BOOK REVIEWS

James S. J. Schwartz and Tony Milligan, eds. *The Ethics of Space Exploration*. Springer Nature, 2016. vii, 267 pages.

The anthology covers, despite its name, not just ethical but also other issues in connection with space exploration. It includes, for instance, essays with a historical focus (Eleni Panagiotarakou, "Agonal Conflict and Space Exploration," pp. 47–60); a cultural focus (Jacques Arnould, "An Urgent Need to Exploe Space," pp. 153–64, Stephen Baxter, "Dreams amd Nightmares of the High Frontiera: The Response of Science Fiction to Gerard R. O'Neil's *The High Frontier*," pp. 15–30, Francesca Ferrando, "Why Space Migration must be Posthuman," pp. 137–52, and Christopher C. Yorke, "Prospects for Utopia in Space," pp. 61–71); a technological focus (Gonzalo Munévar, "Space Colonies and their Critics," pp. 31–45); an aesthetic focus (Sean McMahon, "The Aesthetic Argument to Terraforming Mars," pp. 209–18); a legal focus (Frans G. von der Dunk, "Shaking the Fundadations of the Law: Some Legal Issues Posed by the Detection of Extra-terrestrial Life," pp. 251–63); and a literary focus (Stephen Baxter, "Dreams amd Nightmares of the High Frontiera; The Response of Science Fiction to Gerard R. O'Neil's *The High Frontier*," pp. 15–30). As the title indicates, however, most texts do have an ethical focus, and several are concerned with extraterrestrial environmental issues. I focus this review on three chapters dealing with the value and moral status of possible extraterrestrial microbial life.

The first chapter I discuss here is written by astrobiologist Charles Cockell, "The Ethical Status of Microbial Life on Earth and Elsewhere: In Defense of Intrinsic Value" (pp. 161–79). The main thesis of this chapter is that individual microbes, as well as microbial ecosystems, have intrinsic value. As is known from literature in environmental ethics on our own planet, *intrinsic value* is a tricky term that tends to take on more than one meaning, sometimes in the same line of reasoning. The author seems to be aware of that and he makes significant attempts to be clear about what he means, and what he does not mean, by the term. To him, the question of intrinsic value is about "where we draw the line of moral relevance" (p. 169). It is not a type of value that is "independent of any valuer" (p. 168). He also assumes that the existence of a valuer is necessary for a value to be ethically relevant. If there are no valuers, he says, "the object is merely an object in the Universe unmolested by any intelligence going about its business and therefore not subject to the conclusions of any ethical codes" (p. 169).

I find it praiseworthy that the author makes the effort to clarify his position in this way. Unfortunately, however, he does not manage to be successful because he both states that intrinsic value for him is about moral standing, but also contrasts it with instrumental value, which is usually contrasted to the concept of end or final value, rather than moral standing. This is significant because his arguments work quite well for establishing end value but not for establishing moral status. The author's main

argument for his thesis that microbes have intrinsic value is that they possess an evolutionary capacity to eventually evolve into complex life. His main argument for why also microbial ecosystems possess intrinsic value is "the awe we feel for the sheer scale of their biogeochemical processes and their longevity on Earth" (p. 171). He considers this feeling of awe to indicate ". . . a sense of reverence and importance beyond purely instrumental value to us" (p. 171).

The author foresees a counterargument against his position in the appeal to the impractical consequences of assigning moral status to microbes. It is, in fact, impossible to live without killing large numbers of microbes everyday. His primary solution is to infer a graded scale such that microbes have moral status, but not to the same extent as we do. We, therefore, have the right to kill microbes when very important human interests are at stake, but not when it can be avoided through reasonable effort. He also states that instrumental values can sometimes trump intrinsic values and that the intrinsic value of the microbes sometimes need to be sacrificed for something that has a higher instrumental value to humans.

To make a fair judgment of Cockell's reasoning, I think it is important to uphold the distinction between moral standing and end value. As arguments for moral standing, I find them questionable in several ways. Any grading of moral status is highly questionable (what, for instance, about humans who fulfill the criteria for moral status to different degrees?), while it is quite obvious that end value comes in degrees. It also seems hard to motivate the use of someone's feeling of awe as a basis for moral standing, though not as a basis for end value. Also, his statements about the subjective nature of intrinsic value and that instrumental value sometimes can trump intrinsic value make good sense if we talk about end value rather than moral standing.

Moving on, let's consider Anna Frammartino Wilks' chapter, "Kantian Foundations for a Cosmocentric Ethic" (pp. 181–94). Kant may seem like a surprising starting point for claiming moral standing for microbes. The author insists that her ideas are based on Kant's ethics and philosophy of biology, but she does not intend her theory to be representative of Kant's own ethical theory. The author describes her own view as a weak cosmocentric ethic, meaning that it attributes moral standing to all beings in the universe but not to the universe itself.

