Anthropocentrism, Exoplanets, and the Cosmic Perspective

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Nonanthropocentric environmental philosophy is a response to two kinds of anthropocentrism: personal anthropocentrism, according to which being human involves the possession of some or all of a set of properties typical of persons, and biological anthropocentrism, according to which being a human involves being a member of the species *Homo sapiens*. Nonanthropocentric environmental philosophy itself becomes problematic when it is viewed in terms of two arguments that it often seems to imply: the "Planetary Perspective Argument," which rejects both forms of anthropocentrism and seeks to maximize good outcomes and minimize bad outcomes in terms of life's point of view, the land's point of view, or the global ecosystem's point of view, and the "Cosmic Perspective Argument," which is structurally analagous to the planetary perspective argument but has much more sweeping empirical premises driven by recent work in cosmology, astrobiology, and exoplanet science. The ultimate problem for environmental philosophers is to find a way to remain nonanthropocentric without succumbing to the indifference of the cosmic perspective.

I. INTRODUCTION

Many environmental philosophers maintain that anthropocentric thinking is the ultimate source of the harm we do to the environment and that taking a nonanthropocentric perspective is essential for developing a proper concern for the environment. Several critics respond that the most logical choice of a nonanthropocentric perspective is that of the planet as a whole, but that if we take this perspective, the environmental damage we are currently wreaking is only incidental. Over the upcoming several billion years, life will flourish in some form or another. Taking the long-term planetary perspective, they say, yields an attitude of environmental unconcern. I call this the "Planetary Perspective Argument" against nonanthropocentric environmental philosophies.

In this paper, first, I distinguish two different kinds of anthropocentrism: biological and personal. Second, I unpack the planetary perspective argument, showing that it presupposes that the nonanthropocentrist (a) rejects both forms of anthropocentrism and (b) works with a consequentialist maximizing ethic. Third, I formulate a stronger

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variant of the planetary perspective argument: the "Cosmic Perspective Argument." This argument is driven by recent work in cosmology, astrobiology, and exoplanet science indicating that elsewhere in the universe there are countless planets harboring life. The thrust of the cosmic perspective argument is that unmooring ourselves from parochial concerns about planet Earth leads to a final perspective (that of the universe as a whole) inimical to the concerns of environmentalists. Finally, I discuss options available to nonanthropocentrist environmental philosophers for avoiding the unwelcome conclusion of the cosmic perspective argument.

II. TWO KINDS OF ANTHROPOCENTRISM

Informally, to be anthropocentric is to assign human beings undue importance in the grand scheme of things. Among an array of philosophers—environmental philosophers, philosophers of religion, ethicists, and even philosophers of science—anthropocentrism is seen as the source of numerous moral and intellectual errors and an impediment to progress.[1] But "assigning human beings undue importance in the grand scheme of things" itself is a vague notion. Can we specify anthropocentrism more clearly? This is a large question—much too large for a brief article.[2] But what we can do is distinguish two quite different kinds of anthropocentrism. They correspond to two quite different conceptions of what it is to be human: biological and personal.

On the biological conception, to be a human is to be a member of the species *Homo sapiens* rather than a member of some other species. On the personal conception, to be a human is to possess all or many of a set of properties typical of persons: rationality, self-consciousness, the ability to use language, the ability to enter into a moral community, and so on. Not all humans in the biological sense are humans in the personal sense. For example, newborns, severely mentally handicapped adults, people in long-term comas, and so on are not self-aware, cannot speak, and lack a variety of other capacities we think essential to having a full life—yet clearly they are still members of our species. Not all humans in the personal sense are humans in the biological sense. For example, Koko the gorilla seems to be a person. She uses sign language, recognizes herself in the mirror, and demonstrates other hallmark characteristics of personhood.[3] And even if it just so happens that

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[1] Notable philosophers to identify and criticize anthropocentrism as part of their critique of religion include Thomas Hobbes, *Leviathan* (Oxford: Oxford University Press, 1996), chap. 12; Baruch Spinoza, *The Ethics and Selected Letters*, trans. Samuel Shirley, ed. Seymour Feldman (Indianapolis: Hackett, 1982), appendix to part 1; David Hume, *Dialogues Concerning Natural Religion* (Indianapolis: Bobbs-Merrill Educational Publishing, 1970); and Bertrand Russell, *Religion and Science* (Oxford: Oxford University Press, 1997), chap. 10.

[2] For a nice introductory discussion of what anthropocentrism is, along with a collection of helpful readings, see *Environmental Ethics: The Big Questions*, ed. David Keller (Malden, Mass: Wiley-Blackwell, 2010), pp. 59–88.

[3] Those doubting the personhood of Koko should visit her website at http://www.koko.org.

no other animal on this planet is a person, that does not mean nonhuman persons are impossible. They are certainly conceivable, as many religious people maintain and various science-fiction movies demonstrate.

