

COMMENTARY

Invasion Blowback and Other Tales of the Anthropocene: An Afterword

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How shall we tell stories of the nonhuman living beings that join us humans in making the Anthropocene? Such beings are not just tools of human manipulation; they make their own histories. In this discussion of the articles in the Special Issue 'Invasive Species', the features that make good Anthropocene storytelling come into view. The protagonists are humble, inconspicuous beings, but each is reachable through vernacular human observation. They each get caught up in modernist projects of landscape transformation – but, rather than being pawns, they change the world in unexpected ways. They are exemplary subjects for parables of the more-than-human condition.

Keywords: invasive species; nonhuman living beings; Anthropocene storytelling; the Anthropocene; environmental humanities

Tales of plants and animals are marvellous in every sense of the word. When they emerge in a scholarly world divided between airy discussions of theory and plodding empirical reports, they stand out. With the vividness and wonder of children's stories, they guide our imaginations.

The tales here are also serious additions to scholarly knowledge. Too often, even the best environmental humanists tell us about the importance of other beings (the conceptual vitality of their materiality; their centrality in history) without allowing them to become protagonists in our stories. It is easy to get analytically stuck in human worlds in which nonhumans are either tools or blocks for human projects, even while proclaiming the importance of nonhumans. These papers instead bring us into the world-making projects of other living beings. This is an approach we will need in order to tell better stories of the Anthropocene.

The four papers gathered here each offer a slice from the history of a humble non-human organism. These are not the great charismatic actors. And yet, sometimes the stories of the humble tell us more than the stories of the great. Through their stories, these organisms illuminate central issues in global environmental history. Let me retell each as a parable to reiterate some of their key insights. I use the term 'parable' following Julie Livingston's brilliant *Self-Devouring Growth: A Planetary Parable as Told from Southern Africa* (2019). Livingston's parables are true stories assembled through ethnographic research and grounded in location, culture, and history. Yet they speak beyond the places and participants they describe. The essays in this collection do just that work, as they consider how humans and other beings build worlds together. They show us both treacherous and hopeful knots of past, present, and future.

In Holocene fragments

Zachary Caple (2017) coined the term 'Holocene fragments' to refer to contemporary ecological patches in which old evolutionary symbioses continue to structure social relations, even amid Anthropocene simplifications and catastrophes. Humans can be part of Holocene fragments; after all, the Holocene, as a geological epoch, is only 11,700 years old, a period during which not just humans but also farms and cities were well established. Livia Cahn's essay on collaboration between archaeologists and moles helps me imagine what is possible within a Holocene fragment. Even though many people don't like them much, no one has succeeded in wiping out these moles. And, even when they are useful, no one has domesticated the moles. Instead, the archaeologists studying Monnikerede village learn what moles are up to. The archaeologists shift their practices to work with the habits of moles, thus, for example, scheduling work in the spring when the moles are most active. Certainly, the arrangement was born within a very particular situation; archaeologists were not allowed to dig in this village, so they came up with the idea of looking for ceramic shards in the dirt cast up by moles. They would have preferred badger setts since badgers dig deeper, but badgers are protected in Europe, and so they are stuck with moles as collaborators. The fact that this is not Anthropocene business-as-usual is suggested by the fact that other archaeologists make fun of them for working with moles. As so often is true, difference offers insights.

Willingness to learn from another organism without aiming to either destroy or control its kind is one very 'Holocene' way to be human. For most of the existence of the human species, people have negotiated the worlds of plants and animals by paying attention to them. Modern scholars have been particularly focused on domestication, extermination, and other control-oriented projects. Still, it's easy to find

examples of learning and accommodation. For example, much non-commercial agriculture, even today, continues to depend on humans learning and working with the coppicing ability of some trees, that is, their ability to grow back from their stumps after being cut down. In the Meratus Mountains of Kalimantan, Indonesia, where I did my first fieldwork, people made fields that they expected to return quickly to forest through the ability of trees to grow back in this way (Tsing 1994). When trees sprouted from their stumps, even before the crops were harvested, they created a shady environment that allowed a quick transition between field and forest, such that a five-year return to forest had generally already shaded out the sun-loving grasses and weedy annuals that might otherwise have prevented the forest's return. Similarly, in the Japanese *satoyama* village forests that I learned about in my study of matsutake mushrooms (Tsing 2015), people depended on the regrowth of oak trees cut for firewood and charcoal to hold the ecology of the forest-field complex against weedy pioneers. In each case, attention to the habits of particular kinds of trees allowed farmers to collaborate with trees in the making of rich and habitable local ecologies. In both cases, these ecologies are threatened by Anthropocene practices of *not* paying attention to the habits of trees but rather cutting them down and substituting commercial tree plantations. Anthropocene ecologies might even be defined as landscapes created through not paying attention to the lives being replaced.

