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Exoplanets as Sites of Rebellion

Emma Johanna Puranen



Humans leaving Earth to live on an exoplanet, or a planet outside our solar system, is a common storyline in science fiction. Establishing a new society on an unfamiliar world, which might present unknown dangers to human biology or have a small margin of error to maintain human habitability, brings up fundamental questions of governance and forces characters to undergo a radical change. Pre-existing divisions among settlers can be exacerbated, and new ones can be created between the exoplanet settlers and the people back on Earth—either can lead to rebellion and revolt. In this paper, I discuss examples of how distance and harsh conditions on newly settled exoplanets in the novel *Aurora* by Kim Stanley Robinson, the video game *The Outer Worlds*, and season four of the television series *The Expanse* all exacerbate human rights issues and lead to conflict between settlers and people on Earth, or representatives of Earth in the form of governments or private companies. I investigate the tension inherent in the juxtaposition of these fictional revolutions to gain rights for the downtrodden with portrayals of humans moving to exoplanets that are often reminiscent of or re-enacting settler-colonialism. This paper is also inspired by the June 2021 Edinburgh Futures Institute conference *The Institutions of Extra-terrestrial Liberty*, which delved into many of these questions of governance and rights for space-faring humans. I draw on my position as an interdisciplinary scholar working between astronomy and literature at the St Andrews Centre for Exoplanet Science—itself an interdisciplinary organisation tackling ethical questions about potential human interaction with other worlds and lifeforms—to uplift science fiction as an underutilised source of scholarly thought on these matters. Lessons from science fiction regarding the potential future of humanity in space are especially crucial given recent interest in colonising Mars—after all, as Lucas Mix states, “we don’t do things until we imagine them.”

I will summarise three case studies of fictional revolts on exoplanets and then compare themes that emerge from the three cases. First, Kim Stanley Robinson’s novel *Aurora* (2015) takes place on a generation ship en route to the Tau Ceti system, a real star system about twelve light-years from Earth. The massive generation ship hosts a population of about 2000 people, living spread across twenty-four different Earth biomes (Robinson 45-46, 51). The voyage takes about 170 years at 10 percent the speed of light, spanning the initial generation who left Earth, several caretaker generations who only know life on the ship, and finally the generation that arrives at their destination, an Earth-like moon of the exoplanet Tau Ceti e, which the settlers dub “Aurora” (46, 48). When they arrive at their new exoplanet home, only to find it uninhabitable due to deadly disease-causing prions in the otherwise breathable atmosphere, a conflict emerges among the passengers. One group of settlers from *Aurora* attempts to return to the ship, but they are killed by those onboard to maintain quarantine. Disagreement over this action leads to brawls among the

remaining people on the ship until the ship's AI itself takes over, physically separating dissidents and referring to itself as “the rule of law” (229). With the Aurora settlement unviable, people are divided under the AI's arbitration into one group that stays and attempts to terraform another world in the Tau Ceti system, and one that goes against their mission and returns to Earth.

In *Aurora*, the survivors, called the “returners,” eventually return to Earth, resorting to novel cryosleep technology after their onboard ecosystems collapse and they run out of food. It is also revealed that the mission to Tau Ceti began with not one generation ship, but two—the other ship was destroyed in a conflict among its passengers, and the memory of this was buried so as not to provoke such a conflict in the remaining ship (232-233). Arriving back at Earth, they find that the reason for their mission was expansionism alone, and that people on Earth are still sending out generation ship after generation ship, with no indication of success from any of the missions. One space advocate argues:

It's an evolutionary urge, a biological imperative, something like reproduction itself. Possibly it may resemble something like a dandelion or a thistle releasing its seeds to the winds, so that most of the seeds will float away and die. But a certain percentage will take hold and grow. Even if it's only one percent, that's success! (429)

This did not prove justification enough for the returners. When they made their decision at Aurora, they rebelled against an Earth they had never known, which had generations ago taken away their agency without their consent. As Aram, one of the returners, puts it, the engineering challenges of settling space might be overcome, but the biological ones are insurmountable: “Life is a planetary expression, and can only survive on its own planet” (428). *Aurora* argues that humans evolved on Earth, and living anywhere else, particularly the bottle of a generation ship, will lead to ecological collapse.

