

Ecological Immunity and Kim Stanley Robinson's 2312

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Abstract

In this paper, I will propose the notion of “ecological immunity” as a useful conceptual tool for thinking about the Anthropocene. The term refers to a basic condition of all life: in order to flourish, an organism must insulate itself from its environment and maintain a stable interior space which can support the organism’s vital functions, immunizing it against the dangerous flux of its ecological environment. The history of the human species can be written as a process by which this internal environment is progressively explicated and exteriorized. The Anthropocene marks the historical moment when these strategies for immunization reach an absolute limit: as the biosphere is itself revealed to be a finite interior, the outside disappears. It is no longer sufficient to immunize the human collective against the ecological environment; instead, the challenge becomes the maintenance of the biosphere as a whole, now understood as the last immunitary container. Kim Stanley Robinson’s science fiction novel 2312, I argue, can be read as an extended allegory of the problem of ecological immunity and a perceptive exploration of its biopolitical implications.

Introduction

Kim Stanley Robinson’s 2312 opens with a six-page “Prologue,” consisting almost entirely of a magnificent description of sunrise on Mercury as seen by the “sunwalkers” – a group of people who spend their days hiking across the battered surface of the planet, always staying in “the zone of the breaking dawn” so as to “catch glimpses of the sun” (1). The sunwalkers live for these moments of ecstasy – and they occasionally die for them, too: transfixed by the spectacle, some of them invariably stay out too long and are “cooked” by the sheer intensity of solar radiation (4). Still, the narrator admonishes his readers, we should not dismiss them as fools:

Do you think you would never make such a mistake? Don’t you be so sure. [...] You are a creature of the sun. The beauty and terror of it seen from so close can empty any mind, thrust anyone into a trance. It’s like seeing the face of God, some people say, and it is true that the sun powers all living creatures in the solar system, and in that sense *is* our god. The sight of it can strike thought clean out of your head. (4)

The sunwalkers play no significant role in subsequent chapters. Yet this opening scene, whose stylistic opulence is clearly calculated to match the famous opening sequence of Stanley

Kubrick's *2001* (to whom the book also alludes with its title and original cover-design), does set up a theme that is central to the novel and, I wish to argue, holds together the many, seemingly disparate strands of the narrative. The scene derives much of its force from the profoundly ambivalent quality of the sun itself: to look at the sun is both to encounter the ultimate source of one's own vitality and, at the same time, to be reminded of life's extreme precariousness. The sun gives life, and it also kills. It is at once utterly alien and strangely intimate, to the point where the sounds of one's own body seem to emanate from it – a sense of intimacy underscored by Robinson's use of the unusual second person narrative voice: "suddenly the sizzle of the fiery cilia becomes audible, a turbulent roaring – that's your own blood, rushing through your ears, but in those moments it sounds just like the sun burning." (4) Looking at the sun, the sunwalkers deliberately confront an existential situation that is common to all life, when it is considered in the larger scheme of things.

The name I want to give to the theme which Robinson thus introduces in the prologue of *2312* is "ecological immunity." I conceive of ecological immunity as a necessary complement to an idea that is much more familiar but also, I will argue, often poorly understood, namely that of "ecological community." This idea is so central to environmentalist thought and so pervasive that many texts which rely on it do not even bother to spell it out in any detail. With some frequency, it is simply identified with the meaning of ecology itself. One of its earliest, most cogent, and most consequential formulations can be found in Aldo Leopold's essay "The Land Ethic." This is one of the founding documents of U.S. environmentalism and arguably the first attempt to conceptualize ethical duties not to this or that individual creature, human or animal, but rather to the land itself. Leopold encapsulated his land ethic in the famous maxim that "a thing is right when it tends to preserve the integrity of the biotic community. It is wrong if it tends otherwise." Leopold's notion of "biotic community" was principally informed by the work of the ecologist Frederic Clements, who employed the term to refer to the tightly knit web of plant and animal populations inhabiting a particular geographical area. In "The Land Ethic," Leopold provides a concise summary of the underlying theoretical model – a summary which, just like Robinson's novel, starts with the sun:

