. It is equally beautiful, and it too is populated by numerous happy animals living good lives. Even more incredibly, Lux and Caecus have the following in common (i) they have the same number of animals and the same number of equally diverse species (ii) they have identical average and total wellbeing, distributed equally fairly among the animals. We might say, Caecus and Lux are identically good worlds, with identically good populations.

There is one difference between them, however. On Lux, some animals have eyes. One species, reminiscent of simple primates on Earth, has excellent colour vision. Let's call them Bower-Monkeys. Their vision has instrumental value, as it helps them find colourful fruit against the green background of foliage. However, their ability to see also brings them pleasure. Bower-Monkeys often assemble to watch the evening sun set on the sea, a sight they seem to enjoy. They also take pleasure in the vibrant red colour of their favourite fruit, in the sight of Bower-Monkeys considered beautiful and so on. They even, like the Bowerbirds of Earth for whom they are named, utilise colour in their mating rituals, by making beautiful colourful nests for their prospective mates. As with Bowerbirds, the most desirable mates are those who make the most beautifully coloured nests.

I have already said that the two worlds are identical in all other respects, particularly in levels of biodiversity and the amount and distribution of welfare. Could one world be any better than the other? If we value only biodiversity, then we must say that both worlds are equal. Though the Bower-Monkeys on Lux have one additional sensory modality absent on Caecus (sight), we can assume that this increase in Lux's biodiversity is compensated for by some additional form of biodiversity on Caecus – perhaps a species of plant on Caecus exhibits a novel kind of photosynthesis unknown on Lux. Appealing to the intrinsic value of biodiversity cannot distinguish between Caecus and Lux. Likewise, if we value only welfare, then it seems that both worlds must be equally good since welfare is equal on both. Though the Bower-Monkeys enjoy vision, we can assume that this increase in their welfare is compensated for by some additional welfare on Caecus – perhaps animals on Caecus enjoy their food slightly more. And of course, appealing to both biodiversity and welfare will also not distinguish between the two worlds.

Intuitively it seems that Lux is a better world than Caecus. This judgement cannot be explained by appealing to (i) the value of biodiversity (ii) the value of positive welfare or (iii) the beauty of the two worlds, since all these elements are equal across both. PEP can readily explain this intuitive judgement by pointing to the greater degree of positive engagement with reality on Lux, and this is a point in favour of that principle. Caecus and Lux are both beautiful, but that beauty is less appreciated on Caecus. Only on Lux are the pleasures associated with vision enjoyed. Similarly, animals on Lux can achieve things which go unachieved on Caecus (the creation of the beautiful coloured nests) and there is knowledge, at least phenomenal knowledge, which is known on Lux but left unknown on Caecus. While it is plausible that biodiversity, welfare, and beauty are all valuable, it seems that there is an

additional source of value not picked out by these theories which makes Lux a better world than Caecus. I claim that that missing value is the value of positive engagement with reality.

Other Considered Judgements

PEP fits well with other considered judgements about the value of biodiversity and the badness of extinction. Consider the debate over the value of conserving species ex situ, in zoos for example. If a species were to become extinct in the wild, while a viable population remained in existence in zoos, how should we evaluate this state of affairs? Intuitively, a world in which elephants existed only in zoos would be less valuable than one in which they continued to live in their natural habitats. Rolston (1985) expressed this intuition when he said that it "is not preservation of *species* but of *species in the system* that we desire". If we valued biodiversity simply as the existence of a diverse set of genotypes, or as the existence of organisms that differ in their physical appearance, however, then it would be difficult to see why the existence of animals in zoos would be less valuable than their existence in natural habitats. Rolston's explanation for this judgement is somewhat ambiguous. At some points he claims that species are inseparable from their environments, but this claim seems too strong – it is hard to believe that the species *Loxodonta African* would literally cease to exist if its only surviving members were confined to zoos. Ecocentrists can defend in situ conservation on the grounds that it preserves the integrity of ecosystems, while ex situ conservation does not. Or we could claim, as Sandler does (p.7) that what is valuable is not the mere existence of a diversity of phenotypes, but organisms engaging in their distinctive forms of life, which cannot be done in zoos. PEP offers another compelling explanation for this judgement. Though species can survive in zoos, much of the value of a species comes from the unique positive engagements that its individuals have with the environment. An

elephant in a cage remains an elephant, but the value of its engagement with the world is lost as it is no longer able to explore and enjoy its environment, use its knowledge and skill to find food and water and so on.

