
Satellite Planetary and the Ends of the Earth

Elizabeth DeLoughrey

*Control of space will be decided in the next decade.
If the Soviets control space they can control earth, as in
past centuries the nation that controlled the seas dominated
the continents.*

—John F. Kennedy, 1960

*The view from a satellite makes possible a Copernican
revolution in outlook. . . . Ever since the early sixties
an inverted astronomy has thus come into being, looking
down from space onto the earth rather than from the
ground up into the skies.*

—Peter Sloterdijk, 1990

While I was preparing this essay, the space shuttle *Endeavour* flew over my home, completing what the media referred to as a “victory lap” around Los Angeles to cheering crowds. The house shook in response to the force of the low-flying Boeing 747 that carried the five-story, seventy-five-ton spacecraft over the city and was escorted by two F-35 Lightning II military jets (Feldman and Kelsey 2012). As a scholar working on the legacies of the Cold War, including the radioactive ones that we carry in our bodies, I felt a profound sense of ambivalence. On the one hand, the shuttle’s voyage around California celebrated the military-industrial complex, US victory in the Cold War, and the ongoing militarization of space. As many spectators attested, the *Endeavour*

invoked feelings of nostalgia for the Cold War era and national pride. There was no public critique except some discontent over the felling of nearly four hundred trees to allow the shuttle to be towed overland to the California Science Center. On the other hand, the sense of community shared by the jubilant viewers—and the feeling of awe as it flew over my own home—testify to the power of identifying with a vessel imbued with narratives of technology and progress that connect one to a national community and to an outer space that is literally outside our own orbit. Although we cannot, technically speaking, see outer space, the space shuttle itself functions as its metonym; witnessing this vessel fly in California’s troposphere (the lowest region of the atmosphere) allows the spectator to participate in the making of an extraterritorial imagination. This suggests that vessels and visuality are vital to imagining and territorializing outer space. Accordingly, the planners of this event had a clear sense of the spectacular—images of the *Endeavour* circling the Hollywood sign, Griffith Observatory, and, in San Francisco, the Golden Gate Bridge quickly appeared online and in print, along with observers’ expressions of excitement at participating in the shuttle’s homecoming and of nostalgia for the passing of a bygone era. This widely circulated photograph (see fig. 1), of the *Endeavour* flying past the Hollywood sign with a military escort, encapsulates its spectacular visual and cinematic effects as well as its Cold War legacies.

The US space shuttle *Endeavour* maintains a British spelling because it was named after Captain James Cook’s famous ship, a vessel that, in circumnavigating the globe, represented Enlightenment science, national pride, and the expansion of an earlier empire into extraterritorial space. In fact, one could say that both vessels symbolize an empire’s use of narratives of technological progress to expand toward the “ends of the earth” in ways that naturalize dominance over the global commons such as the high seas and outer space.¹ Navigating the HMS *Endeavour*, Cook claimed indigenous Pacific lands for Britain while under orders to discover and claim the famed southern continent, Terra Australis Incognita—what eighteenth-century Europeans imagined to be the ends of the earth. Cook’s second navigation of the Pacific determined that Terra Australis was not the antipodean land fancied by the ancients but frozen seas and ice, later determined to be the continent of Antarctica.² As the epigraph from John F. Kennedy

1. For more on the global commons, see Buck 1998.

2. Terra Australis had long been sought by voyagers and was a “bipolar” discursive configuration of barren, brutal savagery or bountiful and receptive islanders (Eisler 1995: 2). Cook was unable to navigate through the frozen seas to determine if there was a continent.



Figure 1 *Endeavour* flying over the Hollywood sign. Mike Blake / Reuters / Landov

suggests, control of the global commons has shifted in terms of scale. If in past centuries those who controlled the seas controlled the continents, in the Cold War era and beyond the control of outer space is understood to be vital to the control of the planet. The US *Endeavour* represents the twentieth century's territorial expansion of empire, not to the ends of the earth per se but to the end of the earth's field of gravity. Whereas the *Endeavour* was launched and coordinated by the National Aeronautics and Space Administration (NASA), previous space shuttles, such as *Columbia*, *Challenger*, *Discovery*, and *Atlantis*, were used for Department of Defense missions, with the aim of the space shuttle program being to secure, maintain, and develop the technology essential to the operation of the US military, namely, surveillance and communication satellites (see Reed and Norris 1980; Morgan 1994; Day 2000).

The nostalgia and fanfare demonstrated by many Americans toward the *Endeavour* suggests the need for a national vessel to visualize beyond the limits

of what Hannah Arendt (2007 [1963]: 48) referred to in her work on the “conquest of space” as the “common-sense experiences of earthbound creatures.” It also reflects a long Cold War history in which militarization and empire were naturalized by appeals to the progress of science. As the Pentagon declared in 1961, the “environment in which the Army, Navy, Air Force, and Marine Corps will operate covers the entire globe and extends from the depths of the ocean to the far reaches of interplanetary space” (quoted in Doel 2003: 657). This *extra-terrestrial* military expansion was counter to a simultaneous international movement to remap the global commons in terms of a “peaceful purpose” evident in the United Nations Convention on the Law of the Sea, launched in 1958, the Antarctic Treaty of 1959, and the Outer Space Treaty of 1967. While environmental studies has generally focused on national topographies, my concern in this essay is how visualizing the planetary environment is tied closely to, and perhaps made possible by, tropes of the extraterrestrial. Mapping these “outer spaces”—*terrae incognitae*—within and outside the earth has been key to our modern understanding of the planet and to visualizing the global environment.

Extraterritorial spaces, such as the high seas, Antarctica, and outer space, are imaginatively, historically, and juridically interconnected. Their international legal regimes are derived from the concept of the “peaceful” global commons as it developed in the midst of the Cold War, which was defined by the superpowers as nonaggressive rather than nonmilitarized.³ The Antarctic Treaty, catalyzed by the 1950s scramble for the southern continent, declared that the region “shall be used for peaceful purposes only,” a concept derived from the Law of the Sea and subsequently adopted for the 1967 Outer Space Treaty (Maogoto 2006). The development of these international regimes for spaces outside the territory of nation-states and beyond the normative inhabitable zones of the human species deserves some theorization. To that end I want to turn specifically to the visual and spatial logic of rendering outer space and build upon Caren Kaplan’s (2006: 400) attention to “aerial space as an historicized zone—a space in the world that is connected to the earth and yet apart.” Modern modes of imagining and visualizing the earth are tied to these mappings and histories of this concept of outer space. Because extraterritorial spaces cannot be fully inhabited, we rely on their visual, specifically photographic representations by satellite and other vessels to produce what Martin Jay (1988: 4) refers to as one of many “scopic regimes of modernity.”⁴

3. On contested definitions of peaceful purpose, see Morgan 1994 and Gonzales 1999.

4. For more on scopic regimes and a theory of countervisuality, see Mirzoeff 2011.

Visualizing the Globe

While there is an enormous body of work examining how we visualize the totality of the planet,⁵ it has not engaged extensively with how these concepts are closely tied to Cold War militarism and its scopic regimes, from the era of *Sputnik* to the satellites that document global climate change in the ice shelf collapse at the poles. According to Wolfgang Sachs (1999: 116), “Satellites equipped with sensors are veritable heavenly spies, scanning the earth’s surface so as to gather information hidden even from people on the ground. That process links a synoptic view with probing,” yet it’s this very probing that led to some of the most important ecological discoveries, such as the depletion of the ozone layer and the collapse of ice shelves at the poles. Oddly, the rise of globalization studies, with its emphasis on neoliberal flows, has not contributed all that much to our understanding of the histories of colonialism and militarism that are key to how we map and visualize the globe and the concept of planet as biosphere. As Tarak Barkawi (2004: 155) observes, “In focusing on global flows . . . globalization studies lost sight of war. Implicitly, war here is misconceived as a breakdown of communication and interchange, rather than as an occasion for circulation.”