Her line of reasoning is, in short, that the capacity for self-legislation (characterized by the ability to "legislate to themselves the moral law of reason" [p. 187]) that Kant finds in rational beings is nothing but a "heightened or more pronounced" form of the capacity for self-organization that according to Kant's philosophy of biology can be found in all life forms. From this she concludes that all living beings possess intrinsic value, which—just like Cockell—she uses both in the sense of moral standing and in the sense of end value. Contrary to Cockell, however, she also conflates these two meanings of *intrinsic value* with a third, namely, "a value that something possesses by virtue of its intrinsic properties or nature" (p. 183). Sliding between different concepts is, in fact, an important part of her reasoning. She claims that self-organizing beings can be seen as autonomous and

that self-organization implies purposiveness, which implies some form of ethical constraint, that in turn generates some "primitive form of moral agency" (p. 186), which is both sufficient and necessary for moral status.

Like Cockell, Wilks also claims that intrinsic value comes in degrees. The highest form of values assumes complete self-legislation, a capability that not even humans possess. Humans would still score quite well, though, when it comes to self-legislation. The lowest degree of intrinsic value, according to her scale, falls on beings that by the power of their self-organizing abilities, according to the author, respect their own intrinsic value through their struggle for survival (p. 190). According to Wilks, the different status between humans and microbes entails that we are permitted to perform activities that "might result in harm or destruction to extraterrestrial microbial life forms" (p. 191). If, on the other hand, we encounter life forms that score higher than we do, "human beings would be in a position of subordination to them" (p. 191).

The author suggests two ways of mitigating the problems that come with a gradient of moral status. One part of the solution is a complement to the self-regulation/self-legislation scale based on one's ability to respect the intrinsic value of other beings with intrinsic value. The better you are at respecting others' intrinsic value, the higher will be your own intrinsic value. The other part of the solution is to assign the same intrinsic value to all members of a species and hold that the intrinsic value of all members of a species is decided by "the potential for some members of the species to manifest that capacity in the current phase of their evolutionary history" (p. 188). Yet, I find it very difficult to see why my moral status should be determined by the abilities of some other members of my species. It is also not clear why it has to be the status of the individual with the highest status that rubs off on the others rather than the other way around. I also have a hard time understanding how this idea fits with the idea that one can gain or lose value through the degree to which one respects others' intrinsic value. Does not this mean that as long as we have at least some moral superstars, the rest of us can do really horrible things and still retain our moral status?

In conclusion, Wilks argues that what she has shown is that we are allowed to interfere on other planets to support existing life and to implant life where there is none. Unfortunately, she has not mentioned any of this in the actual text, which makes it difficult to assess. To sum up, then, I find this chapter very confusing and the arguments thoroughly unconvincing, especially the basic premise that self-regulation should be a basis for moral status, an idea that seems to be based in a conflation of three different senses of *intrinsic value* and a sliding between different concepts from self-regulation in a biological sense to self-legislation in a Kantian sense.

Finally, I consider Kelly Smith's chapter called "The Curious Case of the Martian Microbes: Mariomania, Intrinsic Value and the Prime Directive" pp. 195–208). "Mariomania" is Smith's name for the idea that Martian life, even microbial life, has "the highest possible" moral standing (p. 196) and that if we find life on Mars,

no matter how primitive, it should result in a strict hands-off policy regarding Mars. The aim of Smith's chapter is to question this view and his main strategy is to convince the reader that it, and some of its practical consequences, are unreasonable.

A difference between Smith and the previous two authors is that Smith believes that moral standing cannot come in degrees and it cannot be trumped. This means, according to the author, that if we grant microbes moral status on par with human beings, we will not be able to make prioritizations, which is problematic in most real-world situations where different interests are at stake. He exemplifies this, and puts it in an interplanetary context, by referring to the "Prime Directive" from Star Trek. The Prime Directive is a categorial standing order that forbids members of Star Fleet to interfere with the life and culture of sentient life on other worlds. As Smith points out, however, following the directive would often lead to results that run counter to our strongly held moral intuitions and even though the crew frequently exclaim the sacredness of the Prime Directive, they often find themselves breaking it.

Smith also makes a most unusual move among philosophers and presents the results of a survey to support his claim that "Mariomania" carries very weak support among both laymen and professional ethicist. Smith admits that measuring the popularity of a view is not "always" a good way of finding the truth, but he thinks that the lack of support puts the burden of proof on the proponents of "Mariomania." I do not think, in fact, that surveys can be used in this way, but I share the author's general intuition that assigning moral status to microbes makes little sense and that the practical implications can be quite unreasonable.

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