At first glance, the properties unique to humans in the biological sense do not appear to be of special moral significance. These are properties such as being a member of the species in the primate family *Hominidae* that has forty-six chromosomes, being a member of the species with the highest brain-to-body mass ratio of any mammal, and having Mitochondrial Eve as an ancestor.[4] None of these properties seem to confer on their bearers any special value or worth. It is tempting to think the reason these properties fail to do so is that they are causal or historical properties, and therefore extrinsic properties—properties had only in relation to other things.[5] So, for example, the MacBook Pro on which this essay was typed has a property no other MacBook Pro does—the property of being owned by the author of this paper. Aside from the files on it and the serial number affixed to it, however, it is (at the macro level, at least) qualitatively indistinguishable from countless other MacBook Pros on the market. Being owned by the author of this paper is an extrinsic rather than an intrinsic property of this MacBook Pro. And because of that fact, having been owned by the author of this paper does not make this MacBook Pro any better or worse than another MacBook Pro that has the same intrinsic qualities. Considerations such as these suggest that extrinsic properties in general are not relevant to the value things possess.

Yet closer thought reveals contexts in which extrinsic properties are of moral and evaluative significance. For example, what distinguishes an original Picasso painting from a perfect forgery is not some intrinsic property, since, by definition, a perfect forgery is empirically indistinguishable from the original. Rather, the original Picasso has the property of having been painted by Pablo Picasso while the forgery does not. That is, it stands in a relation to Pablo Picasso that the forgery does not. As a result, we think the original is vastly more valuable than the perfect forgery.[6] For another example, the philosophical literature on personal identity shows that many people think a subject's concern for a future person tracks whether

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[4] "Mitochondrial Eve" is the name geneticists give to the most recent common female ancestor of nearly every human alive today.

[5] Characterizing causal properties, genetic properties, and extrinsic properties precisely is a task for metaphysicians. For a useful survey of the topic, see the discussion of properties, including intrinsic vs. extrinsic properties, in Chris Swoyer, "Properties," available online at http://plato.stanford.edu/entries/properties. G.E. Moore famously argued that it is wrong to give moral weight to properties that are extrinsic to a thing and proposed what has come to be called "the isolation test" for determining what things are intrinsically valuable. See G. E. Moore, *Principia Ethica* (Buffalo: Prometheus Books, 1988), chap. 1. For more on the distinction between intrinsic and extrinsic properties, and the relevance of this distinction to value theory, see Michael J. Zimmerman, "Intrinsic vs. Extrinsic Values," available online at http://plato.stanford.edu/entries/value-intrinsic-extrinsic.

[6] For a fuller discussion of why, exactly, being a forgery makes a work of art less valuable than the original, see Nelson Goodman, *Languages of Art* (Indianapolis: Hackett, 1976), pp. 99–123.

that future person is identical with the subject, or tracks whether that future person stands in the right causal relation to the subject. A perfect duplicate of me might nonetheless not be *me*, perhaps by having been generated by a replicator machine (the favorite device of many a metaphysician). In that case, although the future person might think he is me and be qualitatively indistinguishable from me, he would not be me, and so I would have little or no concern to act in his interest.[7] With respect to environmental concerns, being pristine is often seen as a valuable property of an object in the environment; yet, being pristine is pretty clearly an extrinsic, relational property: the property of a thing's having gotten the way it is free of human interference. It is for this reason that so many environmental philosophers deny that environmental destruction can be fully compensated for by recreating or restoring the environment.[8]

These examples suggest we should keep an open mind when asked of any particular extrinsic property whether it is morally significant. Consider *Schmomo schmapiens*, a species empirically indistinguishable from *Homo sapiens*, but a species that evolved on Twin Earth somewhere else in the universe. Since *Schmomo schmapiens* lacks the property of having evolved on planet Earth, it is a different species from *Homo sapiens*, despite the fact that the two species are otherwise qualitatively indistinguishable.[9] Might the property of having evolved on planet Earth be a morally significant property? Might being *Homo sapiens* provide a moral advantage that being *Schmomo schmapiens* does not? It seems that the answer to both questions is "no," but I return to these questions at the end of this paper.

Unlike the extrinsic properties humans have simply in virtue of being members of our species, we tend strongly to think the personal properties of humans—being able to reason, being able to enter into moral communities, being capable of love, and so on—are morally significant, although of course there are disputes about just how such properties should be rated. The key difference between the biological and the personal properties of humans is that there are (most of us believe) nonhumans to whom the personal properties do, or could, apply. Theists think God is personal: God knows things, decides things, loves other people, and so on. Most of us think there could exist extraterrestrials that think, love, worry, and so on. There

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[7] For a fuller discussion of the replicator scenario, see Derek Parfit, "Divided Minds and the Nature of Persons," in *Metaphysics: The Big Questions*, ed. Peter van Inwagen and Dean Zimmerman (Malden, Mass.: Blackwell Publishers, 1998).

[8] See Robert Elliot, "Faking Nature," *Inquiry* 25 (1982): 81–93.

