REVIEW ESSAY

Is Space Expansion the Road to Dystopia?

*Tony Milligan**

Dark Skies: Space Expansionism, Planetary Geopolitics, and the Ends of Humanity, Daniel Deudney (New York: Oxford University Press, 2020), 464 pp., cloth $42.99, paperback $30.99, eBook $20.99, audiobook $24.99.

Space Ethics, Brian Patrick Green (Lanham, Md.: Rowman & Littlefield, 2022), 304 pp., cloth $116, paperback $42, eBook $39.50.

The exploration of outer space has been an ongoing concern within the scientific community since the 1950s. Interest from fields in the humanities, about the societal role of such activity, has been more intermittent. Over the past two decades, however, the interest in the societal side of space exploration has dramatically increased, driven in part by the emergence of major private-sector players associated with the super wealthy, such as Elon Musk in the case of SpaceX, Jeff Bezos in the case of Blue Origin, and—to a lesser extent—Richard Branson in the case of Virgin Galactic. Also driving this shift has been the prospect of large-scale space tourism; the possibility of accessing great wealth from mining the main asteroid belt; the revival of hope for a permanent base toward the lunar south pole; and the prospect of setting foot on Mars by the midcentury. Other key factors include global strategic shifts, a sideways spread of launch capability beyond the main Euro-American powers, and the emergence of China as one of the space superpowers that could land the first astronaut on Mars. To this we can add a growing problem of space junk in the form of

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decommissioned or simply abandoned satellites, widely regarded as a form of orbital pollution generated by a lack of foresight about the scale and sustainability of human activities in nearby regions of space. Finally, we can add the emergence of populist critiques of human activity in space, such as the satirical 2021 advertisement "1%," put out by Greta Thunberg's Fridays for Future movement, suggesting that the 1 percent should move to the pristine and beautiful red planet in order to escape from the ravages of terrestrial climate change.

The main scientific, policy, and academic concerns emerging out of these developments range from worries about private-sector commercial involvement in space expansion and increasing global inequalities on Earth through to the compromising of unique sites for planetary science in space; to security concerns about the misuse of space by rogue states and the militarization of space by rival powers (the United States and China, in particular) that are trying to keep pace with each other; to academic suggestions about a possible neglect of the Earth or even the revival of some manner of colonial mentality sharpened by hopes for a new and high frontier.

Daniel Deudney's recent book *Dark Skies: Space Expansionism, Planetary Geopolitics, and the Ends of Humanity* exemplifies the concerns about security and a misguided colonial mentality. Deudney's four big worries are that the weaponization of space will increase the risks of terrestrial nuclear war; that space expansion will accelerate a drift toward a single bureaucratic and authoritarian global state, which might be required to construct and maintain space infrastructure; that technologies geared to redirect asteroid orbits will themselves end up being used as kinetic weapons; and that any Mars colony would eventually turn upon Earth, resulting in a war of civilization-threatening scale. This approach is characteristic of broadly skeptical views about a robust expansion of human-space activities. Skepticism of this sort rarely focuses upon only one big threat such as the likelihood of an eventual Mars-Earth conflict. Deudney does avoid a single-issue focus and is typical in doing so.

By contrast, Brian Green's *Space Ethics* touches upon many of these same matters—the dual use of technologies for purposes of exploration or communication and strategic ends—but without any sense of a catastrophic "telos," or ultimate tendency toward global or multiplanetary conflict. Green follows a familiar path of outlining specific worries about the protection of science, a path that tends not to link a specific series of ethical problems to any generalized skepticism about human activity in space, but to arguments about policy, the possibility of

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international agreements, and the irreplaceable and unique nature of key sites (here again, the south lunar pole figures prominently). These are the more localized worries that shape a continually evolving planetary protection policy that emerged as a shared international approach during the U.S.–Russia Cold War era. It is a policy geared to ensuring that nothing bad is returned to Earth from space ("back contamination") and that nothing goes into space that could contaminate sites where we might search for life ("forward contamination"). My own view on these matters is that our expanding human activities in space do come with at least some strategic risks as well as risks associated with planetary protection, but there is no obvious and compellingly strong set of arguments against such expansion. There is also no obvious pathway into the future that carries lesser risks, given that the Earth is now a planet in crisis.

The most compelling argument in favor of space expansion does not concern human destiny or anything of that sort, but rather concerns the importance of planetary science, given that we are currently attempting to mitigate and adapt to climate change and cannot yet reverse it. We may have flourishing futures, but we have no possible futures that are free from high levels of risk. With respect to human activities in space, we may benefit considerably from scientific research into polar ice formation and change on the Moon and on Mars; from a greater understanding of ocean worlds (given that Earth itself is an ocean world); and likely from a greater understanding of atmospheric systems (given that our recognition of the greenhouse effect was itself strongly shaped by Mars and Venus research and the prior recognition of a runaway version of global warming on Venus). The difficulty, however, is getting the benefits of such research without becoming overwhelmed by the strategic and societal downsides—a difficulty made greater because robust science programs in space are likely to require, or at least be associated with, an increasing volume of more general space infrastructure, commercial and military.

