

The Global Novel: Comparative Perspectives

Introduction

Debjani Ganguly

THE NOVEL LOOMS LARGE on the horizon of global literary studies. It not only travels well, but is also widely perceived as future-oriented and open-ended, ready to absorb within its polymorphous ambit the indeterminacy of the present. In April 2019, *New Literary History* hosted a symposium on “The Global Novel: Comparative Perspectives,” with eight scholars who have expertise in various literary regions—East Asia, Europe, Latin America, the Middle East, North America, South Africa, and South Asia. This special issue has emerged out of the symposium. The contributors parse theories of the novel as a global form, and compare their relative provenance across diverse literary traditions. The collocation of terms “global,” “novel,” and “comparative” is a proverbial red-flag in a field beset with anxiety about untranslatability, incommensurability, and the contingent particularity of literary-linguistic worlds. The global is often perceived as a moniker of bad universalism; comparatism as the grammar of transnational biopower and a throwback to nineteenth-century evolutionary logics; and the novel as a malevolent form in an already fragile ecosystem of genres. Perceived as a form unbound by intricate aesthetic conventions, voraciously appropriative, and overwhelmingly marketable, the novel, in the words of Marthe Robert, “can do what it wants with literature; it can exploit to its own ends description, narrative, drama, the essay, commentary, monologue, and conversation; it can be, either in turn or at once, fable, history, parable, romance, chronicle, story and epic.”¹ The conjunction of *global* with the *novel* generates considerable heartburn in some quarters about the form’s complicity with the forces of globalization, its rampant marketability, its abdication of its social role, and the banal professionalization through creative writing programs of a form that was once symptomatic of high aesthetic pursuit.²

Even as one registers this disquiet, literary scholars can scarcely miss the explosion of comparative scholarship on the global novel, a sure sign that this form is wide open for critical and historical evaluation. Recent scholarly work has embraced theories of comparative morphology

(Franco Moretti); the mutual shaping of the novel and human rights discourse (Joseph Slaughter); cosmopolitical negotiation of social difference and otherness (David Palumbo-Liu); born-translated works that have an aspiration for cross-lingual circulation enfolded in their crafting (Rebecca Walkowitz); formal adaptation to modes of apperception characterizing our new media age and the temporal structure of the contemporary marked by global wars and cultures of humanitarian witnessing (Debjani Ganguly); anglophone territorialization and deterritorialization (Baidik Bhattacharya); strategic occidentalism and the neoliberal book market (Ignacio Sánchez Prado); the normative worlding of postcolonial and global south novels (Pheng Cheah); the novel's oceanic and terraqueous world-making (Margaret Cohen); and the novel's planetary scale in works of speculative fiction on climate change and species extinction (Ursula Heise), to name only a few.³ This astonishing conceptual range of the global, which factors in the philosophical weight of terms such as the world and the planetary, reveals that "the global is not a stable content or ideology or an institutional perspective continuous with empire and consonant with neoliberal globalization."⁴ Nor is the global merely the programmed temporality of capitalist globalization. It can be conceived rather as a belated marker of sedimented histories, their accrual and remediation embedded in the language of the contemporary. One can say that the novel or long fictional prose, seen in this light, has been a global form these past two centuries—or four, or eight, depending on one's scholarly orientation in nineteenth-century, early modern, or medieval studies.⁵ The semantic range of protonovelistic forms goes back even further to encompass *midrash* in Hebrew, *fabula* in Latin, *monogatari* in Japanese, *qissa* in Arabic, *kadambari* in Sanskrit, *xiaoshuo* in Chinese, *повест'* in Russian, *nutanamana* in Tamil, *Romauns* in Middle English, and *Romanz* in Old French. The global in such a reading signals the linguistic and cultural diversity of this fictional form across time and space, a mode of comparatism that this special issue enlists in the face of attempts to see the global novel as a standardized "bourgeois sociolect," and against a frequent disinclination to historicize its modern bourgeois origins athwart a wider canvas of literary, cultural, and philosophical influences. What does it mean to recognize that the novel is no longer just the literary counterpart of the philosophical ideal of the totality of bourgeois freedom, "a visual reality, a set of images and imaginaries that elevated the fiction of bourgeois ubiquity to a foundational myth of modernity"?⁶ What lies astride, beyond, and before this history?⁷ This volume is at odds with two other meanings of the term global: one, its mimetic exactitude as a mode of cultural equivalence in a market of perfect exchangeability; and two, its historiographical coding as European

