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BOOK REVIEW

Original Sin: Power, Technology and War in Outer Space, by Bleddyn E. Bowen, London, Hurst and Company, 2022, 20 GBP

Astrotopia: The Dangerous Religion of the Corporate Space Race, by Mary-Jane Rubenstein, Chicago, University of Chicago Press, 2022, 24 USD

While analysis of space and space policy in relation to national security and human spaceflight remains a niche academic area, there have still been a growing number of books and articles to explore and detail it. It is this increased pace of activity that has led to a space domain that is contested, competitive, and congested leading to more opportunities for confrontations and even conflict. For the most part, if these examinations are not laudatory, they are at least encouraging in terms of the types of activities they have advocated including not only those associated with national security and defense, but the mining and exploitation of space-based resources and even the colonization of outer space and other planetary bodies.

This should not be all that surprising. Since the opening of the space age, popular culture has portrayed space as a place with unlimited opportunities for discovery and adventure.[1] This early fascination with space's potential has today morphed into billionaire space entrepreneurs extolling the potential and possibility of moving humans to outer space and to Mars. But, the extension of such activities, as on Earth, has not come without criticism. The increased pace of activity in space has come to a pinnacle in recent years with the success of commercial space companies, like SpaceX, the privatization of space activities more generally, the creation of the U.S. Space Force, new plans in China and Russia for human spaceflight to the Moon, and a return to the Moon for the United States and its partners in the Artemis program.

At the same time, space also comes with a darker side, one that is more visible than its proponents would like to think regarding conflict in space, weaponization there, and the possible extension of human driven exploitation in that domain. While concerns over an outbreak of kinetic conflict in the space domain that threatens to pollute near Earth orbits and make operations in space difficult tend to be the foremost of those, two new books also illustrate the dangerous underpinnings of space exploration and exploitation: Bleddyn Bowen's *Original Sin: Power, Technology and War in Outer Space*, and Mary-Jane Rubenstein's *Astrotopia: The Dangerous Religion of the Corporate Space Race*.

These two books come at the topic of space from quite different directions that seemingly have little in common. Rubenstein's shorter, eminently readable exploration delves into historical and religious themes throughout history, highlighting their role in colonial and imperial actions that today also serve to justify the actions of billionaires like Jeff Bezos and Elon Musk in space. Bowen, on the other hand, offers a detailed exploration of the politics and physics of space warfare today. Despite Bowen's play on religious rhetoric with the phrase "original sin," religion is left much to the side whereas it is the central focus for Rubenstein. However, the argument these two authors put forth is much the same; that is, space today is tainted by its often-unacknowledged relationship with techno-

All views are the author's own and not representative of the Department of Defense.

militarism and nuclear warfare in Bowen's case and Christian religious imagery and thought in Rubenstein's book. The lingering question of both, then, is whether, to use another religious phrase, a reconciliation is possible that cleanses space of these original sins allowing for a more just, peaceful, and beneficial future for humanity in the space domain.

Space's *Original Sin*

A follow up to his 2020 book *War in Space*, *Original Sin* picks up on many of the same themes.[2] Where *War in Space* outlined Bowen's own spacepower theory centered on the idea of near-Earth space as a "cosmic coastline," *Original Sin* tries to make much of the hype around space warfare accessible to a lay reader who may not have much appreciation for, let alone knowledge about, the importance of the space domain. In doing so, he argues that much of what makes the space domain what it is today has been either ignored or left out not just by space scholars, but by the public as well.

Using the religious symbolism of original sin, Bowen's main argument is that space systems are tainted by the original sin of their militarized and competitive origins.[3] Going further, Bowen writes that, "The biggest stain on benign images of space technology and the Space Age is that it helped bring about the prospect of nuclear Armageddon."[4] This connection has continued to infect space exploration through the use of dual-use technologies, many of which continue to support the use of force application for states, like the United States, Russia, and China today. As other scholars, like James Clay Moltz and Daniel Deudney, have proffered, Bowen proceeds to detail the many ways in which today's space technology has roots in the militarized nature of space that existed since Sputnik was launched in 1957. In doing so, he takes pains to establish for the reader that arguments that the vast use of space that is happening today is something new and unique are in fact untrue. What is happening today in space in terms of conflict, conquest, exploration, and exploitation is merely the maturation of long gestating technologies and approaches that have geopolitical competition at their roots since the rise of the space age.