A Normal Domain–Special Domain Contrast

Framing matters in ethical terms, and in broad strokes space can either be regarded as a normal domain for human activities or as a special domain that tends toward utopian or dystopian outcomes. If we regard it as a normal domain, then expansion is cause for caution but presents no unusual alarm. If we regard it as a special domain, then far greater alarm may be a suitable response. Although a

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number of other texts will be mentioned, my focus here will be upon the two texts mentioned above that exemplify these two respective approaches. The normal-domain approach, which I sympathize with, is represented by Green's *Space Ethics*, and the special-domain approach is represented by Deudney's *Dark Skies*. The terminology of "normal domain" and "special domain" is my own, but its aptness will become clear. The terminology of "normal" is not intended to suggest that society will be unchanged by space expansion, that our understanding of ethics will be unaffected by human activity in space, or that matters will be "business as usual." Space technologies are already socially transformative, and they are likely to become even more so as robotic technologies accelerate space activity. Much will change, including our understanding of ethical problems when taken into the extreme conditions of space.

Nonetheless, my contention is that we currently have no compelling reason to imagine that space expansion will either fix our familiar societal problems in some special and quasi-utopian manner or make them worse in some special, and radically dystopian, way. Space expansion is unlikely to be special in either of these senses. At present, the most likely outcome of space expansion is that it will be beneficial *overall*, but will introduce significant specific downsides on Earth and in space (for example, damaging irreplaceable sites on the Moon and Mars). Deudney's text helps us to identify some of the terrestrial downsides. But that is not enough to support his special-domain approach over the kind of normal-domain approach taken by Green.

Green and Deudney set out two very different kinds of texts, and the comparison between them poses some difficulties. Deudney's *Dark Skies* is a monograph shaped to make a case for renunciation of key activities in the four risk areas noted above. Green's *Space Ethics* is a textbook on ethical issues in space, geared to support university courses, and makes no particular argument. The latter book is, by a long distance, the best-available text for students to work through, although it might be even more useful when read alongside a text such as Erika Nesvold's recent *Off Earth: Ethical Questions and Quandaries for Living in Outer Space*.

Given that Green's *Space Ethics* is not in the business of building a master argument, my posing here of a normal–special domain comparison will have to do some heavy lifting when it comes to comparing the approaches of the two texts, in the sense of trying to frame an overall contrast of approach that does not concern two directly conflicting arguments. And I pose this comparison by directing attention toward overall assumptions about the ethical (or, in

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Deudney's case, ethico-political) challenges posed by space. More simply, the contrast helps to draw attention to Green's key background assumptions, which happen to conflict with Deudney's approach in ways that might otherwise go unnoticed. I also provide a broader framework for asking whether *Space Ethics* ultimately does justice to what we might call "critical perspectives"; that is, approaches that may or may not embrace some broader skepticism about human activities in space, and that systematically frame familiar ethical problems within the context of power relations, whose authority is then put into question. Deudney's text does precisely this, but in Green's book the role of critical discourses—either through a focus on power in general or through the specialized approaches of feminism, disability ethics, or critical race theory—is far more marginal. This limitation is a familiar problem in the literature and a limitation that can be found in many of my own texts on space ethics. I say this not primarily as a mea culpa, but as a way of marking a shift in the literature. Contemporary work on space ethics is only starting to do better on these matters than the first-generation texts did. My point then, when indicating this limitation of the Green text, is not to make a special criticism of *Space Ethics*, but to indicate a strength of *Dark Skies* that space ethicists in general could learn from. With more specific regard to *Space Ethics*, my suggestion is that it is caught in the middle of the transition and that a second edition might well involve significant expansion and a more cohesive strand of thought on critical perspectives.

An obvious example of the limitation is the lack of detailed discussion of feminist perspectives in Green's volume, an omission noticed by other reviewers and part of the general currency of discussion within the space community about the text. Green's opening chapter motivates a concern with space ethics as a discipline by considering the debate over whether or not to go into space (by which, I take it that he means going further into space and systematically increasing our presence across the space bounded by Venus and Mars). Chapter 2 then outlines ethics at a level that is more general but still applied, and this does include feminist and intersectional ethics on the one hand, and environmental ethics on the other. However, while environmental ethics continues to figure throughout the text, feminist ethics fades away. A difficulty of including it is that systematic regular work in this area was only starting to appear at the time of publication, with Konrad Szocik's landmark text *The Bioethics of Space Exploration* supporting the idea of a feminist bioethics for space, only appearing in 2020. Nonetheless, many of the most likely themes of an anticipated feminist ethic for space could have figured

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in the discussions of fairness and space settlement. Discourse along these lines, anticipating the arrival of a feminist ethics for space, has been around for a while. The issue of abortion rights related to space, for example, has been a recurring theme for a decade, after a special problem concerning abortion was first outlined in a talk delivered to one of a series of meetings on extraterrestrial liberty hosted by the British Interplanetary Society in London from 2013 to 2015.[1] (My aim in setting out the problem was to say something about Rawls and ethics in space, but it quickly became apparent that it might have implications for how feminist theory might run in this unusual context.)

