

Intrinsic Value, American Buddhism, and Potential Life on Saturn's Moon Titan

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Abstract

This chapter concerns the process of how we develop astrobiological morals by examining some of the compromises within ethical argumentation. I illustrate these compromises by turning to Saturn's moon Titan to provide an ethical theory challenge in terms of protecting Titan life, should life be found there, as well as protecting the habitats of that life and enabling the scientific study of that life. Through analysis I find that an intrinsic value approach to astrobiological ethics may, in this case, provide better absolute protection for Titan life. However, an American Buddhist approach, which arises from alternative, deontological ethical presumptions, in this analysis may provide better protection for the habitats of life as well as stronger arguments for the scientific study of extraterrestrial life. In the end we find that the ethical models that we bring to our work strongly color the ethical outcomes that we realize because of the limited, yet still valuable, nature of all forms of ethical argumentation.

Keywords: American Buddhism, astrobiology, bioethics, Buddhist ethics, intrinsic value, life on Titan, planetary protection

17.1 Introduction

The computer that I use to write this essay emerges from a series of compromises. In a perfect world, it would be infinitely fast, have unlimited

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storage, and make my lunch for me, but I do not live in a perfect world. Therefore, I choose to abide a digital device that in glass-half-empty perspective possesses negative dimensions, because the net positive of the computer in my life makes accepting a compromise situation worth it. Indeed, such compromises surround us all, for often we rightly value situations of trade-off above circumstances of utter absence. My point is this: Just because a state of affairs involves a compromise does not mean that it necessarily lacks value to us. I, in fact, hope that my reader enjoys this essay despite its background in a number of compromises like computer microprocessor operations.

As with computers, so it is with astrobiological ethical argumentation. Compromises of some kind always are required, whether one argues from the perspective of Aristotelian virtue ethics, John Stuart Mill's utilitarianism, Wang Yang Ming's Neo-Confucianism, Kant's intrinsic value concept, American Buddhism, or some other methodological viewpoint. Ethics work innately entails locating not an unambiguous formulation but rather an ideal balance of gains and deficits and then supporting the implementation of that multifaceted position with strong rational arguments.

But this trade-off nature does not mean that ethics work is arbitrary or meaningless, as some people appear to imply [17.6]. Finding the right compromise position poses quite a challenge because inherently it means arguing, even if implicitly so, for some type of moral loss, not just moral gain. This compromise-imbued quality makes ethics work in the eyes of the environmental ethicist Dale Jamieson a "problem" with a "difficult nature" [17.9]. The challenging character of ethical argumentation supplies one reason why varying schools of ethical thought have developed and then remained active, since they offer helpful guidance down time-tested paths.

To date the literature in astrobiological ethics does not reflect a fulsome discussion of the compromise-laden character of ethics work, though, thus diminishing effervescence within the ethical conversations among space scholars. This lack of discussion also may increase confusion among those scholars without much training in ethics. Hence, as a central goal this chapter delineates ethical compromises within a comparative performance evaluation between the oft-employed ethical concept of intrinsic value and, alternatively, Buddhist ethics as expressed by American Buddhists in the ethnographic field. I put these two methods of ethical discourse to work in directing the search for life on Saturn's moon Titan so that we can appreciate similarities and differences emerging from diverse modes of ethical argumentation most starkly.

In order to add clarity, here I define "intrinsic value" as a form of ethical argumentation in which value intentionally is accorded to something

in itself rather than for its instrumental use. I illuminate what I mean by American Buddhist ethics at some length below but for now mention that they reject the concept of intrinsic value in favor of deontological, or rule-based, ethical arguments.

Wielding intrinsic value and Buddhist moral approaches, I will show that both schools offer some protection for possible living beings that may dwell on Titan. Given the different premises of these modes of ethical thought, though, I will find that a thoroughgoing intrinsic value argument may provide more complete protection for the lives of organisms themselves than do many American Buddhists. At the same time, however, I will demonstrate how a Buddhist approach may create greater protection for habitats than some arguments that are based on the concept of intrinsic value, while the Buddhist method also may enable science more readily than an intrinsic value argument. This examination thereby teaches us how two divergent ethical tools can direct different yet desirable moral outcomes in terms of protecting living beings, preserving their habitats, and supporting science.