diffusionism, that is, the march of the modern European novel form and its relentless capture of cultural difference across both time and space. This is not to dismiss the material force of either, but to interrupt a predictable hermeneutic they generate, a hermeneutic that forecloses the serendipity of comparative analysis, patterns of influence, historical attentiveness to textures of writing, the aesthetic labor of close reading, and translational voyaging across cultural divides.

The eight essays in this special issue feature analysis of modern and contemporary novels in Arabic, English, German, Italian, Japanese, Korean, Spanish, and Turkish. The novelists they engage with include a mix of renowned figures and emerging creative voices: Taha Hussein, Orhan Pamuk, J. M. Coetzee, Jhumpa Lahiri, Kazuo Ishiguro, Yoko Tawada, Cristina Rivera Garza, Gabriel Garcia Márquez, Jorge Volpi, Daniel Sada, Roberto Bolaño, Han Kang, Sinan Antoon, Pitchaya Sudbanthad, Namwali Serpell, Amitav Ghosh, James George, and Indra Sinha. Offering critical insights on an array of themes—conflicting literacies, aesthetic illegibility, democratic petrification, transculturation, multilingual translation, spectral histories, modes of witnessing, corporeal and psychic logics of wartime death, pluvial aesthetics, and planetary realism—the essays capture the nuances and fluctuations in contemporary modes of thinking about the novel. The global novel is, of course, a vast literary and theoretical corpus, and the question of scale inevitably impinges on our deliberations. We are not talking here of quantitative scales of publication. Nor do we address the staggering increase in novels published around the world in the past three centuries, whose publication and distribution patterns are extensively tracked by computational humanities experts, often with startling results. We also do not limit ourselves to addressing spatial or geographical scale that proliferates in discussions on the global novel. The scalar issues we reckon with instead encompass the temporality, form, and magnitude of human experience that such literary inscription entails across diverse cultural milieu.

The history of the modern Arabic novel is instructive in this regard. A philological history of the long fictional prose form in the Arabic literary tradition—*qissa* and *maqama*—and its manifestation in early modern protonovelistic forms like the Spanish picaresque and in subsequent churnings in the history of the novel constitute one strand of this story. This historiography locates the Arabic novel within a global history of premodern contact not exclusively limited to Europe. It also firmly positions the Arabic novel in the foundational history of modern literary globalism.⁸ Michael Allan's essay, "Dying to Read: Reflections on the Ends of Literacy," with which this special issue begins, offers two other strands for consideration apart from the philological. One is a history

of the modern Arabic novel, and its part in the story of the becoming modern of the world, linked to the rise of commerce, displacement, migration, and translation. This story has distinctive spatial histories, with scholars tracing the dilation and devolution of the novel form across the Maghreb-Mashriq divide. Generic and generational approaches offer theories of subgenres, and a complex dialectic of foreign and indigenous influences that thoroughly complicate the European diffusionist theory. The third strand that Allan delineates in considerable detail, and that constitutes the substance of his essay, is the history of various registers of literacy entailed in the becoming modern of the Arabic novel and the precarity of lifeworlds eclipsed by a print literacy regime. Reading literally becomes a matter of life and death. This is a fascinating history tied to a set of social transformations in the twentieth century due to the impact of industrialization, urbanization, education reforms, and religious, legal, and bureaucratic transformation. Rather than offer a sociology of the modern novel, Allan turns to Taha Hussein's 1934 novel *Call of the Curlew* to trace the waning of the symbolic value of oral literacies such as memorization and recitation, the death of sensibilities associated with them, and the emergence of new regimes of aesthetic pleasure, desire, and discipline. Death, life, and literacy entwine in this story of two sisters, such that one of them as narrator serves as the "literary horizon in a story about her [illiterate] sister's death."⁹