The problem is that community survival in space might well require limiting abortion rights because of the difficulties of reproduction in space, but also that any outright opposition to abortion would need to be rejected in order to avoid exceeding the carrying capacity of space infrastructure. What autonomy in space might look like would probably be different, and perhaps compromised relative to Earth standards. Our readiness or reluctance to accept this position might well shape ethical deliberation about whether or not we *should* settle in any particular space location. Fixing ethics without regard to place might not be a great idea. The point could have been framed by appealing to the Kyoto school, Watsuji, and the conceptual machinery of *fudo* (as environmental-cultural place), but at the time it was set out as a much simpler consideration. My point here is that considerations of this sort have been around for a while, with the abortion problem recurring across multiple texts. (Szocik was involved in the London extraterrestrial liberty discussions of 2013–15 and has done much more with the problem.)

Additionally, returning to the first chapter in Green's book, it is not obvious that we should necessarily follow his way of framing what ethics is. In a sense, Green's approach sits within the Kantian tradition; that is, it is framed in terms of choice: "Ethics is the study of questions of *should and ought*. It is not the study of 'could' or 'must,' which involve the possible application of power and necessity, respectively, although those concepts are often important for delineating the scope of ethics" (p. 16). Of course, there is a difference between choosing to rob a jewelry store and being thrown, without choice, through the window of a jeweler by an opportunistic but muscular thief. Something like choice, by contrast with necessity, does mark a difference in such cases. But if we happened to find out that necessities governed our lives, and that we do not have some ultimate metaphysical level of choice about matters, it seems unlikely that ethical deliberation and judgment would disappear. However, placing too much emphasis upon

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this may be a little unfair, given that textbooks for university courses must start somewhere. My concern is simply that background assumptions about "what ethics is" will tend to come through in a text, even an introduction geared to teaching purposes. And these assumptions about the nature of ethics, and how best to characterize it, may readily be disputed. Another way of putting matters would be to say that Green has a fairly clear-cut understanding of what ethics is. But it is far from obvious that everything we call ethics falls within this understanding. Someone like Iris Murdoch might come along and say that *should* and *ought* are really about evaluating what is right, but ethics should focus more upon what is good. Or it should focus more upon vision than choice, more upon character than action and the exercise of autonomy. Ultimately, it is just going to be difficult to uphold *any* claim that ethics is the study of *x*. Something is always liable to be left out.

Normal-Domain Approaches

In *Space Ethics*, Green provides a detailed overview covering the search for life elsewhere, human settlement, space junk, and the usual expected topics within the work on space and society. His sequence for these matters is orderly and useful, proceeding from a chapter on risk management; to a chapter on health, consent, and the human body in space; to one on the risks of militarizing space (his core area of overlap with Deudney); to one on planetary protection (of the sort mentioned at the start of this essay); to space settlement; to terraforming; and ending with a short conclusion (which could have been expanded upon, given the breadth of content covered in *Space Ethics*).

As a further point about background information and assumptions, beyond the broadly Kantian framing of ethics in terms of choice, Green's own sympathies are in the direction of an ethical naturalism based around the value of humans as the only known moral creatures. This carries some strong influences from Aquinas and the natural law tradition.[2] Having said this, there are places where Green's own naturalistic sympathies do break through; for example, in a discussion of G. E. Moore on the naturalistic fallacy (pp. 181–82) and in the conclusion, where Green does appeal to an orderly human future (pp. 258–59). As part of his normal-domain approach, human activities in space are not treated by Green as necessitating some immediate and radical departure from our regular ways of thinking about ethics and about the regulation of human activities.

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Nevertheless, as indicated above, Green does still see that a greater human presence in space will pose novel ethical challenges. "As we approach the 'high frontier' we should be prepared for ethical situations—some of which will be similar to those we have encountered on Earth or in our current explorations and activities, others that we can anticipate but have not yet experienced, and others that may be unpredictable, novel, and/or unusually challenging" (p. 258). However, the movement from familiar ethics to ethics informed by space is envisaged as a transition from the more partial to the more universal. "In the future we may come to see the various ethical systems that we practice now on Earth are just a few particular cases of a more universal ethic that we will develop in space" (p. 258). This framing suggests high-level principles consistent with the natural law tradition of thinking about ethics as the search for universal ethical laws that might parallel the universal laws of nature studied in physics (with voluntariness or choice marking the key difference between the two). It also presents ethics as more of a coherent totality than some of us might expect.

Overall, it is suggestive of an order and regularity within a world where the good life is possible and adverse contingencies remain manageable. For Green, orderliness is something that we might move toward in a purposive manner: "In order to achieve this morally good life, not only as individuals but as an entire species, humanity—we—will need to work as hard as we ever have. We will need to coordinate across all cultures, nationalities, classes, and races in order to create a better future together" (p. 259). And while the anticipation of a better future is admirable, the framing of matters does again look more to universality than to plurality or to ultimately irresolvable tensions between humans. Pluralism can, of course, be orderly and coordinated, but there are no qualifications offered to suggest that Green has an ultimate pluralism in mind.