Cahn emphasises the *work* of moles who tunnel underground to make both living space and livelihood. This is not the disciplined labour of the proletariat, alienated from the very work that sustains life, but instead, following Marx, a revolutionary labour that hides even as it undermines the best laid plans of capitalists. Moles are symbols of work but not of modern times. Digging through layers, moles crash through the stratification of history that underlies claims for modernity. Unearthing the past in the present and mixing up time, moles conjure the Holocene in the midst of the Anthropocene.

Like moles, mitten crabs and rabbits are feral survivors of the terrors of the Anthropocene. In contrast to moles, mitten crabs and rabbits – as well as potato-killing water moulds – are collaborators in those terrors.

Invasion blowback

Since the 15th century, European expansion has involved multispecies invasion. Europeans brought their plants, animals, and diseases, and these organisms joined the onslaught on the Indigenous peoples and ecologies of European imperial ambitions. In the Americas, for example, whole portfolios of European crops and livestock were introduced on lands cleared by the retreat of native peoples due to war and disease (Crosby 1986). European animals and plants, like disease organisms, spread beyond European settlements, in the process antagonising, impoverishing, and displacing native survivors (Anderson 2006). In Asia, militarised trade morphed into governance regimes that allowed Europeans to raze or co-opt native ecologies for spectacularly profitable plantations of crops for the metropole (e.g., Reid 2015). All of this involved introducing species that Europeans valued to the lands

of other people. Not all of these introductions were under firm human control, of course, but that was an expected and acceptable element of European expansion as multispecies invasion. The encouragement of 'feral' species proliferations in European colonial expansion is, indeed, one of the key projects building the catastrophe we call 'Anthropocene' (Tsing et al. 2021).

Meanwhile, in the process of building imperial mastery, some non-European species snuck back into the metropole. The mitten crabs described in this issue by Lionel Devlieger were one such unintentional introduction. The crabs are particularly good to think with because they grabbed the tail, so to speak, of a European punitive expedition as it returned home. The Boxer Rebellion of northern China was one of the great anti-colonial struggles of the cusp of the 19th and 20th centuries. The rebels were called 'boxers' – an English version of *Yihequan*, 'The Righteous and Harmonious Fists' – because they used their mastery of spiritually augmented martial arts to aid them in driving out Europeans, who were scrambling to control territory throughout the north China region. The rebellion stimulated European militaries to arrive in force for a punitive response. The Prussian Emperor, Kaiser Wilhelm II, was an enthusiastic participant. As Devlieger explains, the Kaiser 'encouraged the soldiers to show no mercy'. He sent the latest in European steam power, the ship SMS *Gefion*, named after a Nordic goddess. Gods and spirits were at play on every side, and some worked through animals. Mitten crabs must have entered the ship with the ballast water supplies pumped directly from the Chinese river where the ship was anchored. The warship took the water, including its crabs, back to Prussia, where the water – and crabs – were dumped. They thrived. By 1912, mitten crabs had been identified in European waters. They spread quickly across the connected watersheds of northwestern Europe. Despite outcries of 'Yellow Danger!', the crab was not much of a threat to European ecologies. Still, its very presence speaks of the possibilities of invasion blowback. The creatures of far-imperial conquests are migrating to the centre. Like the boxers, they are out of control.

Mitten crabs are feisty creatures able to adapt to varied conditions and to survive amid human disturbance. They are collaborators in a multispecies Anthropocene. Meanwhile, Anthropocene dangers spread as the empire strikes back. Blowback has its own blowback. The part of Europe the crabs have come to live in is an old industrial zone, contaminated with toxins. In a related essay, Devlieger describes how the crabs have become saturated with heavy metals, dioxins, and PCBs, making them dangerous not only to humans but also to other animals who might eat them. To keep them out of the food chain, European authorities capture them and incinerate them at very high temperatures in cement kilns (Devlieger 2021). But there is one other use despite this toxicity, and that is sending the contaminated crabs to China where they are eaten as a gourmet food. Europeans are not to consume the crabs, but they are fine for Chinese. The difference between humans worth protecting and collateral damage still unfolds on old colonial lines. Safety is a priority only for a few. The Anthropocene spreads in such joined lines of social injustice and environmental danger. Crabs, even at the dinner table, show us.