PEP also helps explain the special poignance of the extinction of animals that have unique ways of perceiving or interacting with the world. Suppose that one of two species will soon go extinct—the mantis shrimp or a species of beetle that lacks any distinctive way of engaging with the world. The mantis shrimp is famous for its unique visual system, capable of processing visual information in ways that no other animals can. It's plausible that this creature perceives aspects of the world which other animals can't. If it were lost, this unique way of engaging with reality would be lost with it.[11] While the extinction of the beetle would be regrettable, the loss of the mantis shrimp would be especially tragic. If both species are equally distinct in evolutionary or taxonomic terms, and equally help maintain the integrity of the ecosystem, then a concern for biodiversity *simpliciter* cannot explain this difference in value. Nor can welfarism, assuming the two species do not differ in the average or total welfare of their members. PEP on the other hand offers a natural explanation of this judgement – the loss of the mantis shrimp is especially bad as it is the loss of a unique way of positively engaging with reality.

PEP as a unifying value

I now propose that PEP can play a unifying role between two dominant but often conflicting perspectives: holistic theories, which emphasize the intrinsic value of ecological wholes (e.g.,

[11] Of course, I am assuming that the mantis shrimp is sentient and that its unique visual system allows it to positively engage with reality in ways that other animals can't e.g. by discerning colour patterns invisible to others.

species, ecosystems), and welfarist theories, which focus on the welfare of sentient beings. Holistic views, such as Leopold's (1949) land ethic, emphasize the intrinsic value of ecological wholes such as species and ecosystems, but struggle to explain why the suffering of individual animals matters. Welfarist approaches, like Regan's (2004) or Singer's (1975) focus on the moral status of sentient individuals yet often fail to capture what's valuable about biodiversity or ecological integrity.

Taken to extremes, both approaches lead to counterintuitive implications. Pure holism risks endorsing a highly biodiverse world filled with suffering. Pure welfarism, by contrast, could regard as ideal a world populated by a single maximally happy species if that is the best way of maximizing welfare (O'Brien, 2024). PEP avoids these extremes. Because it values positive engagement with reality - realized through the welfare of sentient beings - it does not regard biodiversity as good when it generates mostly suffering. At the same time, PEP avoids collapsing everything into welfare simpliciter. On this view, diversity of sentient species matters instrumentally: it enables a wider range of perspectives, experiences, and modes of world-engagement. A world with many kinds of sentient beings - each capable of appreciating different aspects of reality - is better than one in which experience is homogeneous, however pleasant.

3. Why Biodiversity is Instrumentally Valuable

I have argued that it is intrinsically valuable that reality is positively engaged with by sentient beings. In this section I will argue that biodiversity, in the sense of diversity of sentient beings, is instrumentally valuable insofar as it allows for greater positive engagement with reality. This doesn't necessarily follow – it could be the case that human beings engage with

reality so extensively that no other animals are required. Humans deeply appreciate the beauty of the world and, unlike any other known creature, can grasp the scientific laws that underlie the phenomena of our world, as well as understanding the fundamental logical and mathematical structure of reality. These were aspects of reality which went entirely unperceived and unappreciated before the evolution of humanity.