Of course, modern ways of imagining the earth as a totality, including those spaces claimed for militarism and globalization, derive from colonial histories of spatial enclosure. Denis Cosgrove (2001: 220) points to the Enlightenment era’s encirclement of the globe through Cook’s circumnavigation of the seas, which allowed for colonial claims to expand to a planetary scale. This is evidenced in the nineteenth-century aphorism that the sun never set on the British Empire, a harnessing of the sun as a satellite to a colonial geocentrism. This circumnavigation in turn led to other modes of encirclement, such as the laying of transoceanic cables and the establishment of Greenwich mean time as a world standard, which are direct legacies of colonial maritime technologies.⁶ With the establishment of the standardizing grids of longitude, this encirclement is both a spatial claim to the planet and a temporal one, in that it plots time from a British center. Cosgrove (2001: 217) connects this mode of encircling globalism to a more recent form of Cold War militarism in the “axial advance” to the poles, which gave the superpowers a sense of “global mastery.” I would like to position this Cold War legacy as also a part of a longer colonial history of extraterritorial militarism and encirclement symbolized by the launching of *Sputnik* in October 1957 and *Explorer*

5. For an important discussion about the epistemological differences and colonial claims rendered by the terms *sphere* and *globe*, see Ingold 1993.

6. For a larger discussion about transatlantic colonialism, maritime technologies, and the territorialism of the seas, see DeLoughrey 2007.

four months later. In the memorable words of Marshall McLuhan (1974: 49), “For the first time the natural world was completely enclosed in a man-made container. At the moment that the earth went inside this new artifact, Nature ended and Ecology was born.”

While much has been written about the ways that extraterritorial images of the earth have catalyzed the age of ecology, only a few have connected this environmental consciousness of the planetary biosphere to the history of Cold War militarism.⁷ The first photograph of the earth from outer space was taken by a V-2 rocket shot from the White Sands Missile Range in New Mexico in 1946 (Cosgrove and Fox 2010). Photography of the earth from outer space then greatly expanded with the first satellite photographs taken in 1959 by *Explorer 6*, a satellite operated by NASA that was collecting nuclear radiation data produced by the Department of Defense’s Operation ARGUS in 1958. The following year additional (covert) photographs of the earth were captured by the US military’s top-secret CORONA satellites, which were spying on Russia, Asia, and the poles (Day 2000; Cloud 2001; Doel 2003; Masco 2012). Due to the rise of scopic regimes produced by the Cold War and the inaccessibility of extraterrestrial and extraterritorial spaces of the high seas, poles, and outer space, we rely on visual evidence to look back at the planet from the ends of the earth’s atmosphere. “To imagine the earth as a globe is essentially a visual act,” Cosgrove (2001: 15) argues, and that image, tied to US militarism, is said to produce an Apollonian eye, one that is “synoptic and omniscient, intellectually detached” (2).⁸

Much has been written about how the *Apollo* images of the earth, *Earthrise* in 1968 (fig. 2) and *The Blue Marble* in 1972 (fig. 3), have catalyzed a new understanding of the fragility of the planet and the sense of a globally connected environment, but with a few exceptions they have not been tied closely to a particular kind of global consciousness derived from militarism in the Cold War.⁹ Cosgrove (2001) has convincingly argued that a global view grew out of the aerial perspective of military aircraft and that the new mastering form of vision that arose from the disembodied aviator was central to Cold War discourse. While the *Apollo* space mission photographs were certainly influential, they were part of a context in which *National Geographic* and other popular US magazines used wartime cartography in ways that naturalized militarism and empire under the guise of

7. Notable attempts to theorize war and ecology include Worster 1977; Sachs 1999; Masco 2010, 2012; DeLoughrey 2009; and Marzec 2013.

8. See also Haraway (1991: 581) on “the god trick.”

9. For more on these images and their environmental influences, see Sachs 1999; Cosgrove 2001; Garrard 2004; Heise 2008; Poole 2008; and Lazier 2011.



Figure 2 *Earthrise*



Figure 3 *The Blue Marble*

a unifying view of the globe.¹⁰ Aerial military technologies in turn catalyzed American initiatives to expand the reach of commercial aviation through air-space treaties; a rise in concepts of global connectivity followed, epitomized in the branding of airlines like Trans World Airways (Cosgrove 2001: 245). Thus “global thinking was explicitly connected to air travel” (ibid.: 255), which began with the airplane and culminated in the astronaut’s and satellite’s gaze. In contrast to the limited human vision of the astronaut, “satellite eyes are omnipresent and omniscient” (Sachs 1999: 115), producing what Peter Sloterdijk describes in the epigraph above as an “inverted astronomy” (quoted in ibid.: 110). Of course, while the *Apollo* pictures of the earth have been used in countless advertisements about an environmentally connected consciousness and a sense of globalism, *The Blue Marble* is not necessarily a *global* image but an American image *of* the globe. Moreover, both iconic images prominently feature our most extraterritorial continent (Jasanoff 2001: 330), an Antarctica that, I argue, has figured largely as a proxy for outer space.

10. As Tim Ingold (1993: 38) observes in his discussion of how classroom globes map territory, “The image of the world as a globe is . . . a colonial one.” See also Adey 2010 and Olwig 2011.