Plants absorb energy from the sun. This energy flows through a circuit called the biota, which may be represented by a pyramid consisting of layers. The bottom layer is the soil. A plant layer rests on the soil, an insect layer on the plants, a bird and rodent layer on the insects, and so on up through various animal groups to the apex layer, which consists of the larger carnivores. [...] Each successive layer depends on those below it for food and other services, and each in turn furnishes food and services to those above. [...] Man shares an intermediate layer with the bears, racoons, and squirrels, which eat both meat and vegetables. The lines of dependency for food and other services are called food chains. [...] The pyramid is a tangle of chains so complex as to seem disorderly, yet the stability of the system proves it to be a highly organized structure. Its functioning depends on the co-operation and competition of its diverse parts. [...] Man is one of thousands of accretions to the height and complexity of the pyramid. (252-253)

This passage starts out in a purely descriptive fashion – the biotic community is basically an energy circuit, with the various species akin to so many elements of an electronic switchboard. However, around the middle of the passage the tone begins to subtly shift into a normative register: in grouping “man” with “bears, raccoons, and squirrels,” and describing him as merely “one of thousands of accretions” to the trophic pyramid, Leopold admonishes his readers to take a more humble view of themselves. The land community, he suggests, should be imagined much like classical liberal thought conceives of civil society: a complex, self-regulating web of mutual dependency and exchange in which “co-operation and competition” between the members are balanced in such a manner that the pursuit of their individual interests contributes to the welfare of the community as a whole (cf. Bergthaller 2012). Leopold presents his plea for an ethical reorientation of people’s relationship to the land as a necessary consequence of this new understanding of ecological process: “[A] land ethic changes the role of *Homo sapiens* from conqueror of the land-community to plain member and citizen of it. It implies respect for his fellow-members, and also respect for the community as such” (240). Much of subsequent environmentalist thought has followed Leopold’s example in arguing that the ultimate source of our ecological troubles lies in our failure to recognize that we are a part of the ecological community. It is, environmentalists like to remind us, our insistence that humans are somehow special and different from other biological species, that we stand apart from or above nature, which has led us to plunder and mistreat the earth. When writers suggest that we need to overcome anthropocentrism, rethink our relationship to nature in ecological terms, or remember our kinship with other species, this is usually what they have in mind. The notion of ecological community is hitched to an emancipatory, egalitarian vocabulary, and assumes unambiguously positive connotations.

However, such arguments all too easily lose sight of the fact that what Leopold so comfortingly calls the “biotic community” is, in the first place, a metaphor for the trophic pyramid, and that the relationships obtaining within the latter are qualitatively different from the ones we would usually refer to as “communal.” Me getting my meat from the butcher is not quite the same as the wolf getting his meat from the deer (especially from the butcher’s standpoint). From the standpoint of scientific ecology, to be a member of the ecological community means, first and foremost, to be prey and to be preyed upon, to have to compete for food with other species, and to be exposed to the risks of starvation and disease. If realizing the place of humans within the ecological community entails a “respect” for our fellow species, such as animist peoples presumably feel, we also need to keep in mind that this feeling is inseparable from genuine terror: the propitiatory rites which Native Americans, for example, engaged in before or after the hunt were not only an expression of gratitude or a recognition of kinship, but just as much an acknowledgement of the fact that if the hunt failed, they might die. What popular conceptions of ecological community often fail to take into account, then, is the extent to which ecological community is not only a source of life but, in precisely the same measure, also a constant source of danger threatening the organism with dissolution and death. In an important sense, the survival of any organism depends on its ability to *dispense* itself, for as long as it can, from the burden imposed by its membership in an ecological community. To put the matter more bluntly: to live is to eat and not be eaten (for the time being).

II.