Traversing the distance from print literacy to the legibility of aesthetic regimes in identifying the democratic horizon of the global novel is a scalar challenge of another order. What insights might the novels of Pamuk and Coetzee offer here? This is the substance of Bhattacharya's essay, "Radical Illegibility and Democratic Futures." Excavating the theoretical ground of the novel's portability and democratic readability, from Mikhail Bakhtin's heteroglossia, Catherine Gallagher's idea of "nobody's story," and Jacques Rancière's concept of democratic petrification to contemporary accounts of intermediality, translatability, deterritorialization, and network aesthetics, the essay opens up a novelistic horizon that disrupts any easy conjunction of democratic form and aesthetic legibility. Bhattacharya offers a fascinating comparison between the Turkish Nobel laureate Pamuk's idea of the museumization of everyday objects in his novel *The Museum of Innocence*, and the prominence given to the prosaic capture of the everyday world of objects in nineteenth-century European accounts of the realist novel. The latter is a part of the story of an aesthetic revolution that Rancière captures in his book *Dissensus: On Politics and Aesthetics*. In reading the nineteenth-century French realist masters Gustave Flaubert and Honoré de Balzac, Rancière advances the idea of democratic petrification that foregrounds "Flaubert's disregard

for any difference between high and low subject matters, for any hierarchy between foreground and background, and ultimately between man and things."¹⁰ For nineteenth-century critics, notes Rancière, this was the hallmark of democracy, irrespective of Flaubert's indifference to any kind of democratic political commitment. The petrified world of the everyday, including the representation of insignificant things and objects of daily use, in the pages of the novel was the hallmark of its general readability.

The post-War reception of Flaubert was critical precisely of the democratic legibility of his prose and its indifference to those who read it. Far from being a transparent recording of everyday life, the opacity of Flaubert's style, in Jean-Paul Sartre's scathing words, "surrounds the object, seizes it, immobilizes it and breaks its back, changes into stone and petrifies the object as well."¹¹ This act of petrification of the prosaic is for Sartre an aristocratic assault on the pulsating democratic energy of prose, an attempt "to tear words away from those who could have used them as tools of social debate and struggle."¹²

Pamuk's take on petrification through his idea of museumization of everyday life revives this zone of struggle, what he calls "politics," but not quite in the Sartrean sense. Pamuk's concern is the problem of legibility on a transnational and global scale due to problems of literacy and inequitable access in large swathes of the non-West. The debates are no longer internal to the French aesthetic regime. The novel's global horizon is a volatile one marked by fractured reading publics, translational missteps, and aesthetic illegibility. The writer can no longer remain indifferent to the vagaries of readership or to the challenges to the novel's democratic form. In creating extradiegetic object worlds through diagrams and museums that complement his novels, Pamuk explores a mode of legibility marked by what one may call intermedial translation. To turn from Pamuk to Coetzee is to confront even more dramatically the scene of reading as one of radical illegibility. Coetzee's experimentation with translation, muteness, and petrification in his novels draws attention to the mutually exclusive histories of European aesthetics and racial capitalism under conditions of apartheid in South Africa. The novel's democratic potential in Coetzee's explosive oeuvre lies in the way it brings into relief the suture between a nonlinguistic biometric indexicality of racial identity in apartheid South Africa and a modern European regime of aesthetic legibility. In doing so, Coetzee's novels, in Bhattacharya's words, "tear open the fabric of history and invite its readers to enter into an audacious, even perilous, journey of interpreting the historical anew."¹³