An emphasis upon encountering the new in the light of what has gone before also comes through in Green's attitude toward the existing legal framework for space set out by the 1967 Outer Space Treaty. The treaty's robustness and ability to stay relevant is now in question, given new international agreements about norms (for example, the Artemis Accords) and given nationally based legislation in the United States and Europe (for example, in Luxembourg) to underpin the right to extract materials (primarily minerals) from asteroids. For Green, the OST remains a core agreement from which norms and regulation by law can extend. Either way, setting up norms and regulations to cover the expanding levels of human activity in space raises issues of enforcement, the problematic dual use

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of technologies (for military as well as other purposes), and the proliferation of dangerous technologies into the wrong hands. When considering rogue behavior in space, Green treats the risks in an evenhanded manner; "Space just makes the same situation more complex" (p. 88). The technologies that surround us on all sides, and through which we live, can also be used or adapted for military purposes that we might or might not approve of. For instance, asteroid redirection capabilities, when they arrive, could be used to hurl large rocks at Earth, but this is a new version of an old problem.

Green is, I believe, right about these kinds of dual-use concerns. Anything connected to rocketry has always tended to be like this, even when developed for benevolent purposes. An interlocking of rocket technologies and nuclear weapons programs has historically posed ethical challenges. However, in *Space Ethics*, the historic and current links to nuclear weapons programs is only one concern among many, and there is a broad understanding that the problems in question stem as much from socially transformative technological change as they do from anything that might be chosen or abandoned. There is no policy option that might allow us to avoid the ethical dilemmas and difficulties of dual-use technologies. Robotics, artificial intelligence, and new generation biotechnologies are further examples of this kind of socially transformative dual-use tech, and the rhizomes of these things are everywhere. They are already too widespread to remove.

Here, again, I tend to think along these same lines as Green, with perhaps a little more emphasis upon the way that space will reshape ethics, and with less of a sense of the potential orderliness of our life in the universe. At the very least, acting in space is physically different from exercising agency on Earth, but that does not stop the two from being strongly interconnected in ways that tend to be repeatedly underestimated in public perceptions of planetary and environmental science. Recognition of the greenhouse effect was heavily dependent upon prior Mars and (especially) Venus research, but this is not widely known outside of the space community. Like others leading our understanding of the Earth's atmosphere, James Lovelock, known for his Gaia theory about Earth, was initially a Mars/Venus researcher and applied lessons about atmospheric systematicity to make sense of what has been happening to our own planet. Planetary science is not an Earth-only set of practices, theories, and norms.

While we cannot automatically move from scientific considerations of this sort to ethical judgments, we can at least say that the science does not conflict with treating space as a normal ethical domain, even if not exactly the same as

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Earth, and even if some special problems are posed. In line with this, it is unlikely that space exploration and colonization will either fix all of our societal problems, and lead to utopia, or bring about the collapse of human civilization. Although the latter is perhaps more likely than the former, I think what is most likely is somewhere in between, as we are today. There does seem to be a strong case for saying that if we master the technology to safely return significant volumes of materials from space (such as metals from asteroids) this same technology would allow us to remove unwanted materials from Earth (such as nuclear waste, sequestered CO_2, and a variety of other unwanted things). Figuratively, we might think of this as *allowing the Earth to breathe*—taking in what is needed and safely expelling what is toxic. This is the aspiration at least, that is, breaking out of an increasingly dysfunctional enclosed system. This might not be the road to utopia, but it seems unlikely that it is the road to dystopia.

In contrast, special-domain approaches run differently from this and differently from each other. Broadly, they include optimistic (utopian) and pessimistic (dystopian) variants. Optimistically, there is an idea that experiences of seeing Earth from space may give rise to an overview effect; that is, a new way of viewing the world that we can bring back to the ground for transformational purposes. More pessimistically, we might think of space as a playground for elites, or possibly a place where military tensions on the ground will be amplified to a terrifying intensity. Pessimistic versions of a special-domain approach tend also to carry undertones of cyberpunk, suggestions of an authoritarian military-industrial-commercial-governmental fusion: "the company." This image of the world accompanied the rolling out of widely accessible computer technologies and the emergence of tech superstars (such as Steve Jobs and Elon Musk) and shaped popular science fiction from the late 1970s onward in films such as *Aliens*, *Total Recall*, and *Minority Report*. At the heart of the cyberpunk vision is the idea that those who control the technology will control the world, with technologically savvy dissidents operating just one step ahead of a state-megacorporation fusion, while most of the population succumbs to technologically manipulative control.