[9] According to most philosophers of biology, species are individuated in part by their histories. "If we discovered that other planets possess life forms that arose independently of life on Earth, those alien organisms would be placed into new species, regardless of how closely they resembled terrestrial forms. Martian tigers would not be tigers, even if they were striped and carnivorous." See Elliott Sober, *Philosophy of Biology* (Boulder, Colo.: Westview Press, 2000), p. 151. The reasoning behind this is simply a modification of Saul Kripke's famous argument for the necessity of material origins. See Saul Kripke, *Naming and Necessity* (Cambridge, Mass.: Harvard University Press, 1972), lecture 3 (especially note 56).

is considerable scientific evidence that some nonhuman animals (e.g., Koko) use language and are self-aware.

Reflection on these two very different conceptions of what it is to be human reveals two very different possibilities for what it is to be anthropocentric. Without specifying exactly what we mean by "thinking something is special," we can distinguish *biological anthropocentrism* from *personal anthropocentrism*. Biological anthropocentrism is thinking there is something special about being a member of the species *Homo sapiens*.[10] Personal anthropocentrism is thinking there is something special about personal properties.

It is possible to be a biological anthropocentrist without being a personal anthropocentrist. Several science-fiction movies and video games illustrate the idea that biological anthropocentrism can manifest itself independently of personal anthropocentrism. For example, the recent video game series Mass Effect features a shadowy organization called Cerberus that seeks to advance the interests of humanity against an array of intelligent extraterrestrial species. In this bit of science fiction, most of these other species are equal (or even superior) to humans in their capacity to reason, to enter into a moral community, and so on. Indeed, human characters enter into alliances with members of these other species throughout the game. Nonetheless, Cerberus works against these other species simply because they are not our species.

Likewise, it is possible to exhibit personal anthropocentrism without biological anthropocentrism. For example, according to anthropomorphic projection theorists of religion, many humans (doctrinally, at least) are personal anthropocentrists but not biological anthropocentrists. Ludwig Feuerbach notably theorized that, when humans worship gods, they actually worship some idealized yet alienated human essence.[11] Anthropomorphic projection theorists of religion think humans create non-human objects that display perfected versions of personal properties such as power, knowledge, and freedom. Humans then build their religions around worshipping these objects.[12] Yet adherents of these religions believe nonhumans—God or the gods—are the most important things in the universe, with flesh-and-blood humans occupying a range of subordinate positions, from "favored creations of God" to "objects of complete indifference to the gods."

For another instance of personal anthropocentrism, consider that defenders of

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[10] Dale Jamieson uses the term "*Homo sapiens*-centric speciesism" to refer to what I call "biological anthropocentrism." See Dale Jamieson, *Ethics and the Environment: An Introduction* (Cambridge: Cambridge University Press, 2008), pp. 108–09.

[11] "Religion, at least the Christian, is the relation of man to himself, or more correctly to his own nature (i.e., his subjective nature); but a relation to it, viewed as a nature apart from his own." Ludwig Feuerbach, *The Essence of Christianity*, trans. George Eliot (New York: Harper and Row, 1957), p. 14.

[12] For a nice survey of anthropomorphic projection theories of religion, including Feuerbach's, see James Thrower, *Religion: The Classical Theories* (Edinburgh: Edinburgh University Press, 1999), chaps. 6 and 7.

the design argument for the existence of God must address the question of why we should expect God to create a universe like this one.[13] Philosopher Robin Collins says that "since God is an all good being, and it is good for intelligent, conscious beings to exist, it is not surprising or improbable that God would create a world that could support intelligent life."[14] Philosopher John Leslie says that "it is believed that a cosmos serving a divine purpose would have beauty, grandeur, etc.; but more basic, typically, is the belief that the cosmos would be good *through containing intelligent living beings*. I think that makes excellent sense."[15] More generally, anyone who thinks there is a special need to explain why the universe is such as to permit the existence of conscious, intelligent life engages in personal anthropocentrism. Such a person need not be a theist.[16]

Note that the preceding definition of "biological anthropocentrism" is just equivalent to what many environmental philosophers—particularly those writing on the issue of animal rights—have called "speciesism." Some are quite careful to distinguish speciesism from personal anthropocentrism, specifically the form of personal anthropocentrism that says being a moral agent is a particularly valuable property. Consider the following passage by Tom Regan:

> A speciesist position, at least the paradigm of such a position, would take the form of declaring that no animal is a member of the moral community because no animal belongs to the "right" species—namely, *Homo sapiens*. To deny animals membership in the moral community because they are not moral agents, however, is not to deny them membership solely on the basis of their failing to belong to the right species; it is to deny them membership because they lack the necessary cognitive and other prerequisites that underpin the reciprocal relationship that holds between the only individuals who, according to the indirect duty views, are members of the moral community—namely, moral agents. That this way of arbitrating who is, and who is not, of direct moral concern is not speciesist should be abundantly clear once we remind ourselves that *some human beings* fail to qualify for membership, despite the fact that they are *Homo sapiens*. There may be other prejudices at work in the attempt to limit membership in the moral community to all and only moral agents, but speciesism, at least in its paradigmatic form, is not one of them.[17]

Were everyone to define "speciesism" as clearly as Regan, we could use "biological anthropocentrism" and "speciesism" interchangeably. Despite the best

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[13] For a fuller discussion of this question, see Neil A. Manson, "The 'Why Design?' Question," in *New Waves in Philosophy of Religion*, ed. Yujin Nagasawa and Erik J. Wielenberg (London: Palgrave Macmillan, 2009), pp. 68–90.