Translational experiments in Coetzee's recent trilogy, *The Childhood of Jesus*, *The Schooldays of Jesus*, and *The Death of Jesus*, mark a radical move toward unsettling assumptions about the readability of the global novel in the anglophone marketplace. Making scarcely any concession to readability in its style or narrative, the first volume appeared in the English original after the Dutch translation. The third volume was initially available only in Spanish translation, with the English original released in the UK and the US the following year. Inspired by Miguel de Cervantes and Jorge Luis Borges, and intertextually woven with the translational histories of their masterpieces, Coetzee's trilogy accentuates the complex and often intractable circuitry of aesthetic legibility in the global sphere. In her book *Born Translated*, Walkowitz, reads Coetzee's trilogy as "animat[ing] the rich conceptual history of translation." Coetzee, in her view, is at pains to demonstrate "how his Australian novel is indebted, fictionally as well as literally, to translation's past and to the literatures of Argentina and Spain."¹⁴ Walkowitz's essay for this issue, "On Not Knowing: Lahiri, Tawada, Ishiguro," offers yet another insight into the translational dynamics of the global novel. The problematic of translation is articulated not in terms of works that are born-translated or that resist easy legibility in the anglosphere, but to an abjuration of ideas of linguistic competence and mastery in a dominant global language. What happens to familiar arguments about anglophone or francophone dominance when novelists like Lahiri, Tawada, and Ishiguro no longer seem interested in "clearing the space for the right to use a colonial language?"¹⁵ Unlike, say, the flamboyant experimentations of James Joyce and Salman Rushdie, who saturated the English language with syntactic, lexical, idiomatic, and figural particularities from other languages, irrevocably transforming English from a colonial to a postcolonial tongue, and who in doing so left their mark on this indubitable global tongue, Lahiri, Tawada, and Ishiguro move between two or three languages of which English is but one.

Ishiguro's diegetic Japanese nuances in his previous novels give way to a medieval history of the English language in his 2015 novel, *The Buried Giant*. This novel revives the premodern convulsions of English history and the unsettled multilingualism of the English countryside before the colonial era. The English language loses much of its triumphalist global sheen in such a work. Lahiri and Tawada, based in Rome and Berlin respectively, do not belong principally in the anglophone sphere, even if their works do circulate in such a marketplace. Lahiri, the author of four successful works in English, now writes in Italian. She engages in acts of translation from Italian to English and vice versa, sometimes of her own work, often times of the work of others. Neither tongue is her first

language, which is Bengali. Her creative labor oscillates between writing and translation. Each impinges on the other and generates rifts in her literary fluency. These rifts are generative; they enable her to swim in untested currents in the company of proficient language speakers who collectively help her advance toward a horizon of civic literacy that in previous eras was often denied to foreigners and especially to women. Tawada frequently writes her novels twice, in Japanese and in German. When the English translations appear, the order of the original often ceases to matter. Her global readership toggles between three languages in order to access her works, and she herself circulates between three overlapping literary-linguistic zones without granting one primacy over the others. Walkowitz notes that Tawada “manipulates publication and translation in order to resist the distinctions between domestic and foreign editions, native and foreign tongues. There is no single source language to know, and no unique history of letters, however large, which the author seeks to possess.”¹⁶ This untethering of novels and novelists from particular histories of production and circulation located in monolingual cultures poses a unique challenge to contemporary literary accounts that accentuate the role of global languages like English or French in promoting the idea of world literature.

A different history of the global novel emerges when we turn to Latin America, one founded on an agonistic mesh of local cultures, market logics, metropolitan influence, and regionally varied linguistic and narrative patterns. Rather than offer a history of the novel’s unmooring from national, linguistic, and cultural roots, Sánchez Prado’s essay situates the global visibility of novelists like Márquez, Llosa, and Bolaño against a wide range of theories of the Latin American novel that have emerged from the 1940s to the present. Two concepts in particular intersect with the contemporary turn to the global: *transculturation* and the *national-popular*. These are not subsumed under the global. Rather, each marks the differential histories of becoming modern in Latin America, and the contestation to which global histories of capitalism and the emergence of the modern European novel have been subjected in the rich body of theoretical work on the novel from this region. Ángel Rama’s idea of literary transculturation, with which Sánchez Prado engages in some detail, advances a theory that opposes the unidirectionality of acculturation. Rama’s theory also purports to overcome Lukacsian sociologism and an ahistorical formalism, and recalibrates the Boom-phase of the 1960s and 1970s, when Latin American writers dazzled the world republic of letters with magical realism. Readers encounter a range of theoretical voices in Sánchez Prado’s essay that scarcely feature in global deliberations on the Latin American novel, those of Retamar, Ortiz, Polar, González, Palou,