The second argument Bowen works to establish is that space, even during the Cold War, was far from bipolar, dominated by the United States and the then-Soviet Union. In several interesting chapters, Bowen details the Cold War space programs of states including the United Kingdom (UK), France, China, Russia, and India. "Today," Bowen writes, "over 80 states, wealthy and poor, large and small, are using space technologies, building their own space industries, or have their own ambitions of space technological development. Space technology is not a luxury for the superpowers of the day. It is part of high-technology industries and infrastructure."[5]

While Bowen explores these multipolar dynamics, he takes care also in exposing some of the imperialist and colonial notions that Rubenstein takes up in her own work. He highlights how countries like the UK and France utilized their colonial and former colonial possessions for everything from space tracking stations and launching sites to nuclear test sites. Bowen is stunningly sensitive to many of these social dynamics, writing, "A space program is not merely a question of science and engineering: it is a battle of budgets, meeting political and important policy goals, managing people and egos, dealing with politicians and vested interests, and inspiring the right people to work despite such difficulties. The space technologies produced are the products of these social, political, military, and economic forces."[6] While full description and analysis of these forces are not fully in the scope of *Original Sin*, Bowen's sensitivity to them is both illuminating and a reminder to space scholars about the Western dominance of ideas about space.

The final argument that Bowen advances builds on *War in Space* and continues to advance the analogy of the cosmic coastline, as well as remind the public that, science fiction aside, active kinetic conflict in space is not as feasible or rational as its proponents might have the public believe. In making this argument, Bowen not only outlines the types of space weapons that are possible in the future, but also provides a cogent discussion of their limits. Further, he reinforces the idea that warfare in space is only as important insofar as it affects the outcome of warfare on Earth, writing, "Space warfare is ultimately about picking apart supporting infrastructure in orbit and preventing the enemy from doing the same in return, and not destroying space systems or other space weapons just for the sake of it."[7]

Unlike *War in Space*, Bowen does not tread too much new ground in *Original Sin*. Indeed, the connection between weapons of war and space technology has also been detailed in other books, such as Deudney's *Dark Skies* and even Neil DeGrasse Tyson and Avis Lang's *Accessory to War*, and summaries of space weaponry and the space programs of other states are available elsewhere.[8] Instead, his purpose is to bring together several different themes about the potential for war in space to make them more accessible to a reader who is not fully immersed in the field of space policy or space studies. *Original Sin* also serves to highlight the ways in which the space domain has not been fully integrated into the larger fields of international relations or security studies, their original sin of being related to nuclear weapons preventing many scholars from seeing space as just another part of national security.

It is perhaps in using the language of "original sin" that Bowen provides the most insight while provoking additional questions. The religious implication of original sin is that all human beings are born with it, but can be made "clean" through the ritual of baptism. Thus, Bowen's invocation of original sin provokes two follow on questions that are not outright answered. One, what is the specific effect that this original sin has on the space field? Two, is there an analogous baptism that space and space technology can undergo that can remove the stain of original sin? While Bowen does not speculate on the second question, the implication of the book seems to be that the Global Space Age's original sin makes it so that the real purpose of space technologies and systems has not only been historically obscured from the public, but makes it so that the conflict that seems to be coming in space "is only becoming more probable as more states choose to exploit Earth orbit for terrestrial combat advantages and economic infrastructure."[9]

Coming *Astrotopia*

If Bowen serves as an antidote to calls to further militarize and weaponize space to take advantage of the "high ground," then Rubenstein is a rejoinder to the growing crowd of commercial space enthusiasts and would-be space colonizers that their ambitions also suffer from an original sin, in this case of religiously-based arguments that justify schemes to colonize the solar system. While this might not be a negative influence if these arguments served to benefit all people, Rubenstein instead highlights how these Christian worldviews that have supported imperialist, racist, and unjust projects on Earth are now being used to justify human expansion might only be propagating more of the same outwards into the space domain.