It is worth noting how different all this is from the way that technological change and expansion into space figured optimistically in social critique from the second half of the nineteenth century until the 1960s—with the establishment of a spacefaring civilization figuring as a goal that would lead toward a more benevolent social transformation, and indeed that might not be realized without

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such a transformation. Advocates of social change tended to be pro-space. The most obvious example being the strand of what is known as cosmism, associated with some late nineteenth- and early twentieth-century Russian thinkers who linked space exploration to reform movements, to the Bolshevik Party, and eventually to the Russian space program. Following the defeat of the 1905 revolution in Russia, Alexander Bogdanov wrote some very popular science fiction about communist society on Mars and its interconnection with revolution in Russia. After Lenin, Bogdanov was arguably the most senior member of the Bolshevik faction, and effectively the leader inside Russia itself during Lenin's exile. By the 1960s, things looked very different. Russia was losing the space race to the United States, and to astronauts who were Westerners with military haircuts. Malcolm X opposed the space program in his 1963 The House Negro and Field Negro speech, and so did much of the civil rights movement (even staging a protest at the gates of the launch site the night before the launch of Apollo 11). From the early 1960s onward, a series of critiques attempted to align space expansion with elites, domination, high levels of risk, and a waste of resources. This pattern has continued to the present day, with space programs often regarded with suspicion by movements of dissent.

In both of these optimistic and pessimistic approaches, space remains a special domain, but the dominant special-domain thinking that is allied to social critique currently sees space activity as driving us toward a dystopian rather than utopian outcome. Deudney's *Dark Skies* is the best (and, by far, the most rigorous) exemplar of this pessimistic line of thought: social critique extended from Earth to space. Like other variants of pessimism and skepticism about space, it is time indexed. Nobody sensible is denying that *eventually* humans will expand into space. What is denied is that *now* is the right time. In Deudney's words, "The pursuit of ambitious space expansion must now prudentially be judged to be deeply undesirable for humanity and the Earth for at least several centuries" (p. 381). The thought, then, is that space expansion and space technologies, or both, are *untimely*.

The rigor of *Dark Skies* makes it all the more valuable as a social critique. In contrast to the critiques that have focused on wasted resources or inequality, Deudney argues that the primary problem is an intensification of existential risk: "Solar space expansion is likely to lead to highly violent war, extreme levels of oppression, and the eventual extinction of humanity" (p. 265). The normative implications of this view are that we ought to *reverse*, *regulate*, and *relinquish* a

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good deal of our activities in space before space expansion pushes our world out of control: "The avoidance of civilizational disaster and species extinction now depends on discerning what not to do, and then making sure it is not done" (p. 367). This formulation as a three-*r* approach is Deudney's own, and he argues that all three things have to be done, but the appeal to relinquishing seems to do far more of the heavy lifting than do reversal or regulation.

While this claim of an extinction risk may seem rather extreme, the pace and character of technological change (and the high downside involved) does suggest that someone ought to be writing about extinction-level threats, even if we happen to think (as I, as well as Green, do) that society is very likely to continue to survive without a system collapse for the foreseeable future. In a similar vein, given the high downsides, governments may have every good reason to believe that society will go on, but they are also prudent to invest in devising protocols for catastrophic asteroid strikes and other bad contingencies. We may also reflect that eventual system collapse is historically normal and there is value in thinking and writing about it, as well as the processes that might bring it about, accelerate matters, or mitigate risks. Below, Deudney's responses to such system-level threats are set out with a particular focus upon risk, the reorientation of our civilizational attention back to Earth, and the idea that there can and should be a relinquishing of space expansion in the overall interests of humanity.

Civilization-Level Risk

Nuclear Worries

Deudney's approach to understanding the risks associated with space exploration —primarily the risk of asteroid redirection technology being used to attack Earth —is to build on narratives associated with movements for nuclear disarmament. Such movements have tended not just to say that millions could die if we do not relinquish nuclear weapons but also to say that humanity could be wiped out. While the former is true, this idea of an extinction-level threat has always been problematic. Deudney's critique identifies a more plausible civilization-level risk, in that military tensions associated with space do have a broader extinction potential. We have had strong evidence for global extinction in the past as a result of an asteroid impact, and hurling an asteroid toward the Earth with a similar outcome would, at least in theory, be within the capabilities of various states once

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asteroid redirection and mining begins. Space expansion may, for a period of time at least, create genuine vulnerability of this sort.

The practicalities involved are a little less clear. It is no simple thing to use kinetic weapons, such as a well-directed asteroid, or even to get an asteroid from a distant pickup point to somewhere near its target. The technologies involved would be much the same as those we could use to redirect an asteroid away from Earth. The tech that makes such kinetic weapons a threat also comes with possibilities of effective response. And so even if there is a period during which risk is high, we may be facing a bottleneck of risk that we have to get through, rather than an unending high-risk scenario. This does begin to look a little more like the Cold War circumstances where the highest risk levels were concentrated into a relatively short time span. The risks have never entirely gone away, but the highest level of risks did not become a permanent threat, either.