Nonetheless, it seems unlikely that humans do, or could, engage sufficiently with all aspects of reality. When we remember that other animals have radically different senses, live in different environments, and have different concerns and ways of life than we do, it seems almost certain that there are valuable aspects of reality that other animals engage with which we cannot. This is most obvious when we consider animals with very different sensory capacities than humans. Compare for example the sensory experiences a typical human and a typical dog might have of the same garden. The human is likely to better appreciate the varied colours of the flowers for example, while the dog will have olfactory experiences of that same garden that go far beyond any that a human is capable of. The point is not simply that the dog has experiences that the human does not, though this too may have value. What is valuable here according to PEP is that the dog can positively engage with aspects of reality which humans can't.[12]

Furthermore, it is not merely the case that some animals can perceive parts of the world that we cannot. Rather, animals of various forms have ways of living and interacting with the world that are totally alien to us. Obvious examples include bats navigating by echolocation; whales living in the oceans and communicating across vast distances by song; bees flying from flower to flower collecting pollen and so on. These diverse ways of life involve positive

[12] See Yong (2023) for a fascinating account of the many unique ways animals perceive the world.

engagements with reality that humans are simply incapable of – there are pleasures that humans will never know, beautiful things that we will never appreciate, and ways of engaging with the physical world that will always be beyond our reach. We can think metaphorically of the world as a set of locked value niches, and animals of various forms as the keys required to open them. Humans may never have access to these goods, and, if the other animals did not exist, these valuable aspects of the world would never be known or appreciated. If we accept PEP, then we should conclude that a diversity of sentient beings is instrumentally valuable insofar as it allows these goods to be enjoyed.

What implications does PEP have for the way in which we value biodiversity and our practices of conservation? First, it should be remembered that PEP alone will not value all forms of biodiversity, nor will it value them all equally. Much biodiversity on our planet is of insentient beings, and as such does not fall within the scope of PEP. If diversity of these lifeforms is valuable this cannot be because these creatures engage with reality in distinctive ways. We might however think that a diversity of insentient organisms is valuable for other reasons. For example, we might think that biodiversity is valuable because it is beautiful and complex, because of its long evolutionary history, or simply because diversity of living things is a primitive good. PEP does entail that this basic goodness becomes much more valuable when it is positively engaged with by sentient beings. So, the existence of a diversity of kinds of vegetation may be good in itself, but, when this vegetation is engaged with positively by sentient beings this results in much more positive value than either the mere existence of the diversity of flora or the disconnected experiences of bee-like beings in a digital world. PEP then gives at least indirect reasons to preserve insentient nature and is compatible with other ways of valuing it.

Secondly, some creatures may be valued much more highly than others according to PEP. For example, bees and bats may be valued very highly since they have relatively unique ways of engaging with reality. Bees for example can perceive colours in the ultraviolet range and engage with flowers in ways that humans cannot. If we value positive engagement with different aspects of reality, we might value these creatures far more than, say, yet another species of beetle which has a way of life and set of sensory apparatus almost identical to those of many other species. Another implication of PEP, mentioned in section 2, is that, all else being equal, we should prefer in situ conservation over conservation in zoos and aquaria. According to PEP, much of the value of sentient species is their positive engagement with aspects of the world which would go unappreciated in their absence. Animals confined to zoos, unfortunately, cannot engage with much of the world at all.

Finally, PEP values *positive* engagement with reality. It has been forcibly argued that the lives of many wild animals are characterized by suffering and deprivation (Ng, 1995; Horta, 2010; Faria, 2023). Regrettably, it seems that many forms of biodiversity have emerged under evolutionary pressure for some animals to exploit and harm others, e.g. there is a great diversity of predatory and parasitic species on our planet. If we value diversity of sentient beings because of the positive engagement with reality which it allows, we need to be able to say something about how to trade off this value against the increased suffering which many species cause. So far, I have said nothing about how to evaluate negative engagements with reality, such as being caused to suffer or inflicting suffering on others, living in fear of predators etc. Giving a full account of the value of diversity in terms of PEP would require saying something about the disvalue of suffering, and especially whether increasing the kinds of negative engagements with reality (which biodiversity makes possible) makes things worse rather than better. I return to this issue in section 5.

4. Alternative Approaches

I have argued that it is intrinsically valuable that more aspects of reality are positively engaged with by sentient beings, and that diversity of sentient animals is instrumentally valuable insofar as it increases this engagement. My argument therefore makes essential reference to the minds and experiences of other animals, or, as Nagel (1974) put it, what it is like to be them. This aspect of the value of biodiversity has been surprisingly neglected in the literature – to my knowledge only Livermore (2024) and James (2024) have made arguments on these lines.[13] In this section I will assess their arguments and conclude that PEP is a better way of accounting for the value of animal experiences.