It is this existential necessity that I wish to designate with the term “ecological immunity.” Following Roberto Esposito, I want to suggest that we view immunity as a necessary obverse of community: the two terms imply each other and are mutually constitutive. As Esposito points out, both terms are derived from the Latin root *munus*, denoting a duty, a debt or a burden, and specifically the obligations arising from gift-giving. To belong to a community is thus to be *cum munus*: under the burden of an obligation. When we speak of communal belonging, Esposito suggests, we need to be attentive to the negative or *expropriating* dimension of this expression: to belong also means to be owned, to see one’s self-possession negated. Community voids the self of that which is most proper to it; it therefore “borders on death” (2010: 9). The term “immunity” is formed by adding the privative prefix to this same etymological root: to be immune is precisely to be *free* from obligation (a meaning that is still active when we speak, for example, of diplomatic immunity). It is to enjoy privileges, to be exempt from communal duties, from burdens that regular members of the community must shoulder. The logic of immunization thus functions by negating the negation: it “reproduces in a controlled form exactly what it is meant to protect us from” (2011: 8). A vaccine exposes the body to an attenuated form of the pathogen; to protect themselves from internecine violence, citizens invest the state with a monopoly on (lawful) violence.

Esposito is a political philosopher, and his account of immunization is essentially an attempt to uncover and reconstruct the conceptual logic of what Michel Foucault described as biopolitics. According to Esposito, the category of immunization offers a solution to the “enigma” that Foucault had puzzled over: how a politics expressly devoted to fostering life could (with the genocide of the European Jewry) culminate in a politics of death (2008: 39). He argues that modern political history is at its core a process of immunization wherein the “individual” (which is itself a product of this process) is legally and politically exempted from the expropriating tendency of community – but at the same time becomes ever more vulnerable to the power of the sovereign state which is the final guarantor of its immunity.

Strikingly, even though he places considerable emphasis on the “lexical slippage” between the biological and the juridico-political meanings of the term (2011: 4), Esposito has never sought to articulate the ecological implications of his theory of immunity. However, it has become increasingly apparent that many of the emancipatory gains of modernity which Esposito tabulates under the heading of immunization were in fact inseparable from the emergence of new strategies for exempting humans from the burdens of ecological community. Foucault himself had located the origins of biopolitics at the historical moment when, in the late eighteenth century, breakthroughs in agriculture and public health loosened the iron grip of “epidemics and famine” and lead to rapid demographic expansion (142). The subsequent expansion of individual liberties (and of strategies for hedging and harnessing these liberties for economic ends) was only the flipside of a development in which the immediate problem of biological survival gradually lost its urgency. The single most important factor driving large-scale ecological immunization was the discovery of fossil fuels as a source of power, which allowed humans quite literally to quit the “biotic community” as conceived by Leopold: they no longer depended on the slow trickle of solar energy through the trophic

pyramid, and became able to construct material and symbolic spaces in which human life could flourish seemingly regardless of ecological conditions. As Dipesh Chakrabarty memorably puts it: “The mansion of modern freedoms stands on an ever-expanding base of fossil-fuel use” (208; cf. Bergthaller 2017).

The great irony of this development is, of course, that the very success of modern societies in immunizing themselves against the vagaries of ecological existence precipitated a crisis of the biospheric commons which now threatens to undo all of these accomplishments. Industrialized agriculture and modern medicine led to a fourfold increase in the world’s human population over the course of less than a century, even as the combination of market capitalism and liberal democracy prevalent in the most resource-intensive societies of the planet has made it nearly impossible to imagine restrictions on freedom of movement and consumption, ecologically necessary though they may be. All across the planet, ecosystems are degraded and pushed to the limits of their carrying capacity. Perhaps most consequentially, the burning of fossil fuels is destroying the very immunitary mechanism which conditions all terrestrial life: the atmosphere, that gaseous membrane which both protects us from and connects us to the deadly, live-giving rays of the sun.

III.