Our modes of seeing have long been informed by what Paul Virilio (1989: 79) refers to as “cinematic derealization,” an experience of detachment first theorized by Ernst Jünger (1989: 207), who in the 1930s wrote about how technologies of vision produce a “colder,” “second consciousness” that emotionally distances the viewer from the self and the object of vision. This discourse and concern about militarism and the technologies of detachment were further developed through Cold War images of nuclearization. US popular magazines repeatedly depicted the destructive effects of nuclear detonations on actual cities (Hiroshima) and anticipated targets (New York) from “an Olympian distance,” using an overhead gaze looking down upon the detonation as if it were a “distant astronomical event” (Weart 1988: 237).¹¹ While environmentalists have tended to embrace the extraterrestrial vision of a vulnerable planet, philosophers have been wary of the “second consciousness” enabled by this Apollonian eye. Famously, Martin Heidegger (1990 [1966]: 55–56) was disturbed by the photographs of the earth taken by satellite and argued that “we don’t need an atom bomb at all; the uprooting of human beings is already taking place.” He concluded, “We only have purely technological conditions left. It is no longer an earth on which human beings live today,” because “the uprooting of human beings which is going on now is the end if thinking and poetry do not acquire nonviolent power again.”¹² The technologies of militarized modernity contribute to this sense of detachment from the earth, leading to an extraterritorial vision with distinct epistemological and ontological effects. Arendt, Michel Serres, Dipesh Chakrabarty, and others have theorized the ways that the technologies of artificial satellites (Arendt) and the recognition of anthropogenic climate change (Serres, Chakrabarty) have contributed to an experience of the world that is *unheimlich*, or unhomely, an experience that I would like to tie more concretely to the technologies and legacies of satellite vision.

This sense of being both connected to the earth and yet apart informs what Gayatri Chakravorty Spivak terms “planetarity,” a mode of interpreting the world that does not reduce it to the homogenizing reach of globalization, including its military forms, and recognizes its uncanny difference. In demarcating between “global agents” and “planetary subjects,” Spivak (2003: 72) shifts from the technicity feared by Heidegger toward a more ecological mode of theorizing the planet as a form “of alterity.” This mode of reading resists “immediate comprehensibility by the ideological average” (Spivak 2003: 71), a resistance with disciplinary as

11. See, by contrast, Akira Mizuta Lippit’s (2005) argument that the atomic era and specifically the bombings of Hiroshima and Nagasaki destroyed the Enlightenment visual order.

12. For a far more extensive reading of Heidegger in this regard, particularly in relation to Hans Blumenberg’s theory of “aesthetics,” see Lazier 2011.

well as spatial implications. While we may metaphorize our sense of “outer and inner space,” or human and nonhuman being, we must educate ourselves to recognize that space is neither “continuous with us” nor “specifically discontinuous” (Spivak 2003: 73). To begin to understand a planet that is not overwritten by the militarism of the satellite gaze or the techno-fixes of climate change, embracing the contradictions of alterity and the limits of human knowledge is necessary. “Planet thought” addresses the complexities of totalizing models (of the planet) that do not reduce the earth to transparency under an Apollonian eye. This turn to rendering the planet *unheimlich* has garnered criticism. Djelal Kadir (2006: 71) warns that Spivak’s validation of the planetary potential for reading comparative literature overlooks a “planet whose every inch is already platted on universal global positioning systems, whose interplanetary space is thoroughly weaponized, and whose planetarity, rather than ‘undivided “natural” space,’ is already naturalized into martial containment.” However, I think that Spivak’s theory of planetarity is an attempt not to overlook the technicity of militarism but rather to refuse to let it overwrite the possibilities for analysis and critique. Like Heidegger she emphasizes a critical method of “thinking poetry,” an aesthetics of alterity particularly suited to literary reading.

In this essay I would like to bring together Cosgrove’s theory of an Apollonian vision of the globe, which foregrounds the histories of colonial and military encirclement, with Spivak’s method of “planet thought,” which acknowledges the function of alterity. Thus what I am calling “satellite planetarity” is a vision of the globe that arose after the development of artificial satellite imagery, a product of the Cold War space race, which also produces an understanding of the planet as alterity in which human vision is both connected to and disconnected from the earth. This might be tied to Gerhard Richter’s (2007: 112) gloss on Siegfried Krauer’s concept of extraterritoriality: “depart[ing] from territory as a space and as an idea while still remaining deeply attached to it . . . attached to it precisely in the act of departing from it.”¹³ Elsewhere I have explored the implications of Spivak’s model of planetarity, in a reading of James George’s 2006 *Ocean Roads*, a New Zealand novel that tells the story of an Apollonian global militarism through the uncanny trope of light, structured around forms of radiation like nuclear fallout, photography, cinema, and radiotherapy (DeLoughrey 2009). *Ocean Roads* suggests that the primary way we understand the environment and its relationship to modernity is through the vehicle of light, even if that vehicle often exceeds the

13. Jennifer Fay (2011) helpfully recasts this concept of extraterritoriality as a frame for how the visual representations of Antarctica might produce “cold love.”

limits of representation and comprehension. In his depiction of how Cold War militarism produces radiation ecologies, George depicts an ecological relationship to place that is made possible by light in both local and planetary terms, foregrounding its alterity. Inscribing the wars of light poses particular narrative challenges: George structures his novel around flashes and flashpoints of Cold War history, such as the wartime photographs of one of his central characters, rather than employ chronological or linear narration. He presses the boundaries of narrative convention, creating radical disjunctures in space and time to narrate the visual legacies of Pacific nuclearization. His mapping of Pacific militarism ranges from white settler colonialism of the American West, figured through the work of the Manhattan Project at Los Alamos, to the atomic bombings of Japan, and places characters at Pearl Harbor, in Nagasaki, at the Bikini Atoll, and in Saigon during and after the Vietnam War. George gives unexpectedly prominent textual space to Antarctica in his mapping of the militarized Pacific, suggesting the ways polar geography—literally the ends of the earth—is vital to how we *visualize* the planet in terms of space and time. The novel's mapping of the Pacific, because it is produced by Cold War militarism and the uncanniness of desert Antarctica, suggests that satellite planetarity is a complex narrative legacy of modernity. The Cold War helped produce globalizing narratives of “one world” against nuclearization as well as apocalyptic fears about the end of the earth, and these concerns are given geographic shape at the poles. George's novel calls attention to how the scientific underpinnings of US militarism catalyzed—and continue to produce—our detached visualizations of an ecological globe but also suggests, as I explain below, that the representational process enables a radical merger and attachment.

Antarctica: The Extraterritorial Earth

Ocean Roads maps the process of Cold War militarism in a way that, to borrow from Barkawi (2004: 156), “theorize[s] war as a pervasive and historically significant form of international interconnectedness, as a *globalizing force*.” The protagonist, Isaac Simeon, a British physicist who is employed by the Manhattan Project and helped design the first plutonium weapon, travels from Los Alamos Laboratories and the Trinity site to Nagasaki to witness the aftermath of the atomic attack, while his Maori photographer-wife travels through the Vietnam War and then to military memorial sites such as the Pearl Harbor and Trinity monuments. The space given textual prominence for the mapping of global militarism is Antarctica, a place where Isaac has a mental breakdown that leads to his institutionalization in 1959, the same year the first images of the planet are taken from a US satellite in outer space. In militarized Antarctica, where “the

only green for a couple of thousand miles is that of military fatigues” (George 2006: 65), he determines, “I spent a decade there without even knowing it. Every empty mile, every breath of graveyard wind had my name on it. A name like mine, arrogance like mine. I just never realised it until I stood on it, set my foot with my flesh instead of my mind, my imagination” (ibid.: 342). In wandering in the Antarctic desert he finds “phantom footprints” and an uncanny silence that replicate his experience in visiting postatomic Nagasaki (ibid.: 66). It’s curious that of all the military landscapes he has mapped, George turns to Antarctica to set the scene for his protagonist’s realization of his complicity in nuclear violence, an awareness that literally renders him speechless for over a decade. In that sense he is much like Victor Frankenstein, traveling to the polar ends of the earth to comprehend the ethical implications of scientific instrumentality. It is significant that George positions one of the major climax points of the novel here, articulated retrospectively and at a distance from the significantly named “Iris” asylum in New Zealand. Antarctica thus exceeds the appearance in the novel of the *Apollo* space mission to the moon, which produced, as one character observes, a vision of detachment known as “astronaut’s eyes.”¹⁴