4.1 Livermore's Heteric Welfarism

Livermore sets aside ecocentric reasons to value biodiversity, and proposes an alternative view which he calls 'Heteric Welfarism' (HW). Livermore's central claim is as follows:

> "worlds that have greater diversity of subjective experience—a greater variety in the forms and qualities of experiences—are better *ceteris paribus* than worlds with less diversity of subjective experience" (p.264).

Livermore's claim is not that a diversity of experiences always makes life go better for any particular being, but rather that worlds or populations with more diversity of experience are superior to worlds with less. Unlike traditional welfarist views which are concerned with only

[13] Though see also Southan (unpublished manuscript). Since his view is similar to Livermore's I will not consider it further.

the total amount of welfare (such as total utilitarianism), or more complex views which also value fairer distributions of welfare (such as egalitarian or prioritarian views), HW also sees diversity of experience as a fundamental value. Worlds in which experiences are more diverse are more valuable than worlds in which they are less (p.265).[14]

Unlike simpler forms of welfarism, or ecocentric or biocentric views, HW can readily explain why Lux is better than Caecus. While total welfare is equal and distributed equally fairly on both worlds, the diversity of experiences on Lux is greater than that on Caecus, since there are animals with an additional sense modality on Lux. To the extent that the experiences of seeing creatures are different from those of non-seeing ones, total diversity of experience on Lux is higher. HW can also explain other intuitive judgements as well as PEP can. For example, conserving an animal species in zoos rather than in situ would reduce diversity of experiences as animals would have less diverse experiences in zoos than they would in the wild. Likewise, HW explains the intuition that there is something especially poignant about the extinction of animal species characterized by unique ways of perceiving the world, as this too would reduce diversity of experience (p.272). HW also has an advantage over PEP in being a simpler theory – HW values diversity of experiences directly without needing the additional complexity of valuing certain kinds of engagement between mind and world. Nor does it need to claim that the world itself has any intrinsic value – the insentient world is valuable only insofar as it allows for greater diversity of experiences.

HW also faces some difficulties. First, at least in its most basic formulation, HW seems committed to valuing diversity of negative experiences, such as experiences of suffering. This reading is supported by Livermore's reflections on the problem of wild animal suffering

[14] It is debatable whether Livermore's view is strictly welfarist, but I will not pursue this question here.

(p.275-276). He argues that, though intervening in nature to reduce animal suffering might be good from the point of view of increasing their welfare, HW also gives us reason not to pursue this project, since by doing so we would likely reduce the diversity of animal experiences. Still, Livermore recognises that there are alternative ways to treat the value of diverse negative experiences, and his principle could be reformulated so that only diversity of positive experiences is valuable (p.281-282). A related problem concerns pleasures that cause significant pain to other beings. On Livermore's account the diverse experiences of a Hyena eating his prey alive have value, both in virtue of being diverse, and in virtue of being pleasant for the Hyena. PEP values only positive engagements with reality, and it seems plausible to deny that eating a sentient being alive is a form of positive engagement since it doesn't respond appropriately to the value of that being.

A more serious problem is that HW is committed to the view that mere experiences, totally disconnected from reality, are just as valuable as veridical experiences of an objective world. As he states (p.265) "What matters under the account articulated here is subjective experience". The real world, and any engagement with it by sentient beings, is on his account valuable only insofar as this realises a diversity of subjective experiences. This view has some deeply counterintuitive implications. Regarding conservation of species, HW seems committed to the claim that, were it possible to simulate experiences digitally, we would have no reason to conserve animal species. For example, if we could simulate the experiences of bats on a computer, then, according to HW, we would have no reason to conserve flesh and blood bats, since it is only their diverse experiences, and not their engagement with reality, that matters. Alternatively, we could conserve real bats but connect them to virtual-reality machines which give them a great diversity of bat-like experiences, totally disconnected from the real world. If diversity of experience is all that matters, then this world should be just as

good as a world populated by real bats positively engaging with reality. This implication is at odds with our intuitions regarding conservation of species, and indeed with more fundamental intuitions about the value of mere experiences versus connection with reality generally.[15]