With this, we are back where we began, namely with Kim Stanley Robinson’s *2312*. This novel is a sequel of sorts to Robinson’s best-known work, the Mars trilogy (1993-1996). It is set further in the future these novels had outlined, shares many of their thematic concerns, and also resembles them in its painstakingly detailed description of a scientifically and sociologically plausible future society. With regard to its literary form, however, it is much more adventurous, “strategically redeploying,” as Ursula Heise writes, “narrative techniques that first emerged in high-modernist urban novels of the early twentieth century” (19). The bulk of the novel consists of straightforwardly narrative passages, told in a third person omniscient narrative voice and focalized through a small cast of central characters. However, these passages are regularly interspersed with sections billed as “extracts,” “lists,” and “quantum walks.” The “extracts” present text fragments from an imaginary future library, often accounts analyzing the world of *2312* in historical retrospective, but also geological treatises, terraforming manuals (describing, in the manner of a cook book, how to prepare an asteroid for human inhabitation) or medical studies. The “lists” are just that – animals (451-452), place names (20-21; 403-404), technologies of the self (62-63), types of ecosystems (236-237) or psychological dispositions (207-208), reasons why we need not care for others (372-373) – often challenging the reader to generate a paradigm that could encompass all the terms in the list. The “quantum walks,” finally, are brief, lyrical stream-of-consciousness passages told from the perspective of an artificial intelligence (which only becomes clear over the course of the novel).

In *2312*, the terraforming of Mars which stood at the center of Robinson’s earlier trilogy is already a distant triumph, about to be overshadowed by the ongoing terraforming of Venus and Titan. There are human settlements on Mercury, the moons of Jupiter, as well as on thousands of asteroids all across the solar system, which are organized in a loose federation

known as the Mondragon Accord. The “spacers,” as the humans living off the home planet are referred to, have mastered most of the social problems that beset human society as we know it today: they have replaced capitalism with a sort of post-scarcity cybernetic communism, where goods are distributed according to needs by artificial intelligence, and material want seems to have become a thing of the past. They have pushed the human tendency towards “autoplastic refinement” (Sloterdijk, 706) to new extremes: the traditional dichotomy of male/female has been replaced by a bewildering array of gender choices (230); racial categories seem to have fallen largely out of use, and would in any case be eclipsed by the much more conspicuous (and voluntarily adopted) phenotypical differences between “smalls” and “talls.” Perhaps most radically, the spacers have developed longevity treatments which allow people to live for almost two centuries (and counting). Taken together, these achievements indicate that the spacers have advanced far towards the goal of escaping the “human condition” as Hannah Arendt defined it in her book of the same title, exchanging “human existence as it has been given, a free gift from nowhere [...],” for something they have made themselves (2-3). The spacers seem to have achieved immunity in the highest sense: they no longer depend on free gifts; they do not owe the conditions of their life to a world that is given in common – they themselves have put these conditions in place.

The life of the spacers stands in stark contrast to the situation on an Earth wrecked by centuries of climate change, overpopulation (there are now eleven billion people on the planet), ecological degradation, and the political fragmentation and disorder that are both a cause and a consequence of the former. The world of the novel thus seems to present the reader with a neat opposition: on the one hand, there is the utopian society of the spacers, who appear to have achieved a state of almost perfect immunity; on the other hand, there is the dystopian mess of an Earth where ecological community breeds universal misery. What the novel proceeds to do, of course, is to complicate this picture, and to show how immunity and community are in fact mutually implicated. Early on, we learn that the spacers do in fact need to return to Earth every few years lest they become ill and die prematurely. Science has not been able to unravel the reasons for “Earth’s continuing clutch on space-dwelling humans,” but in one of the extracts, it is suggested that life in “oversterile environments” weakens their bodies; thus the “notorious sabbatical has been proposed as an example of hormesis or Mithridatism, in which brief exposure to toxins strengthens the organism against greater” (94) – and that is where the excerpt breaks off. Here, the continuing dependency of the spacers on their original home is characterized in explicitly immunological terms: a certain level of exposure to the risks of communal life is necessary in order to ensure the vitality of the organism.