In what we might call "the standard scenario" of an asteroid used as a kinetic weapon against Earth, the likely level of risk and the duration of peak risk are unclear. But this still makes the problem something we should be aware of and that we should plan for. Deudney's call for regulation (one of his three *r*s) seems well placed. He argues that no single government or corporation should be in a position to exercise redirect capability (pp. 373–74). That is certainly one way to try and contain the problem, although there may be various other modalities for containment as well. Interestingly, Deudney does not stretch his position into support for a move toward world government as a *means of regulation and containment*, despite this familiar anti-militarist narrative still being very much alive within the space community. For example, advocacy of a global federalism as a form of world government can be found in Ian Crawford's chapter "Brightening the Skies," which responds to *Dark Skies*, suggesting a way to recognize the genuineness of the dangers and act in response to them.[3] Deudney rejects this kind of authority-integrating globalization as an authoritarian option. There is, however, something tempting about it. A shift into space is often thought of as bound together with a greater sense of unification on Earth, and a sense of our shared earthliness. Even Green's comments, for example on the need to find an orderly way to coordinate across all cultures and nations for successful space exploration, raise the kind of concerns about space expansion leading to global unification that Deudney flags. And so, while extending a familiar kind of anti-nuclear narrative, his text contains a greater concern about the globalization of

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political authority than we might find in traditional narratives against nuclear weapons.

Yet a familiar background anti-nuclear narrative plays a strong role in shaping Deudney's text. For him, the dangers of nuclear war and space expansionism interlock, with an ongoing and underacknowledged link between space rocketry and the delivery systems for nuclear weapons. He argues:

> What matters most about the events of the Space Age is how they have interacted with the possibilities of the Nuclear Age and with their catastrophic and existential threats to humanity and the Earth. By excluding ballistic missiles from the space story, space advocates have, ironically, underestimated the magnitude—and direction—of space impacts. Because the single most consequential impact of actual space activities has been to increase the risk of nuclear war. (p. 373)

Critics, such as Al Globus of the National Space Society, suggest instead that Deudney is overestimating the ongoing connection of a mostly historic link. "Painting space settlement with the ICBM brush is a little like attributing tank warfare to the automotive industry," writes Globus.[4]

Whatever we may think about the interlocking argument being weak or strong, it plays a symptomatic role in *Dark Skies*. It is indicative of the hypothesized telos of space expansion and space expansionism: tending toward a bad end. This is difficult to dispute, but also difficult to establish. I have no problem with teleological theories as such. And while I would tend to appeal to contingency as an important aspect of what is likely to unfold, there may be no good reason to go with contingency rather than teleology on this matter. Deudney's reasons for claiming that we are going in a catastrophic direction toward a bad end may be as good as any that I could offer to show that the outcome is *not* yet fixed (among other things, there are too many factors in play, political change could go one way or another, and the wide impact of other socially transformational technologies is not determined in advance). Overall, while I do not deny that the process does tend one way or another, I am simply less convinced than Deudney about our ability to predict the end result. My stance is a combination of two things. The first is an uncertainty about how a dominant tendency is likely to play out within a complex system. The second is an appeal to epistemic humility in the face of Deudney's strong conviction about knowing what the dominant tendency happens to be. But, from Deudney's point of view, this may look more like culpable blindness. And even if the overall direction of travel really is less clear than he believes, the risks of harm

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may still outweigh any prospect that things could turn out well. And saying this would bring us close to Deudney's position, with some minor adjustment of formulations. Given the intractable problem of rogue states with an enthusiasm for accessing advanced and dangerous technologies, it might seem that a precautionary principle should lead us to put safety first and do exactly what Deudney recommends; that is, relinquish what we can of our space ambitions.

Again, this looks similar to proliferation-focused arguments for nuclear disarmament. We would not, of course, relinquish all space ambitions; we probably could not relinquish them all even if we wanted to, and Deudney does not propose anything so comprehensive. Space-based Earth-monitoring systems are already crucial for our response to climate change, which poses a clearer and less conjectural risk. Space-based systems would also be pivotal to the monitoring of compliance for disarmament agreements. Such systems must be there, even on Deudney's approach. But what this entails, when joined with his concerns about risk, is not renunciation of everything in space, but rather an Earth-oriented space program geared toward nuclear disarmament.

Earth Orientation

This idea of Earth orientation is a problematic aspect of Deudney's text, and it is the theme that comes closest to familiar populist critiques of billionaires, or the "1 percent," in space. It risks reinforcing some of the ways of seeing the world that have led us into our current predicament through a geocentric approach, or ground bias—an overseparation of Earth and the *everywhere else* that is space.[5] And such bias can be tied to a further series of biases, such as our failure to think of Earth as a water world, and instead focus upon land (where humans tend to live). This works together with our tendency to think about planetary surface (again, where humans live) rather than deep geology, an approach that we find even in classic formulations of Gaia theory. Gaia, on the classic account of James Lovelock, is a restricted conception of Earth. It is the living surface, not all of the planet. Yet, as a complex civilization, we have always depended upon metals whose source lies deeper within Earth. Our pattern of urbanization has historically tracked geological fault lines, which lead to mineral deposits as mineral-rich waters from deeper in the planet's interior are pushed upward and then recede.