While we might find the Antarctic setting surprising for a Cold War novel, New Zealand has a particular relationship to the South Pole due to both proximity and history, hosting more Antarctic museums than any other country in the world as well as a federally funded artists’ residency program (Roberts 2008). As early as 1956, artists, particularly photographers, accompanied the New Zealand Defense Force to the world’s only uninhabited continent. As an extraterritorial space, Antarctica is “a challenge to representation” (Fay 2011: 295), particularly narrative. In terms of both territorial claims and the aesthetics of alterity, “more than for any other place on earth, visual mediation defines and has created the territory of Antarctica” (Glasberg 2012: xix). With the discovery of the Antarctic ozone hole in 1985 and the satellite images that documented the collapse of the Larsen B ice shelf in 2002, the southern continent has become more visible in terms of its signification of global climate change and increasingly an object for aesthetic scrutiny, documentation, and imagination, catalyzing an unprecedented rise in films, literature, and artistic engagements with Antarctica.¹⁵

14. His wife recognizes this vision of detachment in her sharpshooting son, Troy, who has a gaze that “always inhabited a different orbit, a distant orbit” (George 2006: 112; DeLoughrey 2009). His Apollonian view of detachment is later complicated by Isaac’s experience of a planetary vision in Antarctica.

15. Some of the earliest anthologies arose from New Zealand. See Manhire 2004; Kolbert and Spufford 2007; *Encounters at the End of the World* (dir. Werner Herzog; 2007); Griffiths 2007; Glasberg 2012.

To understand George's narrative decision to figure Antarctica as an extra-terrestrial space we might consider how this continent represents the limits of human habitation on earth and a space of the planet's alterity. Its climate makes it extremely disorienting, epitomized by the fact that the magnetic South Pole is not fixed—it wanders based on the changes in the earth's magnetic field and polar drift (Roberts 2008). In the novel Antarctica is described as a place of "endless twilight" (George 2006: 336), a desert where there has been no rain in a million years (66), where "'even the ash from burned human excrement lasts forever'" (336). In addition to its spatial alterity, in Antarctica human concepts of time are extended and distorted; in fact, due to its lack of a twenty-four-hour cycle of day and night (each lasts six months), the seventh continent does not subscribe to Greenwich mean time. Antarctica, Isaac concludes, is extraterrestrial: "I might as well have been on Mars" (336). Thus it is, like planetarity, an uncanny place of our earth home and also a place of not belonging, a profound lack of embedded or place-based consciousness. This sense of disembeddedness is not derived from a Heideggerian critique of technicity alone. As Stephen Pyne (2007: 147) observes, Antarctica's isolation from the rest of the continents and its uncanny "abiotic, acultural, [and] alien" features liken it to extraterrestrial spaces such as the deep seas and outer space.

Isaac is not the only one to interpellate the poles as extraterrestrial—NASA used the Antarctic Dry Valleys (depicted in the novel) as testing areas for its Mars space probes (May 1988). These tests were preceded by the US military's Operation Highjump, which in 1946–47 stationed thousands of soldiers and scientists in the Antarctic to conduct Cold War exercises in preparation for anticipated Arctic maneuvers against the USSR, establishing US sovereignty through the expansion of research bases. Like Operation Deep Freeze in 1955–56, these Antarctic missions were to determine new mineral sources for atomic energy and were established in a Cold War "race for uranium" (Moore 2004: 21). While some retired officers suggested that the United States "nuke" the ice cap to expose any underlying minerals, by 1955 reports were circulating that Antarctica was being considered as a US-British nuclear testing zone (Moore 2004: 24). As such, the *climatic* ends of the earth provide an uncanny space for thinking through the *temporal* ends of the earth. The alterity of Antarctic space becomes quickly translated into an uncanny experience of time, whether understood in terms of its destabilization of the twenty-four-hour cycle of day and night, rendered as the deep past in ice core testing for the earth's atmospheric chemistry, or envisioned in the futurity of nuclear apocalypse. In an era of climate change, the poles continue to resonate with fears of environmental apocalypse and "remain eschatological ends of the

earth, whence ozone depletion or ice-sheet meltdown threatens life across the globe” (Cosgrove 2001: 220).

Antarctic space-time has long been associated with radical alterity. In the large body of fictional and fantastic literature of Antarctica, people, planes, and even whole civilizations go missing and are rediscovered; the continent is often depicted through Cold War themes of militarism, hypermasculinity, espionage, aliens, radiation, and uranium mining.¹⁶ Many narratives emphasize megafauna and the deep time of the icy landscape or, as Pyne (2007: 148) observes, construct an interior moral conflict, given the absence of any settled human population amid the enormity of polar space. Fittingly, the alterity and deep time of the ice catalyze the disorientation of George’s protagonist, and Isaac becomes lost in the polar landscape. In a panic “he begins to run, knowing that his tiny figure is covering in seconds what the glacier covers in a century,” and he then sleeps, dreaming of houses “far below, like a Lilliput landscape” (George 2006: 338). George attributes an aerial view to his protagonist in his moment of crisis; Isaac becomes detached from his own human scale, imagining himself from above even as he becomes subject to the immensity and alterity of Antarctica. There he dreams of the lights of a city below and of himself as the plutonium-239 implosion bomb that he created, the “Fat Man” dropped on Nagasaki in 1945. The anthropomorphizing of these weapons of mass destruction (“Little Boy” was dropped on Hiroshima) allows Isaac to merge with the other whom he has created, to set “foot with [his] flesh instead of [his] mind” (342). This merger destabilizes the Apollonian gaze and the disembedding caused by technicity. Hence he describes a dream in which the B-52 bomber’s doors open and he “slip[s] away,” his head and body, “encased in their metal sarcophagus,” representing “two separate nuclear weapons” (339). It is in this fusion process that he explains, “I have begun.”