The extreme precariousness of life in space is a theme that is already struck in the novel’s “Prologue.” This theme will be reiterated throughout the novel, most importantly when Terminator, the settlement on Mercury, along with its entire population, is wiped out by a terrorist attack. It is this attack, whose source is initially suspected to lie on Earth, which shocks the novel’s protagonist, Swan Er Hong, out of her self-absorbed life as a body- and landscape artist, and convinces her to join a secretive interplanetary committee founded by her recently deceased grandmother Alex. Alex, Swan learns, had understood that the spacers could not complacently stand by as the Earth descended into ecological apocalypse, because

the planet's instability posed an existential threat to the Mondragon Accord. The spacers have a vital interest in improving ecological conditions on Earth. For this reason, she and her co-conspirators across the Mondragon have spent the past few decades breeding endangered species in the hollowed out asteroids known as "terraria." Swan helps to carry through Alex's plan. Under her direction, the "reanimation," as news outlets soon come to call it, takes on the look of a crazy guerilla art performance. If the novel can be said to have a climax (which is not so clear, given its convoluted tangle of plotlines), it must be this dream-like, gloriously whimsical scene:

They all came down together, first in big landers protected by heat shields, then in smaller landers popping parachutes, then in exfoliating balloon bags. At that point they were drifting down, each transparent bubble a smart balloon holding inside it an animal or animal family. [...] Swan looked around [...]: sky all strewn with clear seeds, which from any distance were visible as their contents, [...] thousands of flying wolves, bears, reindeer, mountain lions. There she saw a fox pair; a clutch of rabbits; a bobcat or lynx; a bundle of lemmings; a heron, flying hard inside its bubble. [...] Many of the creatures descending had been absent from Earth for two or three centuries. Now all back, all at once. (453-454)

What Robinson imagines here is, of course, a restoration of the Earth's frayed ecological community – precisely in the sense of Aldo Leopold's land ethic, which the novel explicitly invokes in yet another "extract":

The space project accelerated as it was becoming clear that Earth was in for a terrible time because of climate change and general despoliation of the biosphere. Going into space looked like an attempt to escape all that, and [...] defenders of the space project always had to emphasize its humanitarian and environmental value [...]. Inhabiting the other bodies of the solar system could be said to conform to the Leopoldian land ethic, 'what's good is what's good for the land,' because it was going to take stuff from space to save Earth. (420)

This passage frames the question of the ecological significance of space exploration in terms of the dialectic of community and immunity: are the spacers seeking to absolve themselves from humanity's collective debt to the biosphere – or are they, on the contrary, helping to ward off ecological insolvency? Swan holds to the latter view, as becomes especially clear in a subsequent scene, where she defends the reanimation against the criticisms of a group of Russian peasants living on the Canadian prairie:

They liked arguing with Swan; they liked being tongue-lashed by her. They had looked the same in 1905, no doubt, or 1789, or 1776. [...] 'We're part of a family,' Swan was insisting [...]. 'The mammal family.' 'Mammals are an order,' someone objected. 'Mammals are a class,' someone else corrected. 'We are the *class* of animals,' Swan exclaimed, and the *order* is to suckle and love! [...] It's that or die. Our horizontal brothers and sisters. We need them, we need all

of them [...]! Without them we're just—just—' 'Poor forked radishes!' 'Brains and fingertips!' 'Worms in a bottle!' 'Yes! Swan said. 'Exactly.' 'Like spacers in space,' someone added. [...] 'It's true,' she cried. 'But here we are! I'm on Earth, right now.' Her cheeks burned and she looked around at them; she stood on a bench and caught them up: '*We're on Earth!* You have *no idea* what a privilege that is. You fucking moles! You're home! You can take all the spacer habitats together and they'd still be nothing compared to this world!'" (479)