I alert my reader in advance that because this metaethical essay is about the process of how we do ethics work, not a deep exploration of one ethical viewpoint, my intentionally limited portrayals of intrinsic value and Buddhist ethical arguments are for illustration only, being inconclusive in themselves. There in fact exist many types of intrinsic value and Buddhist arguments beyond those that I investigate. For instance, within intrinsic value studies the space ethicists Charles Cockell and James S. J. Schwartz affirm establishing different degrees of intrinsic value [17.5] [17.15]. I have no room here to enter the controversy that accrues to these potential degrees of intrinsic value, however, which anyway fundamentally do not change my main point about the compromises that inevitably reside within ethics work.

In the next section I will outline my focus on the search for life on Titan, because potential Titan life provides a good test for discerning differences in ethical systems. Then, since intrinsic value arguments remain so familiar within astrobiological ethics literature, I explore their role on Titan only briefly. Afterwards, Buddhist ethical perspectives, being understudied in astrobiological literatures, receive a greater share of my attention before I discuss what we learn from comparing these two ethical approaches.

17.2 Titan and Possible Weird Life

The moral task of protecting the life on Saturn's moon Titan, should the chance of life there prove to be true, poses a vigorous test for the ethical

theory challenge that is featured in this essay. Titan, the target of the European Space Agency's 2005 Huygens mission as well as NASA's future Dragonfly mission, remains intriguing to astrobiologists because, despite a surface temperature of only 94 K or -179 C, it nonetheless appears in many ways like Earth [17.10] [17.14]. Quite like Earth, Titan possesses an atmosphere that can shield living beings from radiation and has a pressure of a relatively comfortable 1.5 bar [17.13]. Yet, unlike Earth, organic molecules and hydrocarbon aerosols fill Titan's hazy air. As on Earth, rain falls from Titan's skies, drains into river systems, and then converges to form lakes, but on Titan the rain consists of methane and ethane, not water [17.10]. Titan, like Earth, appears to house volcanoes, but on Titan they should be made of water ice, not stone, and spew not magma but liquid water [17.13].

It is possible that Titan life exists in liquid water pools within volcano systems or in the underground water that supplies them, and, being water based, this life may not be that different from Earth life [17.13]. But, along with some other astrobiologists, Christopher McKay opines that seriously weird life by Earth standards may inhabit Titan's hydrocarbon ponds. Large but simple organisms dwelling in liquid methane lakes, McKay relates, could appear as flat membranes while metabolizing hydrogen, acetylene, or ethane for energy [17.12].

Of course, methane-based life on Titan like this could be so unfamiliar to humans that it remains indistinguishable from its habitat, and under such conditions humans may be prone unintentionally to killing living beings due to unmindfully utilizing their home ecologies. This peril creates a need for a prior ethical agreement to protect life's potential habitats as well as life forms themselves, so that we may inhibit accidental harm, arising from a lack of discernment, to life forms.

In addition, because of the weirdness that I describe, strong arguments to study thoroughly the genetics or molecular structure of such life would appear, even though such efforts would mean killing some of these living beings. Since the theme of this article involves compromises, please note now the trade-off between absolute protection of life and the sacrifice of life in the name of science. Absolute preservation of life inhibits the invasive but complete study of genetic or molecular structure, while allowing such study limits the absolute protection of life.

Hence, I pose this bruising ethical challenge to the moral theories in this chapter: Provide necessary ethical protection for possible Titan life forms, even the weirdest ones, as well as for the habitats that support those life forms. Along the way, enable robust scientific study within appropriate ethical boundaries.

In the face of this task, as we will see, intrinsic value arguments appear relatively to excel with protecting living beings themselves, without concern for preserving habitats. Alternatively, American Buddhists from the ethnographic field, following deontological ethical reasoning, in this essay appear superior in achieving the prevention of harm to habitats as well as enabling science. In light of these distinctions, situating this study vicariously on Titan allows more clear visibility of possible divergences in ethical results between the use of intrinsic value theory and Buddhist ethical arguments. We get a better sense of how these trade-off differences can emerge if we look more closely at the concept of intrinsic value as well as at its opponents.

17.3 Some Strengths and Limitations of the Intrinsic Value Concept

So that I am not misunderstood as an enemy to the concept of intrinsic value, I highlight that I have used it myself in an argument to establish nature reserves on Mars [17.3]. The ethicist Alan Marshall also discusses Mars, rather than Titan like this essay, yet his intrinsic value argument regarding the protection of possible life on Mars retains application to Titan and nicely exhibits some of the qualities of intrinsic value arguments that inform the argument of this paper. Thus, I turn now to Marshall's intrinsic value argument.