In the increasing heat, pressure, and process of becoming an exploding plutonium weapon dropping onto an unaware city, Isaac shifts from atomic vision to that of a satellite. He imagines a second, extraterrestrial gaze: “Someone shadowing my flight might glimpse my skin buckling, cracking, the first rip sending searing light into the last picoseconds of blue sky” (340). I have mentioned that Cold War fears of nuclear attack produced a popular weapon’s-eye view of an unaware city (parodied in films such as *Dr. Strangelove* [dir. Stanley Kubrick; 1964]). In George’s novel, his protagonist shifts from the tropospheric viewpoint of the atomic bomb to an upper-atmospheric gaze. The introduced gaze of a satellite, like an omniscient narrator, suggests that while there may be scales of vision, this

16. See the annotated bibliography of texts in Kay 2012.

viewpoint of the globe cannot be obtained outside the technologies of militarism. This moment in the text is interesting because Isaac experiences this dream just after the launching of the first artificial satellites jettisoned by the International Geophysical Year (IGY), a project that took place in 1957–58 and was vital to creating new scientific and juridical models of the extraterritorial spaces of the deep seas, outer space, and Antarctica.

To sum up, *Ocean Roads* inscribes satellite planetarity, a rendering of both military surveillance and earthly alterity, through forms of radiation such as light, photography, and nuclear fallout. Consequently, we see Isaac merging into the explosive atomic force that he has created, suggesting the violent dissolution of his self, a merger with a global environment that is now suffused with military radiation. The scene suggests Kracauer's "extraterritoriality," an attachment to territory created by departure from it (Richter 2007: 112), a concept that Jennifer Fay (2011: 315) has argued is integral to creating a meaningful relationship to Antarctica and the planet. This simultaneous connection and disconnection becomes evident in Isaac's first-person narrative. To narrate his merger with the weapon Isaac must invoke an Apollonian or extraterritorial view, and, accordingly, his own narrative voice becomes detached, omniscient. The merger with that weapon of alterity, a nuclear weapon, is not in Isaac's dream a merger with the environment. Instead, it is substituted by the satellite eyes of detachment. While a nuclear weapon at detonation will violently merge with its environment even as it destroys it, Isaac maintains his alterity and his aerial vision. He descends to Nagasaki, and his dream concludes as "beneath [him], skin peels, eyeballs melt, bones become liquid" (George 2006: 340). This is a complex narrative decision because this merger would likely have precluded both articulation and accountability for Isaac's being the creator of this plutonium "Fat Man." As someone who refers to himself elsewhere as a "disciple . . . of light" (61), Isaac interprets his dream as suggesting that he is "more a child of the sun than the earth" (340) and thus a sign of both global nuclear militarization (technicity) and planetarity (alterity). Isaac's incorporation of the omniscient eye into his dream ("someone shadowing") reflects a literary shift in incorporating satellite vision, deepening the visual logic of a novel constituted by its engagement with forms of light such as nuclear and medical radiation, fire and napalm, photography and film (DeLoughrey 2009). In George's Antarctica, a militarized "end of the earth" becomes the figure for a postapocalyptic planetarity that renders human time and, given Isaac's breakdown into silence, even articulation (temporarily) impossible.

Geophysical Events and the Ends of the Earth

Isaac's institutionalization occurs in February 1959, shortly after his trip to Antarctica, where likely he was a participant in the 1957–58 IGY, a research project called “a defining moment for twentieth-century globalism” (Cosgrove 2001: 219), in terms of both its geopolitics and its geophysical legacies. Tied as it was to extraterrestrial mapping and conquest, the IGY has been considered as important for the twentieth century as the *Endeavour's* tracking of the transit of Venus was for the eighteenth century (Pyne 2007). The IGY entailed extensive research in Antarctica and resulted in the USSR and the United States launching their first artificial satellites, *Sputnik* in 1957 and *Explorer* in 1958, which commenced the space war. With over sixty thousand scientists from over sixty-five nations, the IGY has been termed the “largest international scientific project of the 20th century” (Doel 2003: 647) and an attempt by biologists, geologists, oceanographers, meteorologists, and others to “triangulate the whole earth” (quoted in Dodds and Collis 2008: 558). While it was deemed at the time remarkable for its international spirit of sharing research objectives during a polarizing cold war, it was closely tied to the state security objectives of the major political powers, enabling the United States and the USSR to secure earth science data and, notably, to use data collected in Antarctica to extend the Cold War into outer space. As such, the assertion that the first Gulf War was the first “space war” might be historicized by turning to the militarization of space catalyzed by the IGY.

George's decision to locate Isaac's dream and the transformation of his character in Antarctica at the tail end of the IGY and the start of the Antarctica Treaty of 1959 suggests that Cold War militarization created another visual logic for mapping the extraterritorial spaces of the planet. The “scramble for the seas” that constituted much of the 1950s was also tied to a “scramble for outer space” as the USSR and the United States rushed to produce both artificial satellites and intercontinental ballistic missiles (ICBMs). In fact, with the extension of coastal sovereignty to twelve miles out to sea (based on the length of a cannon shot), the major military powers also expanded their claims to international airspace (see Kyriakides 1994; Banner 2008; Adey 2010).¹⁷ Between the Law of the Sea, the Antarctic Treaty, and the Outer Space Treaty, the extraterrestrial spaces of the planet were completely territorialized in an unprecedented remapping of the planet.

17. The 1954 *Bravo* test at Bikini Atoll demonstrated the general portability of hydrogen weapons, and thus the US Defense Department gave top priority to developing the significantly named Atlas ICBM series.

The Eisenhower administration and the Department of Energy used the IGY as a cover-up for a series of enormous thermonuclear tests detonated in the ionosphere in 1958 in the South Atlantic seas, where the earth's magnetic field is the lowest (Munday 2012). Called Operation ARGUS after the Greek giant (Argos) (Benson 2012), the many-eyed or all-seeing guardian of Io, the tests ushered in a new era that Joseph Masco (2010: 14) describes as "a period in which the global biosphere was quite literally militarized by the US nuclear state . . . [and] positioned as a comprehensive object of scientific research in the earth, atmospheric, and biological sciences." This detonation of high-altitude weapons, so-called rainbow bombs for the auroral effects they produced around the planet, brought Cold War nuclearization into the ionosphere and initiated radiological warfare experiments in the global atmosphere (Doel 2003). While their purpose was to create an enormous band of radiation over the entire Atlantic that would disrupt the signals of any incoming nuclear missiles from the USSR, the detonation of these 1.7 kiloton nuclear warheads, in addition to the high-altitude tests of Operation Hardtack in 1958, globally distributed nuclear radiation and disrupted, sometimes for weeks, radio and radar communications from Hawai'i to Australia (Munday 2012).¹⁸ The nuclear detonations so irradiated the ionosphere that the USSR pleaded for their cessation out of fear for the health of their astronauts, giving a new level of meaning to what Peter Sloterdijk (2009a, 2009b) refers to as "atmosterrorism," an attack directed not so much at a people but at the very air and atmosphere.

The United States suppressed releasing information about Operation ARGUS to avoid increased international pressure to cease the militarization of outer space. Yet in the years leading up to the 1967 treaty, "outer space achieved the dubious distinction of being the most heavily militarized environment accessible to humans," and as such, the majority of US space launches in the Cold War had military purposes (Vlasic 1991: 45–46), including the *Explorer* satellites that were tracking upper-atmosphere radiation levels from nuclear detonations. The White House referred to Operation ARGUS as "one of the major achievements of the International Geophysical Year" (Munday 2012: 312), because, as a Rand Corporation report explains, "for the first time in history, measurements of a geophysical phenomena on a world-wide scale were being related to a quantitatively known cause—namely, the injection into the earth's magnetic field of a known quantity of electrons of known energies at a known time" (Gonzales 1999: xix).