Just as Leopold in "The Land Ethic" had relied on the liberal vocabulary of citizenship and emancipation in order to argue for ecological conservation, Swan is presented here as a revolutionary agitator, inciting a crowd ripe for insurrection on behalf of an expanded vision of "liberty, equality, and brotherhood," as the motto of the French Revolution famously had it. Swan imbues the idea of ecological community with the same pathos that it holds for many contemporary environmentalists, and the second half of Swan's harangue makes it clear how much this vision is grounded in the notion of the Earth as a world that is given in common, as both the necessary condition of all life and a "privilege" – a gift which bestows a shared immunity on all of Earth's inhabitants but in turn places on them the duty of inter-species solidarity. By contrast, the small-scale immunitary vessels of the spacers look like a miserly, diminished thing.

This is in keeping with the character of Swan, who, I want to suggest, embodies the principle of community in the novel. She accepts the risks that come from hosting strangers with reckless abandon, continually transgressing limits and expanding the boundaries of the common. In the course of the novel, we learn that she has not only embedded a quantum computer named Pauline inside her head, but also bits of genetically modified bird brain, pieces of the brains of several former lovers, as well cat DNA. To top it all, she has ceremonially ingested a "suite" of alien microbes from the moon Enceladus, which are now lodged in her intestines—to what effect remains unknown at the start of the novel (it later turns out that the alien microbes allow her to survive dosages of radiation that would kill ordinary humans). At the novel's conclusion, it is she who allows one of the "qubans," artificial intelligences inhabiting human bodies who are found to have played a key role in the terrorist attack on Terminator, to escape capture and blend into human society. And of course, Swan is also among the sunwalkers described in the "Prologue." Like the sunwalkers, Swan finds ecstasy in the "playful handing over of [her] life to strangers" (623). The enthusiasm with which Swan pursues "the reanimation" and speaks on behalf of "our horizontal sisters and brothers" is of a piece with these actions.

However, Swan's position does not stand uncontested in the novel, as becomes clear when one takes a second look at the passage where she lectures the Russian farmers about ecological kinship. The grand oratorical sweep of the passage makes it easy to overlook the profound ambiguity of the situation: given what the reader knows about the sorry state of the planet, there is more than a little irony in her complimenting a group of poor, drunken farmers for the "privilege" of living on Earth – especially as the compliment is coming from a person who has enjoyed the privileges of spacer life to the extent that Swan has. She is extolling the value of ecological community from a position of safety where the risks which

the latter entails can be experienced as a matter of choice rather than exigency. When, after the reanimation, she exults that “all Earth was a park now, a work of art, shaped by artists” (462), she is blithely ignoring the proprietary claims and immunitary needs of those people who actually make their living from the land – and the reader soon learns that the reanimation is indeed far from uncontroversial, because the restoration of ecological community also entails the violent reintegration of humans into the food chain:

[They] were hearing more often from reports worldwide that people were finding the reappearance of animals in their world hard to handle. [...] People were unused to being potential prey for big predators lurking right at the edge of town. [...] Those who used to go out on their own now usually found company. Some who didn't got eaten, and the rest shivered and complained [...]. (480)

It is not difficult to recognize in these passages an echo of the kinds of conflicts that have played out in nature reserves all across the Global South where, as Ramachandra Guha famously pointed out, the lofty goals of wilderness protection were often pursued at the cost of local communities – and to the benefit of a small social and economic elite (75-76).