[14] Robin Collins, "A Scientific Argument for the Existence of God: The Fine-tuning Design Argument," in *Reason for the Hope Within*, ed. Michael Murray (Grand Rapids, Mich.: Eerdmans, 1999), p. 54.

[15] John Leslie, "The Meaning of Design," in *God and Design: The Teleological Argument and Modern Science*, ed. Neil A. Manson (New York: Routledge, 2003), pp. 55–56.

[16] For example, see Paul Davies, *The Mind of God* (New York: Simon & Schuster, 1992), p. 205.

[17] Tom Regan, *The Case for Animal Rights* (Berkeley: University of California Press, 2004), p. 155.

efforts of philosophers such as Regan to regiment the use of the term, however, non-philosophers are quite apt to use "speciesism" to mean "personal anthropocentrism"—for example, when they claim that if you think humans are special just because humans can think and talk, you are speciesist.

Before moving on, one final comment about the use of the term *anthropocentrism* is in order.[18] The allegation of anthropocentrism is sometimes raised concerning positions, not in normative ethics, but in meta-ethics. Specifically, various anti-realist and non-cognitivist meta-ethical theories hold that the truth of ethical statements in some important way depends on us—either on individual humans or on communities of humans. If we were not around, according to these meta-ethical theories, ethical statements would be neither true nor false, in the same way that, if we were not around, it would be neither true nor false that basketball features five players on each side. A critic of such meta-ethical theories might allege that such theories are anthropocentric, so that if we wish to develop a nonanthropocentric normative ethical theory, we must first reject meta-ethical anti-realism and non-cognitivism, instead embracing realism or cognitivism.

Two points are in order. First, suppose that the universe contains *Schmomo schmapiens* as well as us, with the members of that species living their lives and making their ethical judgments just as we do. What would the meta-ethical anti-realist position be? That some ethical statements are true or false only so long as *Homo sapiens* is around, so that if our species goes extinct but *Schmomo schmapiens* remains, no ethical statement anywhere in the universe would be either true or false? Surely not. That is, if there is any kind of anthropocentrism involved in meta-ethical anti-realism, it is personal, not biological. It is an anthropocentrism that says ethics depends on the existence of conscious, rational agents. Yes, in our experience the conscious, rational agents are all members of *Homo sapiens*, but that is only a contingent connection. Even if anti-realism is the correct meta-ethical theory, the existence of our species is not necessary for there to be grounds for the truth and falsity of ethical statements. Second, even if an ethical theory involves personal anthropocentrism at the meta-ethical level, that does not mean it involves either personal or biological anthropocentrism at the normative level. It is logically consistent to hold that all value depends on persons and yet also hold that the most valuable things are larks, deer, trees, landscapes, and so on. Indeed, numerous nonanthropocentrist environmental philosophers stake out precisely this sort of position.

III. STATING THE PLANETARY PERSPECTIVE ARGUMENT

With this distinction between biological and personal anthropocentrism under our belts, we can now state what the planetary perspective argument is. Since the argument is a rejoinder to nonanthropocentrist environmental philosophers,

[18] I thank Don Maier for suggesting the problem raised in this paragraph.

it requires some assumptions about the nonanthropocentrist position. Of course, self-described nonanthropocentrists are free to reject the characterization of their position given by proponents of the planetary perspective argument. If they do, they are free to claim that they sidestep the argument.

The first assumption made by proponents of the planetary perspective argument is that, concerning normative ethics, nonanthropocentrist environmental philosophers wish to reject both forms of anthropocentrism: biological and personal. This assumption is sufficiently obvious that there is no need to document it here. A less obvious corollary follows from the idea that acting upon ethical principles requires adopting a perspective. The corollary is that nonanthropocentrist environmental philosophers wish to substitute for our (biological or personal) anthropocentric perspective a larger perspective, with the best choice of a larger perspective being that of the planet as a whole. This corollary is not logically entailed by the first assumption; one could, for example, decide to be nonanthropocentrist by taking a perspective "narrower" than the human one—say, the perspective of the gene.[19] Nonetheless, both the first assumption and its corollary read the relevant environmental philosophers faithfully. It is common in environmental philosophy to see arguments exhorting us to abandon our narrow, human-centered point of view and adopt a wider, much more inclusive point of view. Wider points of view suggested as viable alternatives to the human point of view include life's point of view (Paul Taylor's biocentrism), the land's point of view (Aldo Leopold's land ethic) and the global ecosystem's point of view (Arne Naess's deep ecology).