In other words, what Sloterdijk refers to as "atmosterrorism," the irradiation of

18. See also *Nukes in Space: The Rainbow Bomb* (dir. Peter Kuran; 1999).

the earth's atmosphere, was recognized as an anthropogenic change to the planet. The irradiation of the ionosphere has been termed "the first man-made geophysical event" (Munday 2012: 300), predating by some decades consciousness of climate change. Consequently, US militarism of the atmosphere created a new era of geophysical globalism, ways of mapping the planet (through radiation), and consciousness of the atmosphere itself.

A long history, only recently explored, connects Cold War militarism, the IGY, and our current understanding of climate change. It includes the career of the Dutch atmospheric chemist Paul J. Crutzen, who was awarded the Nobel Prize for his work in discovering the Antarctic ozone hole and more recently became known for his promotion of the term *Anthropocene* (Crutzen 2002) to describe a new era in which humans are functioning as geological agents. Crutzen was also the coauthor of an important Cold War text warning of the dangers of nuclear winter (Crutzen and Birks 1982), connecting atmospheric science to the "common-sense experiences of earthbound creatures," to borrow again from Arendt (2007 [1963]: 48). Concerns about the atmosphere and its impacts on earth were first catalyzed by the fallout from the 1954 *Bravo* explosion at Bikini Atoll, which distributed militarized radiation across space and time that is carried in the bones and teeth of subsequent generations on earth (Caufield 1988). Four years later, the ARGUS detonations, combined with the hundreds of atmospheric tests conducted by the United States and the USSR, nearly doubled the atmospheric concentration of radiocarbon by the 1963 Atmospheric Test Ban Treaty (Edwards 2012: 30). The tracking of nuclear-test-derived radioactive carbon 14 in the atmosphere enabled meteorologists to determine that carbon dioxide levels were uniform and consistent and that "excess" radiocarbon from the tests might be tracked in parcels across the atmosphere (Edwards 2012: 30–31). The tracking of fallout led to the discovery of radiocarbon dating, providing new and more accurate models of deep time. Scientists involved in American nuclear testing discovered that the oceans provided a carbon dioxide "sink" and that there were high levels of fossil fuel pollution of the atmosphere (Weart 2007; Edwards 2012). Building on work conducted at Bikini Atoll and for the IGY, scientists determined, as early as 1957, that "human beings are now carrying out a large scale geophysical experiment of a kind that could not have happened in the past nor be reproduced in the future. Within a few centuries we are returning to the atmosphere and oceans the concentrated organic carbon stored in sedimentary rocks over hundreds of millions of years" (Revelle and Suess 1957: 19). Studies of the atmospheric impact of nuclear weapons testing, particularly climate modeling, led to the discovery of the Antarctic ozone hole in 1985 (Edwards 2012: 36), and within three years the

Intergovernmental Panel on Climate Change was founded. In short, our evidence for and understanding of the Anthropocene has been produced by the very military technologies that brought us the Cold War.

Elena Glasberg (2012: xxviii) has argued that every new discovery in Antarctica creates a change in the way we perceive the globe. Thus ancient global maps that surmised the existence of an antipodean continent, *Terra Australis Incognita*, were revised with the discovery of the icescape of Antarctica. The work conducted in Antarctica for the IGY jettisoned new understandings of the earth and atmosphere, as well as new territorial regimes for extraterritorial spaces. The human relationship with these extraterritorial spaces has been driven by fears of the ends of the earth, whether we think of polar ice melting, sea level rise, or the pollution of the atmosphere. The discovery of the ozone hole over Antarctica created a new era of “climate apocalypticism” (Glasberg 2012: xiii) that might be traced back to Cold War fears of an atomic Armageddon. While the satellite mapping of Antarctica (completed only in 2000) led to a unified satellite vision of the globe, that vision was quickly shaken in 2002 when a NASA satellite documented the collapse of the Larsen B ice shelf (Yusoff 2005: 383), an enormous loss of over twelve hundred square miles of ice in just over a month.¹⁹ As such, we turn to the ends of the earth in order to visualize both deep planetary time and climate change as an inevitable future.²⁰

In writing about the collapse of human and natural history created by the Anthropocene, Chakrabarty (2009: 267) observes that “to call ourselves geological agents is to attribute to us a force on the same scale as that released at other times when there has been a mass extinction of species.”²¹ He argues for a new form of “species thinking” that is made possible by consciousness of ourselves as globally connected and geologically determinative agents. This is not phenomenological because, as Chakrabarty (2009: 220) argues, “we humans never experience ourselves as a species. We can only intellectually comprehend or infer the existence of the human species but never experience it as such.” I suggest that this uncanny experience, the experience of ourselves and our planet as a “species of alterity” (Spivak 2003: 72), is historically and epistemologically tied to these extraterritorial spaces that render an anticipation of the “ends of earth.” Moreover, this experience is specifically tied to the legacies of the scopic regimes of Cold War militarism.

19. To view the dramatic satellite images, see Earth Observatory 2002.

20. On visual arts at the poles in an era of climate change, see Bloom and Glasberg 2012 and Giannachi 2012.

21. These observations are developed in Chakrabarty 2012. See also Serres 1995.

Cosgrove (2001: 220) observes that the poles “remain eschatological ends of the earth,” whether through nuclear militarism, ozone depletion, or sea level rise. Through Isaac we see the ends of the earth as an uncanny and destabilizing place for the human subject, an encounter with the planet’s alterity at the same time that it is rendered always subject to technological and military surveillance.²² The 1972 Anti-Ballistic Missile Treaty instituted outer space surveillance by satellite as essential to the international arms control regime, and it remains so today in the ongoing war on that ubiquitous enemy, “terror.”²³ Cold War military planners conceded over thirty years ago that it is “impossible to demilitarize outer space completely” (Reed and Norris 1980: 677). Moreover, sea level rise and ice shelf collapse are leading to new forms of geopolitics, in which the poles are becoming increasingly territorialized in a race for strategic minerals. In a shift from colonial encirclement to a new era of polar advance created by global warming, Great Britain has already put in a claim for Antarctica based on Cook’s 1772 expedition (Glasberg 2012: 5). Turning to satellite planetaryity, we recognize one vital method of planet thought, in which militarism, like environmentalism, is paradoxically continuous and discontinuous to our own attempts to dismantle the homogenizing, geopolitical networks of power in which we are enmeshed.