The Outer Worlds and *The Expanse* both feature class-based revolts with workers rising up against private companies from Earth that have used the harsh conditions of space to exert more control over their employees. *The Outer Worlds*, a 2019 video game from Obsidian, takes place in an alternate future in which space is ruled and settled by megacorporations. Workers and corporate elite alike have come to the fictional Halcyon system in faster-than-light ship journeys which include a ten-year cryosleep. The Halcyon system colony, ostensibly ruled by the Halcyon Holdings Corporate Board, is in disarray and features several examples of revolts on exoplanets. When colonists first arrived in Halcyon, before the events of the game, they created a colony on the world Terra-1. Terraforming Terra-1 provoked rapid mutations of the local flora and fauna that made them deadly to humans. This resulted in colonists rebelling against the Board, which then abandoned the colony and attempted to erase its existence via propaganda. By the time of the video game, a violent schism has occurred on Terra-1, now renamed Monarch, splitting the people there into two groups: one a corporate entity separate from the Board, and the other an anarchist group (“Radio Free Monarch”). The second colony attempt in the Halcyon system, on a planet called Terra-2, has gone better for the Board, but is dealing with a plague caused by malnutrition.

This plague has caused a group of deserters to leave corporate towns against the will of the Board (“Comes Now the Power”). Ultimately, the Board claims to use a “Lifetime Employment Program” to put most workers in stasis to save resources, though in reality the plan is to kill them to reduce the population so the elites may live in comfort (“The City and the Stars”). The future of the Halcyon system in the story, and the extent to which the Board’s control will be weakened or strengthened, depends on the player’s actions in the video game. The combination of authoritative rule by the Board, and the biological challenges of attempting to live within alien biospheres, leads to multiple situations where human rights are abused and people rise up violently.

The Expanse is unique among the media properties I investigate here in that, in its story, many of the human settlers on the exoplanet come not from Earth but from colonies throughout our own solar system. In the world of *The Expanse*, which is based on a novel series by James S. A. Corey, Earth is united under the United Nations, Mars is an independent power, and a group called the “Belters” live in the asteroid belt and the outer solar system under the control of various Earth and Mars governmental and corporate powers. The Belters have lived in space for generations, and due to the change in environment and the distance between populations have developed some biological differences from the rest of humanity. They live in cramped conditions under constant resource scarcity and cannot withstand Earth gravity without a painful and expensive course of drugs to strengthen their bodies (“New Terra”).

Season 4 features a big societal change in the form of the opening of a Ring Gate built by an ancient, unknown alien civilisation that can transport people light-years away in an instant. This opens up a plethora of habitable exoplanets to humanity, and a land grab that destabilises the solar system’s already precarious political situation ensues. Our protagonists are called in to mediate in a struggle between Belter settlers on an Earthlike planet, and an Earth corporation called Royal Charter Energy (RCE) that has been granted an exploration charter by the U.N. for the same planet. The conflict is reflected in the two groups’ different names for the planet—the Belters call it Ilus; the RCE scientists call it New Terra. The Belters, who arrived first, destroy a landing pad just as the RCE ship is landing, causing many deaths (“New Terra”). The remaining RCE scientists try and exert control in the name of their U.N. charter, but this causes tension with the Belters, who have been under Earth’s control for a long time and do not wish to see that re-enacted on this new exoplanet. At the end of the season, the groups are forced to work together against an outside threat, and the name Ilus gains favour, but ultimately the conflict between Belters and Earthers is ongoing.