The second assumption of the planetary perspective argument is that nonanthropocentrist environmental philosophers work with some sort of consequentialist maximizing normative ethic. According to such an ethic, the overarching ethical principle is that we must maximize good outcomes and minimize bad outcomes (with what it is for an outcome to be "good" or "bad" being left as a separate matter). On this view, the moral status of any course of action is determined by its consequences and nothing else. This assumption is much more controversial. Many environmental philosophers claim to work within a deontological or virtue-based rather than a maximizing consequentialist ethical framework. The problem with damaging the environment now, they say, is not that doing so fails to maximize the well-being of this planet in the long term, but rather that it treats the planet as a means to an end, that it harms things that are intrinsically valuable, or that it violates the rights of future generations. In defense of those making this second assumption of the planetary perspective argument, however, three points are in order.

First, there are some nonanthropocentrist environmental philosophers who explicitly endorse some form of maximizing consequentialism. For example, Peter

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[19] Indeed, biologist Richard Dawkins suggests that the correct way to view life on Earth is as a struggle, not among organisms, but among genes. See Richard Dawkins, *The Selfish Gene* (Oxford: Oxford University Press, 1990).

Singer counts as a nonanthropocentrist, as an environmental philosopher, and as a maximizing consequentialist (since he is a utilitarian). Furthermore, the philosophical position "nonanthropocentric maximizing consequentialism" is coherent, even if it is not very popular among environmental philosophers. So the planetary perspective argument is directed against a real position in environmental philosophy, even if it is not a position many hold.

Second, some notable nonanthropocentrist environmental philosophers use maximization rhetoric, whether or not maximizing consequentialism is their official, considered view of normative ethics. It is hard to see how such rhetoric could fail to presuppose some sort of consequentialist normative ethic. (Does it even make sense to talk about a maximizing deontology or a maximizing virtue ethics?) Consider, for example, the view of Arne Naess, founder of deep ecology:

> Ecosophy T has only one ultimate norm: "Self-realization!" . . . If I were to express this ultimate norm in a few words, I would say: "Maximize (long-range, universal) Self-realization!" . . . Viewed systematically, not individually, maximum Self-realization implies maximizing the manifestations of all life. So next I derive the second term, "Maximize (long-range, universal) diversity!"[20]

Passages such as this one suggest that strands of maximizing consequentialism do run through certain forms of nonanthropocentrist environmental philosophy—perhaps more deeply than we are accustomed to thinking.

Third, in the political and public policy arenas, environmental advocates often use maximizing consequentialist rhetoric. This should come as no surprise, since policy tools such as cost-benefit analysis force those on all sides to use such rhetoric. Furthermore, if use of such rhetoric is an inconsistency, it is not one many real-world environmental advocates notice. Trained philosophers aside, few ordinary people are consistent in their normative ethics. They are deontologists in some moods, utilitarians in others, virtue ethicists in yet others. We should expect maximizing consequentialist lines of thought to appear whenever ethical reasoning is applied to practical problems (e.g., sustainable development). In such contexts, environmentalists are just as prone to use maximizing consequentialist rhetoric as anyone else.

Having clarified the two central presuppositions of the planetary perspective argument, let me now state it. According to the argument, the problem with taking the planetary perspective is that from it massive environmental damage within the next few centuries should be viewed as a hiccup. Suppose we cook and poison the planet, dramatically reducing biodiversity as a result (and perhaps destroying ourselves too). The result many millions of years later will be a biosphere reset to a different equilibrium, but one with life and biodiversity comparable to that of

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[20] Arne Naess, "The Deep Ecological Movement: Some Philosophical Aspects," in *Environmental Ethics: An Anthology*, ed. Andrew Light and Holmes Rolston, III (Malden, Mass.: Blackwell Publishers, 2003), pp. 271–72.

the planet prior to our degradation of it. To say the biosphere as it is here and now is more valuable than the future one is to be guilty of *temporal parochialism,* to borrow a term from J. Baird Callicott.

> Considering our time as but an infinitesimal moment in the three and one-half billion year tenure of life on planet Earth, the present tendency of man to extirpate and eventually extinguish other species and take over their habitats for himself and his domesticated symbionts might be viewed quite disinterestedly as but a brief transitional stage in the Earth's evolutionary odyssey. Non-human life will go on even under the worst possible anthropogenic destructive scenario presently conceivable, novel species will radiate anew, and novel ecosystems will mature. The new Age (of Insects, perhaps) will eventually be just as diverse, orderly, harmonious, and stable, and thus no less good than our current ecosystem with its present complement of species.[21]

From this observation William Grey concludes that "the grand perspective of evolutionary biology provides a *reductio ad absurdum* of the cluster of nonanthropocentric ethics which can be found under the label 'deep ecology.'"[22]

> There have been far more traumatic disruptions to the planet than any we can initiate. From a long-term planetary perspective, [claiming human activity is driving the ecosystem toward collapse] is alarmist nonsense. . . . From a planetary perspective, we may be entering a phase of mass extinction of the magnitude of the Cretaceous. For planet Earth that is just another incident in a four and a half billion year saga. Life will go on—in some guise or other.[23]

From these and similar considerations, Grey concludes that "the attempt to provide a genuinely nonanthropocentric set of values seems to be a hopeless quest."[24] Expanding our horizons beyond our short-term concerns here on Earth leads us to recognize the ultimate insignificance of human activity when viewed from the planetary perspective.