References

- Adey, Peter. 2010. *Aerial Life: Spaces, Mobilities, Affects*. Malden, MA: Wiley-Blackwell.
- Arendt, Hannah. 2007 [1963]. “The Conquest of Space and the Stature of Man.” *New Atlantis*, no. 18: 43–55.
- Banner, Stuart. 2008. *Who Owns the Sky? The Struggle to Control Airspace from the Wright Brothers On*. Cambridge, MA: Harvard University Press.
- Barkawi, Tarak. 2004. “Connection and Constitution: Locating War and Culture in Globalization Studies.” *Globalizations* 1, no. 2: 155–70.

22. These experiences are gendered. Cosgrove (2001: 217) writes, “Devoid of disturbing human presence, [the poles] were silent stages for the performance of white manhood.” See also Glasberg 2012. On the current territorialism of Antarctica, see Dodds 2006.

23. In recent years the militarization of space has expanded—under President George W. Bush the United States withdrew from the thirty-year Anti-Ballistic Missile Treaty, declared that space warfare is inevitable, and refused to sign the Outer Space Treaty, which designates space a “peaceful” global commons. Steadily, the planet’s outer space has become weaponized, expanding the satellites that are vital to contemporary military operations. Bush’s defense secretary, Donald Rumsfeld, declared that the militarization of outer space was integral to the US economy and self-defense in order to protect the country from what he called a “Space Pearl Harbor” (Maogoto 2006: 14).

- Benson, Etienne. 2012. "One Infrastructure, Many Global Visions: The Commercialization and Diversification of Argos, a Satellite-Based Environmental Surveillance System." *Social Studies of Science* 42, no. 6: 843–68.
- Bloom, Lisa E., and Elena Glasberg. 2012. "Disappearing Ice and Missing Data: Climate Change in the Visual Culture of the Polar Regions." In *Far Field: Digital Culture, Climate Change, and the Poles*, edited by Jane D. Marsching and Andrea Polli, 117–42. Chicago: Intellect.
- Buck, Susan J. 1998. *The Global Commons: An Introduction*. Washington, DC: Island.
- Caufield, Catherine. 1988. *Multiple Exposures: Chronicles of the Radiation Age*. Toronto: Stoddart.
- Chakrabarty, Dipesh. 2009. "The Climate of History: Four Theses." *Critical Inquiry* 35, no. 2: 197–222.
- . 2012. "Postcolonial Studies and the Challenge of Climate Change." *New Literary History* 43, no. 1: 1–18.
- Cloud, John. 2001. "Hidden in Plain Sight: The CORONA Reconnaissance Satellite Programme and Clandestine Cold War Science." *Annals of Science* 58, no. 2: 203–9.
- Cosgrove, Denis. 2001. *Apollo's Eye: A Cartographic Genealogy of the Earth in the Western Imagination*. Baltimore: Johns Hopkins University Press.
- Cosgrove, Denis, and William L. Fox. 2010. *Photography and Flight*. London: Reaktion Books.
- Crutzen, Paul J. 2002. "Geology of Mankind: The Anthropocene." *Nature* 415, no. 6867: 23.
- Crutzen, Paul J., and John W. Birks. 1982. "The Atmosphere after a Nuclear War: Twilight at Noon." *Ambio* 11, nos. 2–3: 114–25.
- Day, Dwayne. 2000. "Cover Stories and Hidden Agendas: Early American Space and National Security Policy." In *Reconsidering Sputnik: Forty Years since the Soviet Satellite*, edited by Roger D. Lanius, John M. Logsdon, and Robert W. Smith, 161–96. London: Routledge.
- DeLoughrey, Elizabeth. 2007. *Routes and Roots: Navigating Caribbean and Pacific Island Literatures*. Honolulu: University of Hawai'i Press.
- . 2009. "Radiation Ecologies and the Wars of Light." *Modern Fiction Studies* 55, no. 3: 468–98.
- Djelal, Kadir. 2006. "Comparative Literature in an Age of Terrorism." In *Comparative Literature in an Age of Globalization*, edited by Haun Saussy, 68–77. Baltimore: Johns Hopkins University Press.

- Dodds, Klaus. 2006. "Post-colonial Antarctica: An Emerging Engagement." *Polar Record* 42, no. 1: 59–70.
- Dodds, Klaus, and Christy Collis. 2008. "Assault on the Unknown: The Historical and Political Geographies of the International Geophysical Year (1957–8)." *Journal of Historical Geography* 34, no. 4: 555–73.
- Doel, Ronald E. 2003. "Constituting the Postwar Earth Sciences: The Military's Influence on the Environmental Sciences in the USA after 1945." *Social Studies of Science* 33, no. 5: 635–66.
- Earth Observatory. 2002. "Collapse of the Larsen-B Ice Shelf." February 23. earthobservatory.nasa.gov/Features/WorldOfChange/larsenb.php.
- Edwards, Paul N. 2012. "Entangled Histories: Climate Science and Nuclear Weapons Research." *Bulletin of the Atomic Scientists* 68, no. 4: 28–40.
- Eisler, William. 1995. *The Furthest Shore: Images of Terra Australis from the Middle Ages to Captain Cook*. Cambridge: Cambridge University Press.
- Fay, Jennifer. 2011. "Antarctica and Siegfried Kracauer's Cold Love." *Discourse* 33, no. 3: 291–321.
- Feldman, Dana, and Eric Kelsey. 2012. "Space Shuttle Endeavour Home in Los Angeles after Final Flight." Reuters, September 21. www.reuters.com/article/2012/09/21/us-space-shuttle-idUSBRE88F0C520120921.
- Garrard, Greg. 2004. *Ecocriticism*. New York: Routledge.
- George, James. 2006. *Ocean Roads*. Wellington, NZ: Huia Press.
- Giannachi, Gabriella. 2012. "Representing, Performing, and Mitigating Climate Change in Contemporary Art Practice." *Leonardo* 45, no. 2: 124–31.
- Glasberg, Elena. 2012. *Antarctica as Cultural Critique: The Gendered Politics of Scientific Exploration and Climate Change*. New York: Palgrave Macmillan.
- Gonzales, Daniel. 1999. *The Changing Role of the Military in Space*. Santa Monica, CA: Rand.
- Griffiths, Tom. 2007. *Slicing the Silence: Voyaging to Antarctica*. Cambridge, MA: Harvard University Press.
- Haraway, Donna J. 1991. *Simians, Cyborgs, and Women: The Reinvention of Nature*. London: Free Association Books.
- Heidegger, Martin. 1990. "Der Spiegel Interview with Martin Heidegger" (1966). Translated by Lisa Harries and Joachim Neugroschel. In *Martin Heidegger and National Socialism: Questions and Answers*, edited by Günther Neske and Emil Kettering, 41–66. New York: Paragon House.
- Heise, Ursula K. 2008. *Sense of Place and Sense of Planet: The Environmental Imagination of the Global*. New York: Oxford University Press.