For Marshall, any life that is found on Mars must be preserved absolutely, because "Martian life is intrinsically valuable" [17.11]. If microbial life is found on the Red Planet, Marshall claims, Mars "should be left alone, with exploration only via sterilized automated spacecraft" [17.11]. Instead, the entirety of Mars should be turned into a "World Park," devoid of physical humans and their science, in order to preserve the planet's heuristically-presumed intrinsically valuable microorganisms [17.11]. According to Marshall, even sterilized exploratory robots cannot learn scientifically about this life in any way that may be intrusive, since intrinsically valuable "Martians have no duty to contribute to the knowledge of humanity" [17.11]. In this way Marshall's intrinsic value ethical formulation provides any possible life on Mars with stringent, thoroughgoing protection. Yet, because of the ways that it inhibits invasive research, Marshall's ethic does not flex to meet the needs of scientists who wish to utilize microscopes to understand the inner mechanisms of extraterrestrial organisms.

Additionally, Marshall's intrinsic value presentation recognizes that habitats of life should be protected, but Marshall musters no real intrinsic

value argument that can result in this end. Feebly, for instance, Marshall spotlights that stony habitat entities may have intrinsic value, because, for all we know, Martian stones may enjoy a “blissful state of *satori* (the experience of nirvana in Japanese Zen Buddhism) only afforded to non-living entities” [17.11]. While perhaps stones have greater meditative capacities than currently recognized, examples from Earth indicate that a hypothesized and unproven belief in the spiritual capacities of rocks will not preserve environments from the rapacious capacities of human desires, commerce, and conflicts. Therefore, in the end, Marshall’s argument from the standpoint of intrinsic value provides absolute protection to extraterrestrial life but without much of an ethic to preserve the ecologies upon which life depends or the adaptability to meet possible desirables like empowering genetic or molecular science.

Although intrinsic value arguments can vary from Marshall’s approach, Marshall’s presentation exhibits common themes in applying intrinsic value arguments to extraterrestrial realities, such as absolutely protecting life but not so much preserving habitats or enabling science for human benefit. Naturally, Marshall’s argument has detractors, such as the space ethical philosopher Kelly C. Smith. Smith recognizes that the “intrinsic value justification is certainly central to modern environmental ethics” because of its attractiveness in assuring a limited ethical outcome, like, in this essay, absolutely preserving life [17.16]. Smith rightly indicates, “Something with intrinsic value simply should not be treated in certain ways, irrespective of the possible benefits to others of doing so” [17.16].

But Smith finds an intrinsic value approach to be flawed for several reasons. In concert with other theorists, for instance, Smith highlights the diminishing returns that remain inherent in the concept of intrinsic value. Taking an extreme scenario as instructive of principle, if we grant intrinsic value to everything in the natural world, then nothing functionally has value more than anything else, leaving us with no basis for making choices based upon comparative moral valuations. The more that the concept of intrinsic value is invoked, the less it ethically protects, because the harder it is to focus upon what truly possesses worth. On this note, Smith also asserts that the more that different things enjoy intrinsic value, likewise the more we create pointless moral dilemmas for ourselves [17.16]. Put differently, like rich foods or potent liquors the concept of intrinsic value should be used “sparingly,” as Smith says, not liberally [17.16].

Reminding my reader that all ethical arguments involve compromises, so that the contributions of many divergent voices is desirable in the big picture, one can appreciate that it remains advantageous to have ethical voices be capable of entering conversations with each other. Unfortunately,

another drawback to an intrinsic value argument beyond those mentioned by Smith concerns its sometimes deficient abilities as a partner in conversation with other ethical modalities.