Though impossible today, there is no reason in principle that we could not one day create digital minds. If we do, it may turn out that the best way to maximize diversity of experiences is not via biological beings, but through highly efficient digital minds, each optimized to instantiate diverse experiences.[16] Conserving living animals in wild ecosystems would then be a waste of resources – if we can produce diverse experiences more efficiently by creating digital minds instead, then HW entails that we should. If we find that conclusion troubling, this suggests that subjective experiences are not all that matters – connection to reality is also valuable.

4.2 James' Lifeworld Account

James offers an account of the badness of extinction based on the idea of 'lifeworlds'. A lifeworld is the unique way an individual experiences the objective world. On James' account a lifeworld seems to be constituted by the meaning that an individual attaches to certain

[15] See Nozick's Experience Machine thought experiment (1974). This is generally interpreted as an argument against experientialism about wellbeing, perhaps a decisive one. My claim is somewhat different – PEP doesn't necessarily entail that a creature in an experience machine has lower *welfare* than one with identical experiences of the real world. Rather, it claims that the impersonal value of the world is increased by positive engagements with an objective reality. To test our intuitions here we could compare Lux with Virtual-Lux. Virtual-Lux is identical to Lux, except that the visual experiences in that world are not connected to reality but are instead generated by an experience machine. My intuition is that Virtual-Lux is inferior, since all the visible aspects of that world go unperceived.

[16] See Shulman and Bostrom (2021) on the possibility that digital minds of various kinds might be far more efficient at "turning resources into awareness". Though they are concerned with welfare, similar arguments could be made for experiential diversity. There is no reason to suppose that biological minds are the best possible way of maximizing experiential diversity either.

objects in the world. He gives the example of an old man called Alfred. For Alfred, the ring in his cabinet is not just any ring – it is the ring he inherited from his mother; the pebble beside it is not just a pebble, rather it is the lucky pebble he found on a family holiday as a boy and so on. This overlaying of subjective meaning onto a shared public reality of physical things constitutes Alfred's lifeworld, and once Alfred dies, his lifeworld dies with him. This loss, according to James, is impersonally bad "a minus rather than a plus, so to speak, on God's Axiological Ledger" (p.305).

Since lifeworlds are somewhat overlapping, Alfred's lifeworld would not be entirely lost upon his death, however. If he were survived by his wife, then much of the meaning of these objects, much of the shared lifeworld, would survive. Imagine, however that Alfred was the last human being. Upon his death the entire human lifeworld would be destroyed – everything that humans impart meaning onto would lose that meaning, and would revert to being mere physical objects, with little if any value. If that lifeworld has value, then its loss through human extinction might be very bad indeed. James claims that something similar is true of extinction of some animal species. If other animals also have lifeworlds, then the extinction of a species means the destruction of a unique lifeworld, and it is plausible that this is a bad thing.

Like HW and PEP James' account highlights the role that diversity of experience plays in the value of species. It's plausible that at least some relatively complex nonhuman animals have lifeworlds, and that something valuable is lost when these lifeworlds are destroyed. Still, at least as explicitly stated, it faces some difficulties which PEP does not. First, his account of lifeworlds – the overlaying of subjective meaning onto the material world – works well for humans but seems to require a degree of cognitive sophistication lacking in most other

animals. While it is possible that animals like Orcas or the Great Apes project subjective meaning onto the world, it seems unlikely that sentient but relatively simple animals like mice, fish, or bees also do so. Nonetheless, it does seem that something important would be lost if these animals, with their unique ways of perceiving and engaging with the world, were lost. Second, as James acknowledges, it is not clear that all lifeworlds are valuable – the lifeworld of a committed, lifelong racist for example doesn't seem valuable. Something similar may be true of the lifeworlds of some animals – the lifeworld of a parasitoid ichneumon wasp for example might be disvaluable. Third, while lifeworlds seem to require a kind of connection between mind and world, and so avoid the implication of HW that purely virtual experiences are as valuable as experiences of an objective world, there is no requirement that this connection be a veridical one. For example, the ring Alfred inherits from his mother and which he has invested with so much meaning might not be a family heirloom as he believes – rather, unbeknownst to him it could be costume jewellery from a Christmas cracker. Intuitively it doesn't seem that lifeworlds built on false interpretations of the world have as much value as veridical ones.