- Ingold, Tim. 1993. "Globes and Spheres: The Topology of Environmentalism." In *Environmentalism: The View from Anthropology*, edited by Kay Milton, 31–42. New York: Routledge.
- Jasanoff, Sheila. 2001. "Image and Imagination: The Formation of Global Environmental Consciousness." In *Changing the Atmosphere: Expert Knowledge and Environmental Governance*, edited by Clark A. Miller and Paul N. Edwards, 309–37. Cambridge, MA: MIT Press.
- Jay, Martin. 1988. "Scopic Regimes of Modernity." In *Vision and Visuality*, edited by Hal Foster, 3–23. Seattle: Bay.
- Jünger, Ernst. 1989. "Photography and the 'Second Consciousness': An Excerpt from 'On Pain.'" Translated by Joel Agee. In *Photography in the Modern Era: European Documents and Critical Writings, 1913–1940*, edited by Christopher Phillips, 207–10. New York: Metropolitan Museum of Art / Aperture.
- Kaplan, Caren. 2006. "Mobility and War: The Cosmic View of US 'Air Power.'" *Environment and Planning A* 38, no. 2: 395–407.
- Kay, Laura. 2012. "Polar Fiction." www.phys.barnard.edu/~kay/polar/fiction.php.
- Kolbert, Elizabeth, and Francis Spufford. 2007. *The Ends of the Earth: An Anthology of the Finest Writing on the Arctic and the Antarctic*. New York: Bloomsbury USA.
- Kyriakides, K. A. 1994. "Air Power and International Law." In *Perspectives on Air Power: Air Power in Its Wider Contexts*, edited by Stuart Peach, 80–128. Bracknell, UK: Joint Services Command Staff College.
- Lazier, Benjamin. 2011. "Earthrise; or, The Globalization of the World Picture." *American Historical Review* 116, no. 3: 602–30.
- Lippit, Akira Mizuta. 2005. *Atomic Light (Shadow Optics)*. Minneapolis: University of Minnesota Press.
- Manhire, Bill, ed. 2004. *The Wide White Page: Writers Imagine Antarctica*. Wellington, NZ: Victoria University Press.
- Maogoto, Jackson Nyamuya. 2006. "The Military Ascent into Space: From Playground to Battleground—the New Uncertain Game in the Heavens." [Law .Bepress.com/expresso/eps/1347](http://Law.Bepress.com/expresso/eps/1347).
- Marzec, Robert P. 2013. "Environmentalism: Military Maneuvers, the Ecosystem, and the Accidental." *Postmodern Culture* 22, no. 3. doi:10.1353/pmc.2012.0013.
- Masco, Joseph. 2010. "Bad Weather: On Planetary Crisis." *Social Studies of Science* 40, no. 1: 7–40.
- . 2012. "The End of Ends." *Anthropological Quarterly* 85, no. 4: 1107–24.
- May, John. 1988. *Greenpeace Book of Antarctica: A New View of the Seventh Continent*. London: Dorling Kindersley.

- McLuhan, Marshall. 1974. "At the Moment of Sputnik the Planet Became a Global Theater in Which There Are No Spectators but Only Actors." *Journal of Communication* 24, no. 1: 48–58.
- Mirzoeff, Nicholas. 2011. *The Right to Look: A Counterhistory of Visuality*. Durham, NC: Duke University Press.
- Moore, Jason Kendall. 2004. "Bungled Publicity: Little America, Big America, and the Rationale for Non-claimancy, 1946–61." *Polar Record* 40, no. 1: 19–30.
- Morgan, Richard A. 1994. "Military Use of Commercial Communications Satellites: A New Look at the Outer Space Treaty and 'Peaceful Purposes.'" *Journal of Air Law and Commerce* 60, no. 1: 237–326.
- Munday, Lisa M. 2012. "The Civilianization of a Nuclear Weapon Effects Test: Operation ARGUS." *Historical Studies in the Natural Sciences* 42, no. 4: 283–321.
- Olwig, Kenneth R. 2011. "The Earth Is Not a Globe: Landscape versus the 'Globalist' Agenda." *Landscape Research* 36, no. 4: 401–15.
- Poole, Robert. 2008. *Earthrise: How Man First Saw the Earth*. New Haven, CT: Yale University Press.
- Pyne, Stephen. 2007. "The Extraterrestrial Earth: Antarctica as Analogue for Space Exploration." *Space Policy* 23: 147–49.
- Reed, Walter D., and Robert W. Norris. 1980. "Military Use of the Space Shuttle." *Akron Law Review* 13, no. 4: 665–89.
- Revelle, Rodger, and Hans E. Suess. 1957. "Carbon Dioxide Exchange between the Atmosphere and Ocean and the Question of an Increase of Atmospheric CO₂ during the Past Decades." *Tellus* 9: 18–27.
- Richter, Gerhard. 2007. *Thought-Images: Frankfurt School Writers' Reflection from Damaged Life*. Stanford, CA: Stanford University Press.
- Roberts, Leslie Carol. 2008. *The Entire Earth and Sky: Views on Antarctica*. Lincoln: University of Nebraska Press.
- Sachs, Wolfgang. 1999. *Planet Dialectics: Explorations in Environment and Development*. London: Zed Books.
- Serres, Michel. 1995. *The Natural Contract*. Ann Arbor: University of Michigan Press.
- Sloterdijk, Peter. 2009a. "Airquake." Translated by Eduardo Mendieta. *Environment and Planning D: Society and Space* 27, no. 1: 41–57.
- . 2009b. *Terror from the Air*. Translated by Amy Patton and Steve Corcoran. Los Angeles: Semiotext(e).
- Spivak, Gayatri Chakravorty. 2003. *Death of a Discipline*. New York: Columbia University Press.

- . 2006. “World Systems and the Creole.” *Narrative* 14, no. 1: 102–12.
- Virilio, Paul. 1989. *War and Cinema: The Logistics of Perception*. Translated by Patrick Camiller. London: Verso.
- Vlasic, Ivan A. 1991. “The Legal Aspects of Peaceful and Nonpeaceful Uses of Outer Space.” In *Peaceful and Nonpeaceful Uses of Space*, edited by Bhupendra Jasani, 37–55. New York: Taylor & Francis.
- Wear, Spencer R. 1988. *Nuclear Fear: A History of Images*. Cambridge, MA: Harvard University Press.
- . 2007. *The Discovery of Global Warming: A Hypertext History of How Scientists Came to (Partly) Understand What Humans Are Doing to the Earth’s Climate*. College Park, MD: Center for the History of Physics, American Institute of Physics. www.aip.org/history/climate.
- Worster, Donald. 1977. *Nature’s Economy: A History of Ecological Ideas*. Cambridge: Cambridge University Press.
- Yusoff, Kathryn. 2005. “Visualizing Antarctica as a Place in Time: From the Geological Sublime to ‘Real.’” *Space and Culture* 8, no. 4: 381–98.

.....

Elizabeth DeLoughrey is an associate professor of English at the University of California, Los Angeles, and the author of *Routes and Roots: Navigating Caribbean and Pacific Island Literatures* (2007). She is also coeditor of *Caribbean Literature and the Environment* (2005) and *Postcolonial Ecologies: Literatures of the Environment* (2011). She is currently completing a book about the literature of climate change and empire.