Take, for instance, the poor fit between the concept of intrinsic value and Buddhist ethical systems. A distinctive mark of Buddhist philosophies concerns precisely their rejection of notions of intrinsic qualities or essences. The Buddhist doctrine of *anattā*, or no-self, denies that any empirical entity exists independently in time or space, since everything phenomenal arises as an effect of prior causes and in turn serves as a cause for other effects [17.20]. For instance, without the Big Bang 13.7 billion years ago, this essay presumably would not exist. In this light, despite ordinary human temporal perceptions, this essay is not separate from the birth of our universe. Therefore, in Buddhist perspective this essay, rather than arising independently as we may wish to think, is the product of ever-changing conditions that began long ago, leaving it with no final essence or intrinsic existence of its own. In Buddhist philosophies, moreover, the same argument applies to the concept of “value” itself, since value as a notion, being conditioned by various causes, lacks inherent or intrinsic existence. Needless to say, if in Buddhism nothing intrinsically exists, including the concept of value itself, there can be no such thing as intrinsic value in Buddhist ethics. This metaphysic is why the concept of intrinsic value remains little used by Buddhist ethicists: its unfortunate philosophical fit with treasured Buddhist premises [17.8].¹

Alternatively, Buddhism commonly asserts deontological ethical arguments following established rules in the Buddhist scriptures, such as the central *Vinaya* code of rules of behavior for monks and nuns. Deontological ethical arguments ground themselves in the importance of following tested guidelines or rules. In different deontological ethical systems deities can declare these guidelines, for instance, as with the rules within the Ten Commandments; or, in the case of Buddhists, scriptures that contain the respected words of the Buddha, rather than those of a deity, supply a set of directions that is robust enough to support and maintain a large international monastic community for 2,500 years. While deontological and intrinsic value ethical arguments can be integrated, as one sees in the work of the philosopher Kant, for reasons that I have described, Buddhists intrinsic value and deontological approaches generally remain separate, thereby providing this chapter with useful ethical system contrasts.

¹For a rare implementation of the concept of intrinsic value within Buddhist ethics see [17.8].

Now I turn to a Buddhist deontological approach to Titan life so that we can appreciate these contrasts more sharply.

17.4 Buddhist Scriptures and the Search for Extraterrestrial Life

If we consult the *Vinaya* code of behavioral rules for monastics as found in the scriptures of Theravāda Buddhism, we find four deontological ethical injunctions relevant to the search for life on Titan. For precision I add as an aside that these injunctions appear similarly in the scriptures of other forms of Buddhism, too. All four of these ethical injunctions are Pācitiyya offenses, meaning that violation of them requires confession and forfeiture of goods gained.

The first of these rules, Pācitiyya 142 in the rules for nuns or Pācitiyya 61 in the rules for monks, declares, “Should any *bhikkhuni* [nun] intentionally deprive an animal of life, it is to be confessed” [17.18]. With this injunction, which also features prominently as the First Precept of Buddhist rules for laypeople, Buddhism asserts protection for all living, sentient beings.

Along with this protection of life, Buddhist monastic rules also contain precepts for not harming the habitats of small living beings. Pācitiyya 20 for monks (nuns: Pācitiyya 116) specifies, “Should any *bhikkhu* (monk) knowingly pour water containing living beings—or have it poured—on grass or on clay, it is to be confessed,” while Pācitiyya 62 (nuns: Pācitiyya 143) states, “Should any *bhikkhu* knowingly make use of water containing living beings, it is to be confessed” [17.19]. This deontological concern for preserving habitats provides a key difference from many intrinsic value arguments like Marshall’s, as I will discuss further.

One more ethical injunction relevant for life on Titan concerns the propriety of killing those beings for the benefit of humanity through scientific research. Pācitiyya 107 for nuns or the similar Pācitiyya 11 for monks asserts that, “The damaging of a living plant is to be confessed” [17.18]. For some Buddhist monastics, this rule forbids their engaging in agriculture. Yet this apparently plant-friendly stricture has not always stopped Buddhist monastics from growing and harvesting plants, engaging in forestry themselves, or especially from encouraging lay people to pursue practices like agriculture or forestry. Otherwise, with no plants for food, wood for housing, etc., monastics cannot survive. Thus, the net practical effect of this injunction appears to be that the unreasonable destruction of living beings for human use should be avoided while reasonable human uses remain acceptable.

This sensibility of reasonable utilization opens the door for the scientific testing of organisms from Titan to answer the important research question of the potential possession by those organisms of DNA or molecular structure like those on Earth. Such study could reveal possible beneficial medical advances or provide evidence that life on Titan arose independently as a second genesis from that of Earth, which would be scientifically salient.

The guidelines that I have described are rules that the most ardent of Buddhists, the monastics, live by, and thus they represent a respected and time-tested authoritative moral code. But all forms of ethical argumentation face limits, and here Buddhist deontological ethics can struggle, too, because these ethical principles were promulgated long ago without any concern for their applicability to one of Saturn's moons. Do these rules, designed only for Earth, even work off-planet? Rather than let Buddhist ethics simply sputter with this question, I entered the ethnographic field among contemporary American Buddhists so that they can update our understanding. I share their input now.