Furthermore, Swan's oration to the Russian farmers is focalized through her lover and co-conspirator Fitz Wahram. The novel sets up Wahram as Swan's symbolic counterpart. She is born on Mercury, he on one of Saturn's moons, and the differences between their respective personalities bear out all the relevant astrological clichés. Swan is high-tempered, quick-witted, and impulsive, Wahram calm, serious, and self-possessed. If Swan embodies the impulse to expand community, Wahram stands for the countervailing drive to shore up immunitary defenses. Whereas Swan always seeks out the new and the dangerous, heedless of the consequences, Wahram is terrified by novelty and keenly aware of the need for protective envelopes. So it cannot really come as a surprise that Wahram, as he listens to Swan expounding her space-age version of Leopold's land ethic, is not carried away, but rather filled with skepticism: “[It] seemed to Wahram, as he caught Swan falling off her bench toward the bar, that what she had said wasn't really true, not anymore – not with Mars up there, and Venus and Titan coming on board. [...] So they cheered her for being wrong, for flattering them, for buying drinks and catching them all up in a moment of enthusiasm” (479). This temperamental difference between Wahram and Swan again comes to the fore in a later dialogue where they discuss the possibility of rebuilding her home city on Mercury. Wahram tells Swan that she ought to accept the fact that a newly reconstructed Terminator would remain just as vulnerable as the old city had been, and reminds her that even the individual body is vulnerable in the same way. Swan responds:

“But there should be a difference between you and your world. Your body can break – it will break. But your home, your world – those should be stronger. [...] Someone shouldn't be able to pop all that, like popping a soap bubble with a pin. Do you see the distinction I am making?” “Yes.” Wahram settled back in his chair. Having granted her point, there was nothing more to say. The solemn

set of his big face said it: life was a thing kept alive in bottles. What could one do? (539)

In *2312*, neither side wins this argument. On the last pages of the novel, Swan and Wahram get married.

IV.

Thus does the novel's conclusion dramatize the synthesis of immunity and community, sublating the conflicting principles in a unity of opposites. Surely, the real biopolitical challenges of the Anthropocene cannot be resolved with such allegorical neatness. Nevertheless, I would argue that *2312* provides us with a conceptual map that may put us in a better position to tackle them. Much of traditional environmentalist thinking revolves around a critique of the forms of ecological immunization that are constitutive of modern society. Like Aldo Leopold, it argues for the need to tear down the walls that separate humans from their evolutionary brethren and to accept our position as equal members of the ecological community. Like Swan Er Hong, it tends to forget that such claims are often lodged from a position in which ecological immunity has already become taken for granted, and that ecological community does not only sustain, but also undo those who belong to it. Watching the sun rise on Mercury may seem like an excellent idea once you have practically achieved immortality; hiking in bear country to reconnect with ecological realities only becomes attractive once you are able to rely on modern medicine and spend much of your time in air-conditioned rooms. Ultimately, these are ritualized ways of reminding ourselves of dependencies from which humans have always struggled to emancipate themselves. Such reminders are important because the idea that we could completely immunize ourselves against the vagaries of ecological existence is a dangerous illusion. But this does not render moot the human drive to create immunitary mechanisms and protective envelopes – a drive which, as Lynn Margulis has argued, is in the end just another instance of the “home and body making” that all complex life forms have been engaging in at least since the Cambrian period (2007: 81). Such a view confounds customary distinctions between the natural and the artificial, and allows one to imagine that “the arrogant habitat-holocaust of today may cease,” and “in its wake [...] evolve technologically nurtured habitats that re-bind, re-integrate, and re-merge us with nature.” (86) The vision Margulis articulates here is one that is shared by the various proponents of a “good Anthropocene” (Heise 12), and it is also the one that informs *2312*.

Life, then, is indeed a “thing kept alive in bottles” (539) – and the question cannot be how to get rid of the bottles, but rather: what size bottle is best suited in order for life to flourish? In *2312* (and even more obviously in the more recent *Aurora*), Robinson suggests that the best bottles are planet-sized, and that the task for humanity is to figure out how to scale up the immunitary mechanisms which define human communities so that they can begin to converge with the immunitary mechanisms which define the biosphere. The fantasy of a perfect immunity, of a state in which we would be quit of all our ecological debts, and the dream of an unbounded ecological community in which we would never accrue such debts, in the first place, are equally futile and self-destructive. All life is fragile, possible only because

of its finitude, engaged, as the story-telling starship in *Aurora* puts it, in an unwinnable “rearguard battle against entropy” (loc. 1667). The point is to accept this without falling into either hubris or despair.

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