At the very least, Deudney frames our task of a turn to Earth in terms similar to populist critiques in which attention to Earth must be direct, in the sense of being

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unmediated by some larger robust program of space exploration that could only be supported by a broader process of space expansion. The linkages of this approach to anti-elite populism are perhaps clearer in the late writings of Bruno Latour, such as his *Down to Earth: Politics in the New Climatic Regime*,[6] which describes how elites look to space because they want to turn away (and escape) from the consequences of what they have done to our world. As I noted earlier, in relation to the 2021 Greta Thunberg mock advertisement, this is a sort of myth: something that serves to disclose even if not literally true. The guiding thought is that the elite *long to abandon the Earth and would do so if only they could.* The elite are Earth abandoners. The 99 percent are more invested in the future of the planet. Neither Deudney nor Latour takes the anti-elitist argument this far. There is a tension in both of their versions of the return to Earth. Both, for example, acknowledge that Earth is the greater part of an Earth-Moon system. And Deudney also has a refreshingly clear grasp of the Earth itself as extending beyond the immediate planetary surface: "Exiting the atmosphere and going into Earth orbit entails leaving one part of the planet and entering another, not 'leaving Earth.' Features of outer space such as geosynchronous orbit, the Lagrange points, and the Van Allen radiation belts are features of the outer shell of the planet Earth and exist only because of their relationship with other parts of the planet" (p. 80). But this would seem to point toward an acknowledgment that terrestrial problems can be better understood in a more-than-earthly context.

Deudney's expanded conception of Earth is also clearly normative, given that it carries implications about when we have transgressed an Earth-focused approach, and when we have not. There may be nothing to absolutely force the adoption of one normative conception of Earth over another, yet Deudney's account is non-arbitrary, in the sense that our best science points toward the systemic interconnection between Earth and Moon. Our sense of separateness derives again from where humans are found and has little to do with the formation and movement of either body. This expanded Earth view is also in line with a good deal of work that is more supportive of human activities in space than *Dark Skies*. For example, Dan Capper's recent *Buddhist Ecological Protection of Space: A Guide for Sustainable Off-Earth Travel* argues against a binary overseparation of Earth and everything else in space. Valerie Olson's *Into the Extreme: U.S. Environmental Systems and Politics beyond Earth* and Lisa Messeri's *Placing Outer Space: An Earthly Ethnography of Other Worlds* both stress the pivotal

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role of space research in our very idea of terrestrial environment and place. And so, this idea of Earth orientation ends up being pulled in two very different directions, toward the populist critiques and toward the contextualizing of Earth that we see in social studies of space.

Relinquishing

Ultimately, the heavy lifting in Deudney's Earth-oriented approach is carried out by an appeal to relinquishing. This is where the purpose of the text becomes a little less clear. Lots of important texts, particularly social critiques, have given unworkable advice. That is normal. But the temptation to imagine that a critical *ought* always implies a *can* is sometimes overwhelming, and then one gets drawn into difficult claims. This happens in *Dark Skies*. When the text says that "nothing so difficult and dangerous as space colonization can realistically be viewed as inevitable" (p. 381), it is less persuasive than other parts of the text. Both nuclear power and nuclear weapons carry immense dangers, and I heartily wish that they had been relinquished before their presence became normalized. But it is difficult to imagine *how* they might have been relinquished then or will be anytime soon. What might alter matters is the emergence of a very different political culture and a very different set of political institutions making relinquishment possible. In contrast with these factors, the level of risk seems close to irrelevant. Even a tenfold multiplication of the levels of risk would not compensate for the absence of some real pathway. And in the context of space expansion, it is precisely this pathway that we lack in spite of the serious shortcomings that Deudney helps us to recognize. Green makes the similar point that some level of militarization of space also looks unavoidable: "It seems that for humans to truly avoid violence and war, we must first remove the desire for violence and war from our own hearts" (p. 86); this is more recommended than expected.

The very idea of relinquishing also raises questions about what we would do instead, and what might happen if relinquishment were actually possible. Here, it is tempting to say that contextualized views of the Earth have a better grasp of the importance of space science in response to climate change. For example, we recognized a greenhouse effect *on this planet* because we had already encountered the effect in the atmosphere of Venus. Deudney tends instead to think about legitimate planetary science primarily in terms of satellites monitoring Earth, and a few extras (p. 374). This is a significant limitation in the account of the benefits of space exploration that would be relinquished in order to reduce catastrophic risk.

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While Deudney is supportive of modest science programs elsewhere in space, without the support of larger-scale space infrastructure, planetary science research is likely to be significantly weaker if we follow his approach than it would otherwise be. This too looks risky, given that we cannot at this point reverse climate change and need to learn how it is likely to unfold at a planetary level. Deudney's approach presupposes that this can be done in a sufficiently effective manner without larger space-expansionist processes. And this is where a hard-headed approach toward the risks of space technologies, global government, and extinction starts to look unrealistic. Robust science needs commensurately robust infrastructure. Or, at the very least, more robust infrastructure is far more likely to support robust planetary science conducted in strategic locations. Advocacy of such infrastructure would reach beyond Deudney's Earth-oriented approach, and so there is a drawing back, or limitation, of his contextualizing of Earth. My point here (which has also been made by Globus)[7] is that risk seems to be endemic, and the alternatives to space expansion are not obviously less risky or more likely to benefit life on Earth. Matters might be different if we were not confronted by climate change. But in the face of such a global existential problem, a *Dark Skies* approach could lead us to sacrifice or relinquish too much. If we place the risks associated with climate change closer to the center of our attention than the risks associated with space expansion, and we understand the importance of planetary science conducted elsewhere, then we are likely to reject his call for relinquishing.