IV. RECENT WORK IN COSMOLOGY AND EXOPLANET SCIENCE

Callicott and Grey claim that, assuming we take the planetary perspective, the projected lifetime of the Earth works to diminish the importance of the here and now. It does so by expanding radically the relevant time scales of evaluation. Recent discoveries in both cosmology and exoplanet science expand both temporal and spatial scales even more so.

Let us begin with the work in exoplanet science—work that has generated enormous public interest. The discovery of the first extrasolar planet around a Sun-like

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[21] J. Baird Callicott, "Non-Anthropocentric Value Theory and Environmental Ethics," *American Philosophical Quarterly* 21 (1984): 303–04.

[22] William Grey, "Anthropocentrism and Deep Ecology," *Australasian Journal of Philosophy* 71 (1993): 463.

[23] Ibid., p. 468.

star was announced in October 1995. Since that time hundreds of other extrasolar planets have been identified, mostly by detecting Doppler shifts in the light emanating from the orbited star. Most of the planets identified have been gas giants, but very recently astronomers have identified a rocky, Earth-like planet, Gliese 581 E, that is only 1.9 times the mass of Earth. Although it sits close to the star it orbits, a neighboring planet, Gliese 581 D, resides in the "habitable zone" (also called the "Goldilocks zone") that permits liquid water. Outside of the habitable zone, water exists either as a gas or a solid; neither state is conducive to the formation of life. Astronomer Geoffrey Marcy said the discovery of Gliese 581 E "shows that nature makes such small planets, probably in large numbers; surely the galaxy contains tens of billions of planets like the small, Earth-mass one announced here."[25] Astrophysicist Alan Boss has estimated that each Sun-like star has one Earth-like planet on average. "Not only are they probably habitable but they probably are also going to be inhabited," he claimed. [26] The more conservative estimate of NASA scientist Bill Borucki puts the number of Earth-like planets in the galaxy in the habitable zone of their stars at 20,000.[27]

Inflationary cosmology in general predicts a universe much larger than the observable universe, which itself is thought to contain well over ten sextillion (10^{22}) stars. By the estimate of Alan Guth, the physicist who came up with the idea of cosmic inflation, the universe is approximately a thousand sextillion (10^{24}) times larger than the part of it we can currently observe. Given the ubiquity of Earth-like planets, it seems there is a staggering number of chances for life to form elsewhere in the universe—certainly enough chances for the probability to be vanishingly small that only Earth harbors life. But the chances of life forming elsewhere may be even higher. Recent data from WMAP (the Wilkinson Microwave Anisotropy Probe) indicate that the curvature of our universe is "flat" and so our universe is infinite.[28] That is, there is no end to the number of galaxies in existence—a fact which (paradoxically) is wholly consistent with all matter having arisen out of an initial singularity at the Big Bang. The WMAP data are no surprise to many theoretical cosmologists; on many versions of inflationary cosmology, the universe is predicted to be infinite.[29] Indeed, this author's own unscientific polling of physical cosmologists indicates that a solid majority believe there are an infinite number of stars and galaxies in existence within spacetime.

Now it might seem to follow from these considerations that life exists either in an extremely large number of places in the universe or in an infinite number

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[24] Ibid., p. 473.

[25] Jennifer Quinn, "Scientists Discover a Nearly Earth-sized Planet," Associated Press, 21 April 2009.

[26] BBC News, "Galaxy Has 'Billions of Earths,'" BBC News, 15 February 2009.

[27] Ron Cowen, "A Thousand-Plus Worlds to Explore," *Science News* 179 (2011): 18.

[28] Hazel Muir, "Does the Universe Go on Forever?" *New Scientist* 18 (11 October 2003): 6–7.

[29] Joshua Knobe, Ken Olum and Alexander Vilenkin, "Philosophical Implications of Inflationary Cosmology," *British Journal for the Philosophy of Science* 57 (2006): 47–67.

of places. Yet this conclusion cannot be drawn unless we know the probability of abiogenesis—the probability of a natural origination of life from nonlife. Consider an arbitrary Earth-like planet occupying an orbit in the habitable zone around a Sun-like star. There are two options regarding what the probability is of abiogenesis on such a planet: zero or some finite positive probability.[30] If the probability of abiogenesis is zero, then a natural origination of life is physically impossible, and so the existence of life on Earth (or anywhere else in the universe) is a bona fide miracle. While some (e.g., Intelligent Design proponents) might welcome this idea, I ignore it for the purposes of this discussion.

If the probability of abiogenesis on an Earth-like planet is some finite positive probability, then how many times should we expect complex life to arise in our universe? If the universe is infinite, then we should expect complex life to arise an infinite number of times. If the universe is tremendously large but still finite, then we will have to weigh the improbability of abiogenesis against the tremendously large number of chances there are for abiogenesis. The estimates of the probability of abiogenesis vary widely. Complexity theorists such as Stuart Kauffman think it likely that life will emerge wherever the conditions for self-organized complexity are met, and they think that the universe abounds with such locations.[31] Others think it exceedingly unlikely that *all* the necessary conditions for complex life to arise on an Earth-like planet are met because too many happy accidents (having the right kind of moon, having gas giants in the outer part of the solar system) are necessary.[32] It is quite possible that the probability of abiogenesis is so low that even with the vast number of opportunities a vast-but-finite universe provides, it would still be unlikely that abiogenesis would happen anywhere. Given our current state of knowledge, we just cannot say.