17.5 American Buddhists and Life on Titan

Like people from Japan, India, Russia, China, and the European Space Agency countries, residents of the United States live in a spacefaring culture which generally promotes space exploration and therefore provides its citizenry with educational experiences to inspire support for space travel. This makes the United States among the best of locations for discovering informed grassroots ethical reactions to space exploration, including among American Buddhists, who therefore can offer us a capable contemporary Buddhist ethical perspective regarding Titan's possible life.

In order to understand Buddhist attitudes toward space exploration, between March and June of 2019 I visited seven important Buddhist centers in the southeastern United States. I surveyed practitioners at centers across all three Buddhist great sects of Theravāda (N=44), Mahāyāna (N=40), and Vajrayāna (N=37), gaining representative samples from each type as well as a balanced overall sample of N=121. Moreover, in order to highlight the distinctiveness of Buddhist voices from among those of the general American public, I collected a control data set from 78 randomly selected university undergraduate students. For the sake of economy in this piece, I refer my reader to another work of mine for understanding more of the demographic details of the ethnographic data that I present here [17.4].

Since American Buddhists tend not to be experts in space policy, in the field I avoided asking direct space policy questions and instead focused my

interactions with Buddhists in terms of their extensions of ethical values. All informants took the same sixteen prompt survey about the application of Buddhist ethics to extraterrestrial environments. I also gathered qualitative comments both through my survey as well as through discussions with Buddhists and I share some of these qualitative data in this chapter. The quantitative prompts that are relevant for this chapter include:

1. I think that Buddhist principles should be utilized to guide our interactions with microbial life beyond Earth. (responses on a five-point scale from strongly agree to strongly disagree)
2. If we do use Buddhist principles to guide our interactions with microbial life beyond Earth, those principles should be? (choices offered but alternative responses welcomed)
3. We should protect from harm the extraterrestrial habitats of life, the ecologies on which life depends, whenever possible. (responses on a five-point scale)
4. If it intends to alleviate human suffering through the advancement of science, it is acceptable to take the lives of a small number of microbes from beyond Earth for the sake of their scientific study. (responses on a five-point scale)

American Buddhist responses to these survey prompts support the extension of deontological Buddhist rules as derived from the scriptures to guide the search for life on Titan, thereby creating a viable Buddhist ethical position that is alternative to outcomes from some intrinsic value arguments. To the question of whether Titan can represent an appropriate location for applying Buddhist scriptural ethics, 64% of Buddhists strongly agreed and another 25% agreed, making a notable 89% of Buddhists' asserting that Buddhist ethics should inform our actions on Titan. In this way, space-age savvy Buddhists help their tradition to overcome possibly being Earthbound by arguing for the application of its ethics on other worlds.

Further, in terms of what values to apply to the lives of organisms on other planets, 84% of Buddhists agreed or strongly agreed to extend the value of nonharm, also known as ahimsa from the Sanskrit, thus providing protection from harm for life forms. Of course, this result reflects the scriptural injunctions of Pācitiyyas 142 and 61 that I mentioned previously, so here we witness American Buddhists deontologically putting these rules into action. In so doing these Buddhists contrast with the control response of 59% who extend nonharm to Titan, so that Buddhists, as demonstrated by a Fisher's statistical test result of $p=0.0001$, express a distinctive voice on this count within American culture. With their application of Buddhist strictures to

Titan and extension of nonharm toward possible life on that moon, these American Buddhists influence an ethical outcome that is not unlike one that an intrinsic value argument could produce, spotlighting how different ethical argumentative forms can at times produce similar results.

But divergent ethical arguments, of course, also may produce contrasting results. Protection for the ecologies on which life depends rather than just for life itself appears little in many ethical arguments in the current astrobiological literature, including, as I have mentioned, those made from the standpoint of intrinsic value. This lack of protection thereby accentuates in importance the survey prompt regarding the protection of the habitats of life. To the survey prompt, “We should protect from harm the extraterrestrial habitats of life, the ecologies on which life depends, whenever possible,” 75% of American Buddhists in this study strongly agreed and another 21% agreed, so that in total 96% of Buddhists approved. This protection remains important, for it makes little sense to avoid direct harm to an organism yet still eliminate that organism’s way of making a living. Here, following provisions of their scriptures, these American Buddhists supply ethical safeguards for habitats, not just for living organisms, in a manner that is most ethically useful. A Fisher’s statistical test reveals that these Buddhists in fact distinguish themselves on this count from the American general public. As I will discuss more fully, in a world of ethical theorizing compromises, in this instance the Buddhist protection of habitats can contribute an important gain.