A scholar of religion and science, Rubenstein acknowledges that her argument may be challenging to accept by those who see themselves as scientists, and therefore, not swayed by religious iconography and philosophy. However, she argues that the new commercial space race, "is as much a mythological project as it is a political,

economic, or scientific one … The escalating effort to colonize the cosmos is a renewal of the religious, political, economic, and scientific maelstrom that globalized Earth beginning in the fifteenth century."[10] In her telling, it is the influence of imperial Christianity and the colonization projects it inspired, first to the "New World "and later in the form of manifest destiny that now underpins efforts to colonize the cosmos. It is precisely these events that have killed thousands upon thousands of forcibly enslaved and Indigenous Peoples and introduced social, political, and economic structures that are inherently unjust and unfair is what makes their use in the case of space exploitation dangerous.

Rubenstein begins her book with a brief exploration not just of the projects that Elon Musk and Jeff Bezos are proposing to undertake, but the larger policy goal of space commercialization and the motivations of the United States and its leadership to encourage it. Then-vice president Mike Pence, in his role as chair of the National Space Council, comes in for a strong rebuke for his religious rhetoric with Rubenstein highlighting the explicitly religious language used in an address to the National Space Council arguing that we "will not go alone" on a return to the Moon, but instead be accompanied by "His right hand."[11] Former president Barack Obama does not escape critique either for his support for a greater role for commercial space companies, which she contends could lead to the unapologetic plunder of space resources without consideration of things such as the common heritage of mankind or who should properly be able to use them.[12] Following this, Rubenstein begins to build her argument first by arguing for a direct relationship between religion and science, and then, in how Christian religious principles have paved the way for Earthly conquest by Christian adherents. This religious motivation, in Rubenstein's telling, not only allowed for the conquest of peoples for explicitly religious purposes, but human dominion over the Earth itself. Rubenstein then traces how these ideas found expression in the newly-founded United States and its own movement towards the Western frontier to carry out its manifest destiny.

Thus, from 16th century Europe to 19th century America, the religious underpinnings of domination have continued. Rubenstein directly ties this language to the new frontier, writing, "And although the references to God became a bit subtler over the course of the twentieth century, this astrofrontierism was grounded in earthly frontierism, which itself was grounded in biblical land claims. In short, by comparing outer space to the New World, early space enthusiasts were projecting America's self-perceived divine mandate out to the heavens."[13] In this task, she also highlights the hypocritical ways in which U.S. leadership from the mid-20th century to today has utilized a "duplicitous logic" that justifies American military use of space in order to enable "the more benevolent pursuits of science, adventure, freedom, internationalism and peace … American dominance for all mankind."[14]

After tracing this rhetorical history, Rubenstein addresses two major arguments put forward by proponents of space colonization: the betterment of all humanity and the absence of living things on other celestial bodies. First, in terms of the argument that space exploration is being done "for all mankind," Rubenstein examines the varying impacts of space on minorities, Indigenous Peoples, and other disenfranchised and marginalized groups. She argues that not only has space exploration had an unequal impact on people here on Earth, it has also largely ignored the very real world and tangible problems that marginalized people face. In this way, her analysis is not unlike the question often asked by space critics, "If we can go to the Moon, why can't we do X?"[15] Rubenstein further ties this to the fact that spacefaring states have already filled space with dangerous amounts of space debris to the extent that it may become unusable to other states in the future. With respect to this problem, Rubenstein writes, "Space is a disaster. The word literally means

that the stars (*astra*) are out of place, throwing everything out of order. And like any genuine disaster, the disaster of space is affecting everyone."[16]

Rubenstein's answer to the second argument brings *Astrotopia* full circle: it is the Christian inspired philosophy that denies "things" their "personhood" for lack of a better term. Other religions not only take as given that spirits inhabit living things like trees and animals, but also rocks and even other worlds. Plans to mine the Moon and asteroids, or terraform Mars, denies those ideas providing yet more evidence to her overall argument about the ways in which Christianity influences space exploration today. It is also these alternative frameworks that Rubenstein argues might provide a more sustainable and just framework from which to explore space.

In addition to some hyperbolic rhetoric in places (e.g., arguing that "numerous defunct satellites" have collided in space, or calling the proliferation of debris in space a sheer "disaster"), Rubenstein's book also falls short on some elements of space history and security.[17] In criticizing the United States and the Trump Administration for the creation of the U.S. Space Force, she all but lays aside the increasingly threatening actions of other states, like Russia and China, quickly dismissing the argument that the U.S. Space Force is necessary to protect U.S. interests and American ability to operate in space. Likewise, she writes that, "the trends toward militarization and appropriation became clear the minute Armstrong and Aldrin planted that flag on the Moon."[18] This is a position that ignores the longer history of militarized space that Bowen details.[19] These missteps aside, Rubenstein's larger point remains strongly articulated: space's other original sin is that it is tainted by its philosophical and religious underpinnings giving it a second kind of original sin of sorts.