Conclusion

Overall, Green and Deudney present two very different texts with *Space Ethics* and *Dark Skies*. As indicated throughout, my sympathies rest with Green more than Deudney when it comes to treating space as a normal domain rather than a special and threatening domain. That is to say, I firmly believe that space expansion is neither the road to dystopia nor the road to utopia. However, there are a number of limitations in the critical position taken by *Space Ethics*, in terms of standpoints (feminist, disability studies, theories associated with the concept of race, and indigenous standpoints) that could be remedied in a much revised edition. Given the outstanding strengths of the text, such an edition might well be on the horizon. Moreover, in spite of holding that Deudney is wrong in *Dark Skies* about the civilization-level risks that might be avoided by renunciation, I would

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much rather engage with the author's well-placed skepticism about space expansion than with any other sort of contemporary space skepticism. Green's set-piece engagement with the usual expected topics makes it a go-to text for anyone who wants to tackle ethical questions concerning space head on and sequentially. And this is more typical of what is going on in contemporary space ethics, which tends to be problem focused rather than geared to the rolling out of an established normative theory.[8] By contrast, Deudney's *Dark Skies* embraces the question of where humanity is going, and the risks that we will face if we continue along current lines. However, it is not just breadth of vision that Deudney's text provides; it also, and at last, gives a plausible full-scale version of a space skepticism that is not constructed out of fragments put together by someone (such as myself) who holds a less skeptical standpoint about our expanding human activities in space. If Deudney is right, then many of us who write about space and society in a more routine manner have fallen into a complacency from which we need to be awoken. Even if he is wrong, the text remains an important extension of social critique.

Notes

[1] Tony Milligan, "Rawlsian Deliberation about Space Settlement," in Charles C. Cockell, ed., *Human Governance beyond Earth: Implications for Freedom* (Cham, Switzerland: Springer International, 2015), pp. 9–22.
[2] Brian Patrick Green, "Constructing a Space Ethics upon Natural Law Ethics," in Octavio A. Chon Torres, Ted Peters, Joseph Seckbach, and Richard Gordon, eds., *Astrobiology: Science, Ethics, and Public Policy* (Hoboken, N.J.: Wiley-Scrivener, 2021), pp. 177–92.
[3] Ian A. Crawford, "Brightening the Skies: Institutional Solutions to the Societal and Geopolitical Risks of Space Expansionism," in Charles C. Cockell, ed., *The Institutions of Extraterrestrial Liberty* (Oxford: Oxford University Press, 2022), pp. 119–39.
[4] Al Globus, "Not So Dark Skies," *Space Review*, July 13, 2020, www.thespacereview.com/article/3985/1.
[5] Daniel Capper, *Buddhist Ecological Protection of Space: A Guide for Sustainable Off-Earth Travel* (Lanham, Md.: Lexington Books, 2022); Valerie Olson, *Into the Extreme: U.S. Environmental Systems and Politics beyond Earth* (Minneapolis: University of Minnesota Press, 2018); and Lisa Messeri, *Placing Outer Space: An Earthly Ethnography of Other Worlds* (Durham, N.C.: Duke University Press, 2016).
[6] Bruno Latour, *Down to Earth: Politics in the New Climatic Regime*, trans. Catherine Porter (Cambridge, U.K.: Polity, 2018).
[7] Al Globus, "Not So Dark Skies."
[8] Tony Milligan and J. S. Johnson-Schwartz, "Space Ethics," in Juan Francisco Salazar and Alice Gorman, eds., *The Routledge Handbook of Social Studies of Outer Space* (Abingdon, U.K.: Routledge, 2023), pp. 108–20.

Abstract: This review essay contrasts two of the most notable recent contributions to literature on space and society: Daniel Deudney's *Dark Skies* (2020) and Brian Patrick Green's *Space Ethics* (2022). The Green volume is a course textbook, geared to giving students an overview of some of the key ethical issues concerning space and how the arguments on these matters are shaping up. Its aim is to provide an overview rather than a specific line of argument. Deudney's text, by contrast, is an example of a book proposing space skepticism. It argues that we should relinquish

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many of our current ambitions for space expansion on the grounds that they will increase the already significant degree of extinction-level risk that we face. The essay marks the distinction between these texts by contrasting normal- and special-domain approaches. Normal-domain approaches seek to extend familiar ethico-political issues into the discussion about space expansion without regarding space expansion as the road to utopia or extinction. Special-domain approaches hold to some such optimistic or pessimistic view. The essay goes on to highlight the way in which Green's text would benefit from more social critique, along the lines of Deudney. Ultimately, the normal-domain approach presupposed by Green and rejected by Deudney is upheld.

Keywords: space expansionism, globalization, extinction risk, ground bias, relinquishing

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