Potato modernity

Historians Hanne Cottyn, Esther Beeckaert, and Dieter Bruneel have made a bold claim: ‘potato modernity’ shows us the foundations of Anthropocene dangers. Why not! There is much that can be understood through the history of potatoes, as well as the deadly pests and blights that threaten the potato harvest. It’s a big claim. The term ‘potato modernity’ joins the Capitalocene, the Anglocene, the Chthulucene, and other frameworks that have been proposed to understand the history of those entanglements between humans and nonhumans that have put the planet in such danger today. Potatoes can, indeed, carry a big load in explaining this history. They are proper subjects of parable.

The authors explain the term as a gathering of institutional and ideological formations. ‘Since the late eighteenth-century, specific agricultural, scientific, and political practices have enacted a logic of “potato modernity”’, they write. The key element of this modernity is the ‘subjection’ of the potato to an ‘artificial monoculture regime’. Programmes of breeding and selection, creating an ever-smaller genetic range in particular potato crops, have been part of this subjection. So are chemical treatments as well as genetic modification. These spread across potato-growing areas. ‘[T]he expansive drive of potato modernity not simply ignores, but actively destabilises inter-generationally transmitted and locally embedded (multispecies) knowledge regimes’, they write. And all this encourages disease even in fighting it: ‘In contrast to the logic of co-habitation, “potato modernity” is what supports the bringing into being and keeping alive of *P. infestans* [potato late blight disease organism] as an invasive species. The same logic continues to legitimise the entangled scientific-agricultural quest to eliminate this fungus up until today.’ Unexpected and telling: the danger is embedded in the solution. Further biological and chemical refinements, the authors argue, rest on the continuing presence of the enemy. Only those inside the latest rounds of elite beneficence are to be kept ‘safe’ from the danger. This is the structure of the Anthropocene.

One of the most interesting parts of potato modernity, as Cottyn, Beeckaert, and Bruneel tell its story, is that it did not have to be. Potatoes were cultivated for thousands of years in the Andes without the kind of subsistence crisis that followed their introduction into Europe. Furthermore, the first period of cultivation of potatoes in Europe was not plagued with blight. Potatoes were brought by sailors and planted for food but not, in these early years, on a mass scale. It took state and elite policies aiming to maintain docile rural populations to create the potato plagues. Cottyn, Beeckaert, and Bruneel focus particularly on Flanders, where a drop in the price of linen led to the impoverishment of a dense population, and their governors chose potatoes, rather than, for example, reviving the linen trade, as the solution. As in Ireland, potatoes became the only subsistence crop. At the same time, the governors opened up international trade, including the importation of what turned out to be infected potatoes. In 1845, late blight hit, and mass death followed. It was a ‘modern’ kind of crisis, a crisis of agricultural simplification and density.

The crisis stimulated regimes of scientific and political governance that made the problems of homogenisation and density worse. The modernisation of potato production spread the blight around the world, even in its homeland, where potatoes had done fine co-existing with disease in the past. Potatoes became a food staple in the global South, reproducing the very conditions that had caused the mid-19th century European potato plague. The experience the authors describe for Papua New Guinea (PNG) is particularly telling. Development policies introduced potatoes to PNG in the 1970s together with plans for ‘modern’ monocrops and agrochemicals. Less than 30 years later, those model farms were destroyed by late blight. The blight arrived as a concomitant of this modernity. Back in the Andes, the potatoes’ homeland, this modern regime did its best to produce the blight-vulnerable agricultural situation that was spreading elsewhere around the world. Potato modernity, then, encapsulates the ecological simplifications and disciplined crowding that characterises the Anthropocene. We have created plague ecologies.

Crumpled geographies

European rabbits, according to Catherine Mougnot and Lucienne Strivay, are both tricksters and teachers. They confound conceptual boundaries. They were introduced as ‘warren animals’ through most of Europe in a way that confounds hard distinctions between ‘domestic’ and ‘wild’. They were carried into sites of European expansion where they became an invasive species, destroying native landscapes, and yet they are endangered in their Iberian homelands. They are both pests and pets. They make us want to tear our hair out in frustration – but they also make us laugh.