Baptism for space

The combined conclusions of *Astrotopia* and *Original Sin* suggest that space exploration today is really built on flawed and uneven foundations. However, some evangelical Christian traditions hold that adherents should be thankful for original sin as without it, humans never leave Eden and redemption is not possible. Both Bowen and Rubenstein would likely agree – without space's original sins, humanity would likely have not advanced as far as we have, but that doesn't mean it is without flaw. The reader is inevitably left with the question of where to go from here to fix it. Where Bowen falls short in answering this question, Rubenstein picks up the argument. While a smaller part of her book, she argues that the founding myths of space must be rebuilt to support a more just and sustainable vision of what space exploration can be. In this sense, she offers a baptism that could serve as a means of mitigating the original sin and a reconciliation of competing philosophies. Drawing from such diverse sources as Indigenous creation myths, science fiction, and the Afrofuturist music of Sun Ra, she suggests that we must take these founding mythologies and "turn it on its head, or on its side, or to rearrange it completely so that the alien territory becomes a place of genuine liberation rather than liberation at the expense of Indigenous people, exploited laborers, and the land itself."[20]

Reconceptualizing space exploration, whether in the direction that Rubenstein recommends or otherwise, might provide the baptism that can reconcile what people believe the potential of space to be and what has transpired. That is the overall point that Bowen makes – space is not the optimistic, futuristic paradise that its supporters contend, but rather one that has been tainted with military and geopolitical competition preventing it from achieving these higher goals and obscuring it from greater public attention. Similarly, the failures of space exploration to engage with minority and marginalized individuals means that it is now dominated by individuals with agendas that, though they

appear benign, are about extending the current social, political, and power structure into space.

While Rubenstein and Bowen provide excellent starting points, more work is needed into how space systems today reflect the "accumulation of generations of decisions and choices made by people and organizations for practical purposes and ambitions, and often reflect the interests and preoccupations of the major powers of the day and the techno-political and economic elites that live within them."[21] Elsewhere, I have called for a deconstruction of space policy via a feminist perspective.[22] Doing this, as Bowen and Rubenstein have also done in their respective books, and continuing to further interrogate the bases of space policy might allow for the development of an alternative framework and understanding of space that allows states to move beyond the stalemate in developing international laws and norms of behavior that better reflects the utopian ideals that space leaders all appear to support. For example, most theories of space power begin from assumptions rooted in realist international relations theory specifically about the inability of individuals and states to cooperate.[23] However, feminist international relations scholars have suggested an alternative formulation of these assumptions beginning with the idea that humans can and do cooperate amongst one another.[24] Developing theories about the role and purpose of space systems and space power from the assumption that cooperation is a given rather than impossible may stimulate new thinking, and open pathways for consensus on international norms and rules for behavior in space.

Both Bowen and Rubenstein provide a different perspective compared to more aggressive rhetoric that has been used regarding space's role in military and national security and commercialization.[25] These arguments challenge us to not only consider the philosophical underpinnings of the space enterprise but think about the ways in which space may be used in the future – beneficially or otherwise – if these original sins continue to influence developments in space. And while pairing a book about national security and international relations with one about religion might not seem a natural fit, the arguments presented by Bowen and Rubenstein not only complement one another, but reinforce why many people might indeed not support the notion of space exploration,[26] not because of a lack of interest but because of the policy image that it has taken on that appears exclusionary to the interests and priorities of most people.