V. THE COSMIC PERSPECTIVE ARGUMENT

Suppose there exist an infinite number of Earth-like planets in spacetime. Suppose furthermore that the probability of abiogenesis on an Earth-like planet is some finite positive number. These seem to be reasonable suppositions given our current state of scientific knowledge. In that case it is certain that complex life arises an infinite number of times. What are the consequences of this conclusion for the nonanthropocentrist environmental philosopher? Callicott and Grey considered the consequences of taking the planetary perspective and judged those consequences

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[30] Technically, it is possible that abiogenesis has an infinitesimal probability—a probability that is greater than zero but less than any real number greater than zero. Since living systems are physical systems, however, and since physical systems seem to be systems capable of entering into only a finite number of states (when described in terms of whatever fundamental particles and forces our most basic physics employs), it seems safe to ignore this technical possibility.

[31] Stuart Kauffman, *Investigations* (New York: Oxford University Press, 2000), chap. 2.

[32] Simon Conway Morris, "The Paradoxes of Evolution: Inevitable Humans in a Lonely Universe," in Manson, *God and Design*, pp. 340–43.

not at all favorable to the conclusions nonanthropocentrist environmental philosophers typically wish to draw. Taking the cosmic perspective leads to the cosmic perspective argument, which is structurally analogous to the planetary perspective argument but has much more sweeping empirical premises. The conclusion of the cosmic perspective argument seems even more discouraging than that of the planetary perspective argument. Following the reasoning of Callicott and Grey, it seems we have no reason whatsoever to be concerned with the state of the Earth. No matter what we do, life flourishes elsewhere in the universe. We cannot affect the overall or average amount of it; nor can we effect a decrease in the overall or average levels of the various properties nonanthropocentrists value: biodiversity, interrelatedness, and so on. True, alien life does not possess the extrinsic properties of having been experienced by humans or of being genetically related to humans, but if we are truly nonanthropocentric (in both the biological and personal senses), we should not think these properties are morally relevant. To modify Callicott's terms slightly, we are guilty of spatiotemporal parochialism if we think spatiotemporal proximity to the planet Earth in the early twenty-first century makes some lives and some ecosystems more important than others. No, if the universe has an infinite amount of life in it, then what we do to the life here on Earth makes no ultimate difference. We can seek to preserve it if we like, but by doing so we are not making the cosmos any better. We are merely satisfying our partisan preferences.

In response, some might resort to the adage "think globally, act locally." Surely we do the most good for the collective, for the universe as a whole, if we focus on preserving the life it is within our power to preserve—the life that exists on Earth here and now. Right? This answer would be a good response if we were dealing with a finite system. For example, if all we are concerned with is maximizing human welfare here on Earth, it makes excellent sense for each person to focus his or her efforts on people nearby rather than unfamiliar people in remote countries (assuming both sorts of people are equally valuable and equally in need of help). With greater knowledge of local conditions comes greater power to bring about meaningful improvement, so the best way to maximize global human welfare is for each actor to seek to maximize local human welfare. In an infinite universe with an infinite amount of life, however, talk of maximization makes no sense. We can neither add to nor subtract from an infinite total.[33]

This realization marks an important philosophical distinction between the cosmic perspective argument and the planetary perspective argument. Even though from the perspective of geologic time what happens on Earth over the next several hundred years is not very significant, it still makes some quantifiable difference. The Earth itself has not been around forever and will not last forever. Eventually vulcanism will cease, the Sun will envelop the Earth, and then the Sun itself will die out.

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[33] For a contrary point of view concerning value judgments in infinite contexts, see Peter Vallentyne and Shelly Kagan, "Infinite Value and Finitely Additive Value Theory," *Journal of Philosophy* 94 (1997): 5–26.

Hence, the overall amount of biotic good displayed on Earth during its existence, while perhaps vast in comparison to the amount of biotic good displayed on Earth during the next few centuries, is still only finite. If we think there is some obligation to maximize the biotic good, and if we think the Earth is the only location for biotic good, then the propinquity of biotic good is quite plausibly a relevant factor guiding our actions. But if we are in a universe with an infinite amount of life and hence biotic good, the idea of acting so as to maximize the overall biotic good makes no sense and so propinquity is not a relevant factor.

Interestingly, taking the cosmic perspective undermines personal anthropocentrism just as much as it does nonanthropocentrism. If the universe is infinite and the personal properties in question—reason, free will, a capacity for entering into moral communities, and so on—are natural ones with a finite probability of arising out of primitive life, then those properties show up an infinite number of times in the universe. In that case, all of the arguments against being concerned about the fate of living creatures here on Earth apply just as well against being concerned about the rational, free, moral Earthlings of the distant future. In both cases, the infinitude of the universe guarantees that the favored properties will be displayed in abundance elsewhere in spacetime. Nothing we do can diminish the overall extent to which those properties are displayed, so the personal anthropocentrist has no more basis for caring about the long-term fate of Earth-bound humans than the nonanthropocentrist does for caring about the long-term fate of the planet.