But, like all forms of ethical theory, Buddhist ethics face compromises. We see this principle in action with Buddhist responses to the fourth survey prompt that I mentioned, “If it intends to alleviate human suffering through the advancement of science, it is acceptable to take the lives of a small number of microbes from beyond Earth for the sake of their scientific study.” Several Buddhists described this prompt as the most difficult moral quandary of my survey. This dilemmatic character appears because, on one hand, Buddhists, following the deontological rules that I have examined, wish to protect life from harm. On the other hand, Buddhism, like all traditional religious forms, anthropocentrically favors humanity itself, including in this case support for science that benefits humans [17.2]. Indeed, without some anthropocentrism, Buddhists would have no food to eat or places of residence. In this specific situation, mobilizing anthropocentric support for scientific ventures that benefit humanity arguably can be a fully Buddhist action despite the countervailing obligation not to harm living beings.

Exhibiting this tension between protecting life and allowing the harvesting of life for human science, about 24% of Buddhists remained neutral with regard to the prompt concerning the ethical appropriateness

of sacrificing extraterrestrial microbes for scientific testing. But only 20% of these Buddhists actually opposed this scientific testing. Overall, 56% of Buddhists agreed or strongly agreed that the limited harvesting of microbe lives for human benefit from science, even if those microbes must die, remains morally justified. Given the dilemmatic nature of the prompt, though, perhaps many of these Buddhists would agree with the Vietnamese American Buddhist who emphasized that “only a SMALL number of microbes” should be sacrificed.

With this support of science, American Buddhists flexibly make studying extraterrestrial life morally easier, within of course restraints, for we feel more justified ethically to learn from a tiny organism’s genetics or molecular structure. In a world of ethical theory trade-offs, some people, like many of the Buddhists in this study, would consider empowering science in this way to be a moral benefit. Yet conflict remains, since other people wish, in the world of moral compromises, to protect life absolutely. This divergence in approaches brings me to discuss what these deontological American Buddhist ethical positions regarding Titan life mean in comparison to intrinsic value views.

17.6 Discussion

These American Buddhist ethical perspectives could be framed differently than I present them here, as could the intrinsic value argument that I offered above. In this essay the Buddhist and the intrinsic value arguments remain inconclusive in themselves and appear merely to illustrate the compromise-requiring character of astrobiological ethical work.

Reflecting such compromises, in this essay an example intrinsic value argument, when stringently applied to extraterrestrial life like Alan Marshall does, avoids making the compromises for science in terms of protecting life that the Buddhists in this study collectively make. Marshall’s intrinsic value argument completely preserves extraterrestrial life from intrusive study in contrast to the more liberal deontological Buddhist approach. Therefore, in a world of ethical compromises, if we wish to protect life absolutely, because of the ethical reasoning used an intrinsic value argument like Marshall’s may supply this protection more reliably than may the Buddhists in this study. Depending on our ethical goals and ideals, an intrinsic value argument may be more thoroughgoing when it comes to preventing harm to extraterrestrial life itself.

But an absolutist intrinsic value argument like Marshall’s faces limits in terms of habitat protection and the practice of science, as we have seen.

For instance, Marshall's intrinsic value argument attempts to protect habitats, but does so by following the impractical path of preventing entry to planets and speculating about the spiritual capacities of rocks. Likewise, most other intrinsic value arguments protect only living beings, because in these formulations intrinsic value remains extended only to living beings, not to their abiotic habitats. The geologist Murray Gray relates that such situations arise because across times and places, humans have failed to accord intrinsic value to perceived inanimate habitat entities like mineral formations [17.2] [17.7]. Therefore, lacking in historical or geographic precedents for valuing nonliving things, intrinsic value arguments for abiotic entities like stones often remain quite difficult to make, leaving the task of habitat protection understudied in the intrinsic value astrobiological ethics literature. As the space ethicist James S. J. Schwartz helpfully indicates, "preoccupation with protecting extraterrestrial life for its own sake needlessly limits the scope of what should be said about the ethics of planetary protection" [17.15].