Notes

1 Margaret A. Weitekamp, *Space Craze: America's Enduring Fascination with Real and Imagined Spaceflight* (Washington, DC: Smithsonian Books, 2022).
2 Bleddyn E. Bowen, *War in Space* (Edinburgh: Edinburgh UP, 2020).
3 Bleddyn E. Bowen, *Original Sin: Power, Technology and War in Outer Space* (London: Hurst and Company, 2022), 7.
4 Ibid.
5 Bowen, *Original Sin*, 9.
6 Bowen, *Original Sin*, 47.
7 Bowen, *Original Sin*, 239.
8 Daniel Deudney, *Dark Skies: Space Expansionism, Planetary Geopolitics, and the Ends of Humanity* (New York: Oxford UP, 2020).; Neil DeGrasse Tyson and Avis Lang, *Accessory to War: The Unspoken Alliance Between Astrophysics and the Military* (New York: WW Norton and Company, 2018).; Walter A. McDougall, . . . *The Heavens and the Earth: A Political History of the Space Age* (Baltimore, MD: Johns Hopkins UP: 1997).; Paul B. Stares, *The Militarization of Space: US Policy, 1945–1984*

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9 Bowen, *Original Sin*, 326–327.

10 Mary-Jane Rubenstein, *Astrotopia: The Dangerous Religion of the Corporate Space Race* (Chicago: University of Chicago Press, 2022), x.

11 Rubenstein, *Astrotopia*, 28–29.

12 Ibid., 25–28, 106.

13 Rubenstein, *Astrotopia*, 71.

14 Ibid., 73.

15 For example, Neil M. Maher, *Apollo in the Age of Aquarius* (Cambridge, MA: Harvard UP, 2017).; and Roger D. Launius, *Apollo's Legacy: Perspectives on the Moon Landing* (Washington, DC: Smithsonian Books, 2019).

16 Rubenstein, *Astrotopia*, 118.

17 Rubenstein, *Astrotopia*, 114.

18 Rubenstein, *Astrotopia*, 104.

19 Ibid., 104.

20 Rubenstein, *Astrotopia*, 166.

21 Bowen, *Original Sin*, 9.

22 Wendy N. Whitman Cobb, "For All (Wo)Mankind: Developing a Feminist Space Policy," in Paper Presented at the Annual Conference of the Southern Political Science Association, January 2023.

23 Everett Dolman, *Astropolitik: Classical Geopolitics in the Space Age* (London: Frank Cass, 2002).; Joshua P. Carlson, *Spacepower Ascendant: Space Development Theory and a New Space Strategy* (self-published, 2020).; Namrata Goswami, and Peter A. Garretson, *Scramble for the Skies: The Great Power Competition to Control the Resources of Outer Space* (Lanham, MD: Lexington Books, 2020).; John Klein, *Space Warfare: Strategy, Principles and Policy* (New York: Routledge, 2006).; and Brent Ziarnick, *Developing National Power in Space: A Theoretical Model* (Jefferson, NC: McFarland and Company, 2015).

24 Eric M. Blanchard, "Gender, International Relations, and the Development of Feminist Security Theory," *Signs* 28, no. 4 (2003): 1289–1312.; J. Ann Tickner, "Hans Morgenthau's Principles of Political Realism: A Feminist Reformulation," *Millennium: Journal of International Studies* 17, no. 3 (1988): 429–440.; and J. Ann Tickner, *Gender in International Relations: Feminist Perspectives on Achieving Global Security* (New York: Columbia UP, 1992).

25 For example, see Steve Kwast, "The Real Stakes in the New Space Race," War on the Rocks, August 19, 2019, https://warontherocks.com/2019/08/the-real-stakes-in-the-new-space-race/; Jared Thompson, "Op-ed: Beijing's Troubling Space Ambitions," *Space News*, May 20, 2021, https://spacenews.com/op-ed-beijings-troubling-space-ambitions/; Joseph Trevithick, "China's Historic Mission to the Dark Side of the Moon is About More than Science," *The Drive*, January 3, 2019, https://www.thedrive.com/the-war-zone/25781/chinas-historic-mission-to-the-dark-side-of-the-moon-is-about-more-than-science; and Mark R. Whittington, "The latest Chinese space launch presents both a problem and an opportunity for NASA," *The Hill*, May 11, 2020, https://thehill.com/

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26 See David T. Burbach, "Partisan Rationales for Space: Motivations for Public Support of Space Exploration Funding 1973–2016," *Space Policy* 50 (2019).; Francois Nadeau, "Examining Public Support for Space Exploration Funding in America: A Multivariate Analysis," *Acta Astronautica* 86 (2013): 158–166.; and Wendy Whitman Cobb, "Who's Supporting Space Activities? An 'Issue Public' for US Space Policy," *Space Policy* 27 (2011): 234–239.

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