Although these stories are fictional, they engage with several real-life challenges that would occur if humans were to travel to exoplanets for the purpose of settlement. Chief among these is that exoplanets are isolated. Distances just in our solar system are vast—a hypothetical Mars colony, or even a lunar one, would already be the most isolated group of humans in existence. Exoplanets are orders of magnitude farther away. For humans to reach them in real life would either require a method of propulsion that can speed a craft faster than light, which is currently far outside humanity’s technological capabilities, or else a generation ship, as described in the

Aurora section above. A generation ship is still well outside current technology, though certainly much more feasible than faster-than-light travel within the next few hundred years. Many SF stories solve these problems for their narratives by using some form of stasis or cryosleep, as in *Aurora* and *Outer Worlds*, or a wormhole or portal, as in *The Expanse*. Either way, once the exoplanet is reached, the Earth becomes both physically and emotionally distant, and often the settlers either cannot communicate with Earth or can only do so with a substantial delay. This distance necessitates the creation of new forms of government, and makes it very difficult for representatives of Earth power to maintain control in those newly established governments (*The Institutions of Extra-terrestrial Liberty*). Though *The Expanse*'s Ring Gate does allow for communication, in *Aurora* and *The Outer Worlds* Earth is effectively non-existent for the settlers, who rely on the ship's council and eventually the AI's "rule of law," or the Board, respectively. These nearer bodies govern instead of Earth because it is difficult to enforce laws on people who are that far away.

A second challenge that all three stories contend with is the environments of space and the exoplanet itself. Humans living in space face a closed and fragile ecosystem that can leave them physically weaker. If they reach a planet and find it has life, they, as representatives of Earth's biosphere, must then interact with a wholly alien biosphere, and this interaction may be dangerous to one or both parties. Lucas Mix, an evolutionary biologist and theologian who presented at *The Institutions of Extra-terrestrial Liberty*, stresses that evolutionary biology shows there is a link between the distance between populations and their genetic differences, and that the mutation load would be very high in space (Mix). *Aurora* sees settlers die of prion disease upon breathing an exoplanet's air; *The Outer Worlds* sees a botched terraforming attempt render an exoplanet less human-hospitable, as well as a slow starvation of many colonists due to lack of suitable food resources. The Belters of *The Expanse*, adapted to a harsh life in space, have trouble adjusting to the gravity of Ilus, and some die after bad interactions with the drugs they need to withstand the planetary gravity. These challenges necessitate group cooperation to have a chance at survival. In a society with a low margin of error, authority and strong social norms are likely methods to achieve this cohesion—yet these can breed authoritarianism (Mix). The authorities can then craft a survivalist human-versus-nature narrative, as the Board does in *The Outer Worlds*: "Please be reminded that acting against the interests of the corporations is acting against the interests of humanity" (outerworlds.obsidian.net/en). Therefore, the environments of space and exoplanets can directly influence governments to restrict human rights.

A specific type of space environment often used to get to exoplanets is the aforementioned generation ship, presented in *Aurora*, which itself comes with a slew of ethical considerations. SF author Stephen Baxter outlined three ethical dilemmas of such worldships in his *Institutions of Extra-Terrestrial Liberty* presentation. The caretaker generations of *Aurora* somewhat successfully grapple with these dilemmas before they arrive at Tau Ceti. The first is the closure—that is, both the lack of possibility of leaving and the biological fragility and instability of a small, closed ecosystem. Second are vocational limitations, in which caretakers have limited choice in their

occupation. Third is reproductive control, in which to maintain population and diversity people are told how many children they can or cannot have, and with whom (Baxter). Common among these dilemmas is the lack of agency for the caretakers as well as the generation that arrives at the destination—none of them chose to embark on this voyage. Only the first generation made the decision to leave Earth. The Belters of *The Expanse* have, to some extent, also been living on a worldship. Generations ago, their ancestors made the decision to move to space, and now forces of employment and biology keep them there. For the first time, with Ilus, they have the opportunity to live on a planet where there isn't a constant danger of a depressurisation event killing everyone. Generation ships and exoplanets both present extremely challenging settings for any ethical system of governance.