One of the most striking features of Mougnot and Strivay’s account is the ‘crumpled geographies’ through which these authors tell rabbit stories. This is an inspired phrase through which to think about the Anthropocene. On the one hand, figuring the Anthropocene as a homogeneous planetary situation, while it may make good advertising, is completely inadequate to understand the fragmented social and ecological worlds that make up our planet. On the other hand, an entirely localised analysis just ignores the pressing importance of global historical trajectories, climate circulations, and forms of power. In the productive space between these two unhelpful extremes lies the terrain of crumpled geographies. The landscape of European rabbits stretches between Europe and its antipodes – but not everywhere in between. Australia and Britain became linked by the political ecology of colonisation – with its rabbits. This is a crumpled geography, a geography in which rabbits appear to take off directly from the British Isles to the settler-dominated lands of Australia. Many of the geographies of the Anthropocene look like this, not only those involving the introduction of exotic species but also those made by terrain-changing technologies, from deep wells that drain aquifers (Bessire 2021) to radioactivity-spreading ‘atomic cities’ (Brown 2013). Distant places become linked – sometimes mirroring each other – through Anthropocene

projects of landscape transformation. But they do not change all the lands in between, and our planet's surface is still constituted through heterogeneity.

The story of rabbit viruses and their antidotes beautifully illustrates crumpled geographies, offering a parable for the spatiality of the Anthropocene. Myxomatosis, a disease caused by a virus, does not harm American species of rabbits but can be deadly for European rabbits. Latin American scientists first identified the disease, and the virus, in the first part of the 20th century. Australian scientists experimented with it – but then the virus escaped the experimental station, killing 99% of the rabbits it encountered. In France, experimentation was banned, but a rogue researcher released the virus on his property, spreading the disease through continental Europe. When the disease spread to Britain, animal rights advocates collected and spread disease-resistant rabbits. The geography of the disease already looks quite crumpled. It became even more so with the entry of a new disease, Viral Haemorrhagic Disease (VHD), spread to rabbits by fleas and first described from China. Again, in Australia, experiments with the disease escaped the laboratory and started killing the survivors of myxomatosis. Using fleas to kill rabbits became legal in Australia after the fact. These technologies were illegal in New Zealand, but angry farmers spread the disease there anyway. Meanwhile, French hunters, anxious to save rabbits, developed genetically modified viruses, also spread by fleas, that can protect rabbits from the disease. Naturally acquired immunity, too, gains ground.

Ricocheting across continents, all these viruses, diseases, and forms of science and politics become threads of connection and even terrains of life in common. The bioregion of European rabbits and their diseases is extensive but fragmented. New connective ties are forged constantly, even as ecological relations, laws, rebellions, and everyday practices draw varied regions in different directions. Potatoes and mitten crabs participate in these same kinds of spatial relations, carried from here to there. They develop new social and ecological relations in place. They are sent back home with new effects. The Anthropocene is like this, full of ever-extending connections but also diverging ecologies and social worlds. Furthermore, the connections need not gather places that are near each other. They can cross oceans and, even on land, skip this place to hop to that one. The ensuing patches form a crumpled planetary geography.

Telling stories of humble creatures

Rabbits, crabs, potatoes, and moles? Most of the animal stories we hear are either about pets or charismatic wild animals such as polar bears and dolphins. In the past few decades, we've also, surprisingly, begun to hear about much smaller beings, especially microscopic fungi and bacteria, which have become a new kind of heroic protagonist. Biologists have recently asserted that all life depends on interspecies relationships and particularly relations between multispecies organisms and the microscopic beings that live with and inside us. Most big organisms,

like ourselves, are entwined with tiny symbionts, which allow us to develop, thrive, and reproduce (Gilbert, Sapp, and Tauber 2012).

Somewhere between the polar bear and the bacterium, there are humble yet easily known creatures such as moles, rabbits, crabs, and potatoes. We can see them and interact directly with them. We don't need special equipment and training to know they are there. They are part of our daily lives even if we forget to notice them. Most of the time, they don't make a dramatic splash. Indeed, all these organisms are creatures of the dirt and mud; even potatoes are found underground. They are hardly the kinds of organisms that we grew up learning to admire. And yet, they are representatives of the many kinds of hardly noticed life around us.

This set of papers argues that we need to listen to stories of these humble creatures as we re-examine the world around us. They are world-makers together with our human friends and neighbours. We might re-imagine community and history with them inside. There is no need to romanticise them, however. Often enough, they thwart our best-laid plans. They sometimes become dangerous threats against Holocene modes of life; they hasten and spread the dangers of the Anthropocene. Yet, even as antagonists, we need to get to know them. They are our 'people' in a broad sense of that term. Entranced by the vividness and variety of their lessons, we affirm our common sociality.

Competing Interests

The author has no competing interests to declare.

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