Conversely, as we have seen, a large 96% of American Buddhists insist on some protection for the abiotic habitats upon which extraterrestrial beings depend. This ethical advance may promote helpful moral outcomes not just for organisms but also for the ecologies that they inhabit. In the context of the search for life on Titan, in fact, this idea of preserving habitats takes on great importance. Because Titan life may be quite weird by Earth standards, it may be difficult to tell what is a living being and what is an abiotic habitat of that being, thereby complicating preservation.

Take, for example, the findings of the research team Svirčev *et al.* in terms of possible life in loess soils on Titan. Loess soil formations on Earth are formed through the action not just of abiotic minerals but also of microorganisms, since "the eco-physiological activities of microorganisms such as cyanobacteria, other bacteria, lichens, mosses, and fungi play an important role in the trapping of dust particles and formation of loess" [17.17]. Because Titan maintains "all geological factors needed for loess formation like on Earth," Svirčev *et al.* state that on Titan, "The search for extraterrestrial life should be expanded to loess-like deposits" [17.17].

If we encounter such biologically active loess-like soils on Titan like Svirčev *et al.* describe, are we certain that we could immediately recognize life in them, rather than just seeing lifeless regolith? Faulty discernment of what is biotic and what is not could lead to the tragic if unintentional destruction of life. If we cannot tell organism from habitat, along with saving life the protection of potential habitats, too, provides a desirable ethical outcome. And, on this issue, deontological, rather than intrinsic value, Buddhist ideals of habitat protection may offer the unexpected beneficial preservation of unfamiliar life forms, as we have seen.

Thus, by following the different path of deontological ethics, the American Buddhists in this study seem to ameliorate the problem of protecting ecologies exactly by focusing their ethical regard not just on living beings but also on their habitats. Within the compromises that these Buddhists face, they therefore decisively supply astrobiological ethics with a significant benefit, the ability to protect ecologies. On the question of habitat conservation and preservation, we can see that these Buddhist responses, relative to other models, may inspire advances in our collective astrobiological ethics.

Nonetheless, when it comes to practicing science, one of the Buddhists in my study also strongly asserted, “I do not support the scientific search for microbial life. This is not a ‘sanctity of life’ response,” thereby demonstrating the desirability of a different moral end than habitat preservation, the uncompromising protection of life in itself. If the strict preservation of life itself is our goal, with the question of habitat preservation set aside, the rest of these American Buddhists mostly fail us, as we have seen, given that by more than two-to-one Buddhists collectively assert the acceptability of sacrificing limited numbers of tiny beings for science that aims to benefit human beings. This is because Buddhist ethics retain numerous inbuilt anthropocentric elements, and in this case these anthropocentric dimensions result in the benefit of human science rather than in an ethic of inviolate harm toward extraterrestrial life [17.1].

As this analysis reveals, if protecting specific Titan life in itself absolutely represents our goal, an intrinsic value ethical argument may be superior. However, although intrinsic value models may result in better protections for life itself, Buddhism may provide a seemingly better platform for the ethical protection of life’s habitats as well as for the scientific study of weird life. This compromise situation between intrinsic value theories and Buddhist deontological ethics thereby demonstrates the thesis of this chapter: Astrobiological ethics always demand compromises that are difficult to negotiate, limiting in form, yet still valuable in terms of creating a grounded and beneficial moral compass.

17.7 Conclusion

Ethical deliberation in astrobiology remains difficult because of the many compromises within the task. Intrinsic value arguments are popular in the literature, since as employed they enjoy a traditional Western philosophical pedigree and can produce some useful ethical fruit. But intrinsic value arguments face limits, as do the ethics that American Buddhists

in this study extend to life beyond Earth. Thoroughgoing intrinsic value arguments appear to result in more complete protection for various specific forms of life in themselves than contestations supplied by American Buddhists, who make room for the limited harvesting of life for science if human benefit thereby prevails. Alternatively, American Buddhists in this specific study promote the protection of the habitats in a way that helpfully contributes to our astrobiological ethics while they better enable science. Further, Buddhists do so through deontological methods rather than through intrinsic value arguments, which often fall short on these counts. In a Titan weird life situation in which it is difficult to separate an organism from its habitat, this preservation of habitats can supply greater preservation of living beings, although, of course, not the ones that some Buddhists support as scientific sacrifices. By examining the results of intrinsic value approaches in tandem with American Buddhist methods, we therefore learn to appreciate that ethical arguments can offer welcome moral guidance despite their embodiment of imperfect compromises.