5. Problems and Further Questions

A full account of the value of diversity of sentient animals ought to be able to account not only for the positive, but also for the negative engagements with reality which it allows. Recall that a positive engagement was characterized as one that is fitting and that plausibly increases the welfare of the being in question. Typical examples include knowing or understanding the world, appreciating beautiful things, or enjoying the opportunities for pleasure the world affords. Negative engagements then might include forming false beliefs, enjoying ugly aspects of the world (or hating beautiful ones) and enduring and inflicting

suffering. I do not have the space here to give a complete account of the disvalue of such negative engagements. Theoretical options include symmetry – negative engagements reduce the impersonal value of the world as much as positive engagements increase it – and asymmetry – while positive engagements increase the value of the world, negative engagements do not have any special disvalue beyond the decrease in welfare they cause to sentient beings. More research is required to determine precisely what makes an engagement fitting and how best to account for negative engagements.

In the context of biodiversity, the most salient problem of negative engagement comes from predators, and other animals which inflict suffering on other beings. What should PEP say about the existence of lions for example? It is undeniable that lions engage with reality in unique ways, and that these engagements often increase the welfare of the lions themselves. There is something that it is like to stalk, chase, kill, and devour other animals, and these actions require skill, practical knowledge, and physical prowess. Yet for prey animals, the existence of lions is a great threat – being hunted and killed causes them intense fear and pain, and their deaths prevent them from continuing to positively engage with reality themselves. Though it is fitting for prey animals to fear predators, this is, like grief, a kind of conditional value – fittingly responding with fear to the existence of predators may be better than responding in an unfitting way, but it is not better than a world in which the fearful thing (predators) didn't exist at all. Furthermore, hunting and killing a sentient being does not seem to be a fitting way of engaging with that being. If a zebra, for example, is valuable, this is in virtue of being a beautiful and complex sentient being with a good of its own. Killing one is not an appropriate response to this value. Since PEP only values positive engagements, it cannot value such predatory engagements. If we think that negative engagements are

disvaluable, then we would have to say that predatory engagements like these make the world worse.

From a conservationist perspective, such a conclusion would be repugnant. From an animal welfare perspective things are less clear. Some have argued that predatory animals should be eradicated (McMahan, 2010; Bramble, 2021) or genetically redesigned so that they can flourish without killing others (Nussbaum, 2006; Pearce, 2009; McMahan; 2010; Johannsen, 2021). If reprogramming of predators is possible, then PEP should prefer this course of action to the elimination of predatory species. This is because currently predatory animals also have distinctive ways of engaging with reality which are not harmful, and we should prefer to maintain these positive forms of engagement with reality when possible. It should be remembered that PEP is a theory of value, and that the value of positive engagement with reality is one value among many. To determine what we ought to do, we need an account of how the value of positive engagement relates to other values, of how to make trade-offs when values conflict, as well as an account of how PEP relates to the rights of animals, and our responsibilities towards them. Much more research is required to answer these questions. Further questions involve how to measure the extent to which different animals positively engage with reality, and the implications of PEP for issues in population axiology.

I have offered an account of the value of diversity of sentient beings which is intuitively appealing, nonanthropocentric, and which does not reduce the value of animal life to welfare or commit us to endorsing the value of forms of biodiversity which cause a great deal of suffering. Carl Sagan once remarked that humanity is a way for the universe to know itself. But reality is too vast, too intricate, and too multifaceted to be known by a single kind of mind. The world is revealed not only through human science and philosophy, but also

through the alien senses and distinctive modes of experience of other animals. PEP helps make sense of this idea, grounding the value of a rich diversity of sentient lives not just as sources of welfare, but as lenses through which reality is fittingly perceived, known, and loved.

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