Each of these three SF examples includes violence sparked by conditions in which human rights have been deprioritised and taken away. The exoplanet then presents a tantalising opportunity for escape, if only to a new prison—for many of those who chose to stay and terraform in *Aurora*, for example, they make their decision not out of duty to the mission bestowed by Earth, but because they cannot bear to stay on the ship any longer: “It’s one zoo or another, as far as I can tell,” says one proponent of staying in Tau Ceti (Robinson 263). In order to understand why all of these fictional situations led to violence, we need to examine the reasons for going to exoplanets in these stories in the first place. In each example, there are two distinct classes of people: a privileged group who go for corporate interests/expansionism (the first generation in *Aurora*, the Board in *Outer Worlds*, RCE in *The Expanse*), and an underprivileged group who had little to no choice in the matter and go in hopes of new opportunities or a better life (the caretaker and arrival generations in *Aurora*, the workers in *Outer Worlds*, the Belters in *The Expanse*). In aiming to make exoplanets their home, both groups are endorsing and practising the colonisation of these other worlds. Baxter notes the approval of colonialism as another ethical dilemma of worldships—there is no other reason to have a worldship than to build a colony somewhere. The privileged group is making the rules, and even though the underprivileged group may be going for reasons more likely to be considered morally just, their going is really a symptom of or a reaction to the privileged group’s actions. The impetus for going is still a colonisation effort that places little value on human lives, or, indeed, exoplanetary environments.

These three stories, all published within the last decade, must be considered in light of concurrent and ongoing discussions on space colonisation, privatisation, and exploration. In real life, several private companies, including Elon Musk’s SpaceX, are currently proposing Martian colonies. These companies do not discount that the task would be arduous—in fact, Musk himself has said, quite bluntly, and quite similarly to the space advocate from *Aurora* quoted above, “Honestly, a bunch of people probably will die in the beginning” (“Elon Musk”). I argue that before humanity sends anyone to space, we must seriously consider why we are going, and we must establish human rights as a non-negotiable priority. Jim Schwartz, a philosopher focusing on the ethics of space exploration, argued similarly in his *Institutions of Extra-terrestrial Liberty* talk: “No one has any business creating novel conditions of extreme hardship, and then forcing people

(especially future generations) to live under those conditions with no hope of progress or escape.” It is imperative that those in the area of human spaceflight question why they are going, and indeed where they are going. Exoplanets, as seen in these three stories, might already have their own biospheres—how do mission proposers aim to have humanity interact with a pre-existing biosphere? The time to be asking these questions is now, not after we have the technology for such interplanetary and interstellar missions.

Science fiction is often reflective of current discussions within science. SF authors imagine possible futures, and to do so they extrapolate from the world they see around them. These three recent SF stories about the dangers of taking to space without prioritising human rights, and with only expansion and greed as goals, can be read as a warning in response to the current conversation. An alternative to using SF is often to reach for historical analogies on Earth. This happens even within SF—Murtry, an RCE security guard in *The Expanse* Season 4, and the space advocate in *Aurora* both employ verbiage supporting the frontier mentality and manifest destiny of the Wild West (“Saeculum”; Robinson 429). Philosopher and anthropologist Kathryn Denning believes that there are places and uses for such historical analogies, but also that they can be messy, and writes that “instead of using past social conditions to make guesses about what would happen if a detection occurred, we might use our knowledge of present social conditions to help ensure that the science can continue to be done” (311). Denning is writing about extra-terrestrial intelligence detections, but I argue her thesis is applicable to the area of humans on exoplanets as well. I add that SF can often provide a better place to look than history when considering the human element in scientific advances like space travel.

Exoplanets often become sites of rebellion in SF because factors including isolation and severe environments create conditions where tyrannical governance can occur. But the exoplanets themselves are only the catalysts for the more deeply rooted issue of travelling to them with expansionist justifications that do not include the guarantee of human rights. It is this lack of care that leads to revolt by the abused parties. Given current popular interest in sending humans to Mars and beyond, conferences like *The Institutions of Extra-Terrestrial Liberty* are essential for examining the ethical considerations of such proposals. SF provides a vital bridge, accessible to all from academia and industry and the general public, that explores the social ramifications of human settlements on exoplanets. If we listen, we hear that SF is telling us that we need a good reason to go to exoplanets in the first place—and that we ignore human rights in space at our own peril.

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