References

- 17.1. Capper, D., Learning Love from a Tiger: Approaches to Nature in an American Buddhist Monastery. *J. Contemp. Relig.*, 30, 1, 53–69, 2015, <https://doi.org/10.1080/13537903.2015.986976>.
- 17.2. Capper, D., *Learning Love from a Tiger: Religious Experiences with Nature*, University of California Press, Oakland, CA, USA, 2016.
- 17.3. Capper, D., Preserving Mars Today using Baseline Ecologies. *Space Policy*, 49, 101325, 2019, <https://doi.org/10.1016/j.spacepol.2019.05.003>.
- Q1 17.4. Capper, D., American Buddhist Protection of Stones in terms of Climate Change on Mars and Earth. *Contemp. Buddhism*, 2020, <https://doi.org/10.1080/14639947.2020.1734733>.
- 17.5. Cockell, C.S., The Ethical Status of Microbial Life on Earth and Elsewhere: In Defense of Intrinsic Value, in: *The Ethics of Space Exploration*, J.S.J., Schwartz and T., Milligan, (Eds.). pp. 167–179, Springer, Cham, Switzerland, 2016.
- 17.6. Fogg, M.J., The ethical dimensions of space settlement. *Space Policy*, 16, 205–211, 2000, [https://doi.org/10.1016/S0265-9646\(00\)00024-2](https://doi.org/10.1016/S0265-9646(00)00024-2).
- 17.7. Gray, M., *Geodiversity: Valuing and Conserving Abiotic Nature*, John Wiley and Sons, West Sussex, UK, 2004.
- 17.8. James, S., *Zen Buddhism and Environmental Ethics*, Ashgate Publishers, Aldershot, Hampshire, UK, 2004.
- 17.9. Jamieson, D., Oxford University Press, New York, NY, USA, 2014.

- 17.10. Lorenz, R. and Mitton, J., *Titan Unveiled: Saturn's Mysterious Moon Explored*, Princeton University Press, Princeton, NJ, USA, 2008.
- 17.11. Marshall, A., Ethics and the Extraterrestrial Environment. *J. Appl. Philos.*, 10, 2, 227–236, 1993, <https://doi.org/10.1111/j.1468-5930.1993.tb00078.x>.
- 17.12. McKay, C.P., Titan as the Abode of Life. *Life*, 6, 8, 8–12, 2016, <https://doi.org/10.3390/life6010008>.
- 17.13. Meltzer, M., *The Cassini-Huygens Visit to Saturn: An Historic Mission to the Ringed Planet*, Springer, Cham, Switzerland, 2015.
- Q2 17.14. NASA, *Dragonfly's Journey to Titan*, 2020, <https://www.nasa.gov/dragonfly/dragonfly-overview/index.html>.
- 17.15. Schwartz, J.S.J., *The Value of Science in Space Exploration*, Oxford University Press, New York, NY, USA, 2020.
- 17.16. Smith, K.C., The Trouble with Intrinsic Value: An Ethical Primer for Astrobiology, in: *Exploring the Origin, Extent, and Future of Life: Philosophical, Ethical, and Theological Perspectives*, C.M., Bertka (Ed.), pp. 261–280, Cambridge University Press, Cambridge, UK, 2009.
- 17.17. Svirčev, Z., Nikolić, B., Vukić, V., Marković, S.V., Gavrilov, M.B., Smalley, I.J., Obreht, I., Vukotić, B., Meriluoto, J., Loess and Life out of Earth? *Quat. Int.*, 399, 18, 208–217, 2016, <https://doi.org/10.1016/j.quaint.2015.09.057>.
- 17.18. Thānissaro, B., *Bhikkhuni Pāṭimokkha*, 2019, <https://www.accesstoinsight.org/tipitaka/vin/sv/bhikkhuni-pati.html>.
- 17.19. Thānissaro, B., *The Buddhist Monastic Code I and II*, Metta Forest Monastery, Valley Center, CA, USA, 2013.
- 17.20. Walshe, M. (trans.), *The Long Discourses of the Buddha*, Wisdom Publications, Boston, MA, USA, 1995.

Author Queries

- Q1** Please provide volume and page number of reference 17.4.
- Q2** Please provide publisher name and location of references 17.14, 17.18.

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