VI. LESSONS FROM THE COSMIC PERSPECTIVE ARGUMENT

Let us assume nonanthropocentrist environmental philosophers will not simply abandon nonanthropocentrism in the face of the cosmic perspective argument. What are their other options? There seem to be three.

First, they could allow that their view rests on a contingent empirical premise and hope future scientific research supports it. The contingent empirical premise is that, aside from Earth, only a finite number of planets (possibly zero) house life. "We only have one Earth" is an environmentalist rallying cry, but putting it that way frames the matter quite anthropocentrically, with the Earth being special due to its relationship to *us*. The nonanthropocentric version would have to be "There is only one Earth"—that is, there is only one abode for life in the universe. Yet that is needlessly strong; for the sake of argument the premise need not be that there is only one abode for life in the universe, but merely that there are not infinitely many abodes for life. "There are only a finite number of abodes for life in the universe" is thus a premise sufficient for the nonanthropocentrist's purposes. And it is certainly possible that the scientific evidence eventually comes to support this premise. Origins-of-life research could show that the probability of abiogenesis, even on an Earth-like planet occupying the habitable zone around a suitable star, is fantastically small—perhaps infinitesimally small. Further study of extrasolar planets could reveal that, in fact, far fewer of them than we currently believe are

in the habitable zone. Future work in cosmology could show that the universe is finite rather than infinite, so that there in fact are only a finite number of places for life to arise. So perhaps the science will eventually support the idea that there is only a finite supply of life in the universe.

Yet banking on the science turning out this way puts the nonanthropocentrist in the dangerous position of taking a rooting interest in the outcome of disinterested scientific investigation (into cosmology, exoplanet science, and the origin of life). History has shown doing so to be a very bad tactic. For example, some Christian theologians of Galileo's time resisted his finding that there were additional planets and that some of them had moons. If there were intelligent living beings on other planets, how could Jesus Christ provide salvation to them? Were there multiple Incarnations?[34] Yet in the end, the science overwhelmed whatever worries theologians had about heretical consequences. Nonanthropocentrist environmental philosophers should likewise avoid developing a position susceptible to refutation from the sciences. In this case, that would mean developing a nonanthropocentrism that in no way depends on the claim that Earth is the only place (or one of only a finite number of places) in the universe with life.

Second, nonanthropocentrist environmental philosophers could simply reject maximizing consequentialism in all of its forms. They could purge it both from their theoretical work and from their political rhetoric. Doing so seems an easy concession to make, since few nonanthropocentrists self-identify as maximizing consequentialists to begin with. As noted earlier, however, there are at least some nonanthropocentrist maximizing consequentialist environmental philosophers, so they, at least, stand to lose something by this move. Other nonanthropocentrist environmental philosophers (e.g., Naess and his followers) will perhaps need to clarify what their ethical framework is if it is not a consequentialist maximizing one. Lastly, eliminating maximizing consequentialist rhetoric from environmental politics is no easy task, since so often environmentalists must use such rhetoric to counteract the utilitarian rhetoric of their opponents.

Third, nonanthropocentrists could become biological geocentrists, defining *biological geocentrism* as the analogue of biological anthropocentrism, but with the properties of this particular planet, Earth, being special rather than the properties of the particular species *Homo sapiens*. For biological geocentrists, properties occurring on Earth and being part of Earth's evolutionary history will be morally relevant properties, whereas properties occurring on Gliese 581 D and being part of Gliese 581 D's evolutionary history will not be. For biological geocentrists, there being an infinite amount of life of all forms in the universe is not morally relevant, since that other life is not on Earth or descended from life on Earth. To see this position in action, imagine a conflict between *Homo sapiens* and *Schmomo schmapiens*. (Let us presume intergalactic travel has been mastered!) For the biological geocentrist, we should favor *Homo sapiens*, since it is the species that arose on

[34] Russell, *Religion and Science*, p. 37.

Earth. *Schmomo schmapiens*, on the other hand, arose on Twin Earth and so counts for less. Likewise, the Last Human cutting down every member of *Sequoiadendron giganteum* (the Sierra redwood) would be worse than his cutting down every member of the Twin Earth equivalent, *Schmequoiadendron giganteum*. Why? Because one kind of tree is from Earth while the other is merely from Twin Earth.

Admittedly, biological geocentrism suffers from the appearance of arbitrariness. What would make the Sierra redwood any more valuable than its Twin Earth equivalent? Being from Earth just does not seem to be morally relevant. But perhaps the appearance of irrelevance is rooted in intuitions we have about the moral irrelevance of extrinsic properties. As discussed earlier, these intuitions are not decisive. We have intuitions in the opposite direction—for example, regarding artistic forgeries, human replicas, and restored environments. Perhaps embracing the moral relevance of extrinsic properties is the best way for environmental philosophers to remain nonanthropocentric without succumbing to the indifference of the cosmic perspective.