Rojas, Gilman, and Zavala. Juxtaposing these voices against the global visibility of theoretical articulations by Roberto Schwarz and Roberto Bolaño, Sánchez Prado signals the importance of a deeper engagement with regional literary traditions in calibrating the comparative valence of the global in theories of the novel. His extended essay offers three vital insights. One, a substantial time-lag between the appearance of a theoretical work and its translation, in contrast to the quick availability of translations of major novels, skews literary criticism in favor of a watered-down, derivative analysis that theories of distant reading and untranslatability are unable to address. Two, a globalist realism is not necessarily a capitulation to a neoliberal market aesthetics, and a “play of representations internal to the national popular” is not necessarily a sign of regional emancipation. This is illuminated in Sánchez Prado’s brilliant reading of two contemporary Mexican novelists Jorge Volpi and Daniel Sada. Finally, the binaries of the national-popular and the cosmopolitan-global are no longer viable in twenty-first-century Latin America. Or, as Sánchez Prado puts it, Volpi and Sada frame “the possibilities of the global and the transcultural novel in the realm of the contemporary.”¹⁷

Multiscalar entanglements of national and global realms are brought into sharp relief in Daniel Y. Kim’s essay, “Translations and Ghostings of History,” where he focuses on the rapid rise of South Korean novelists such as Han Kang on the global stage, and the spectral weight of violent histories that vanish from a world literary horizon focused on prizes, celebrity circuits, and market logics. The push and pull of cultural nationalism, state mediation in international translation and distribution processes, and a universalizable aesthetics of alienation from the stultifying violence of bourgeois life have all combined to make modern South Korean novels and films legible simultaneously to national and international audiences. This is borne out by the phenomenal success of Bong Joon-ho’s film *Parasite* at the 2020 Oscars, and by Han’s novel *The Vegetarian*, which won the Man Booker International Prize in 2016. Kim’s analysis varies in scale from excavating textual traces of violent regional histories and modes of witnessing in the novels of Han, to intervening in larger debates on theories of global translation and the impingement of a global Cold War discourse on reception histories of Korean literature.

Kim’s essay looks askance at two established narratives of the “becoming global” of novels. The first is the idea that a globally successful novel pictures the nation of its origin by binding the totality of its social processes with the totality of character, to paraphrase Georg Lukács—that it participates in an international republic of letters coded by national

diversity for consumption by a cosmopolitan readership. The second runs counter to the first by tracking a work's global trajectory in direct proportion to its distance from its national origins. A global novel in this second reading is not tethered to a single point of origin or a single language source, or even to a designated cultural readership. Kim's essay tracks several rifts in the two narratives, and accounts for the power of Han's novels in terms of an aesthetics of refraction and enfolding—the refraction of violent local histories that shatters the global legibility of Cold War discourse; the arbophilic and bulimic body refracting off the voraciously violent appetite of a carnivorous patriarchy; and modes of textual memorializing and witnessing that enfold acts of retranslating of violent histories in an affective register that reverberate across psychosocial and geopolitical terrains.

Configuring the global on multiple scales from the individual body to the human species, and from the psychoanalytics of touching a corpse to histories of mass violence, Ranjana Khanna's contribution to this special issue delves into Antoon's novel *The Corpse Washer*. Written in Arabic by an Iraqi American novelist and self-translated into English, *The Corpse Washer* traces the life of Jawad, who is born into a Shiite undertaker family of traditional corpse washers and shrouders. Unwilling to make a living by washing corpses before burial and craving to pursue a life-giving art form, he leaves his family for a period to try his hand at sculpting, and in the late 1980s enters the Baghdad Academy of Fine Arts. Iraq's collapse, first at the hands of Saddam Hussein, and subsequently due to the US Occupation in 2003, compels Jawad to return home and help his family wash the pile of corpses that lie heaped on their doorstep every day. The novel's metonymic figuration of death, positioning the singular act of corpse washing against the backdrop of a history of mass violence, is folded into a speculative aesthetics of necrophiliac desire and animation of the dead. Jawad's fascination with Giacometti's sculptures blends with his insomniac dreams about washing his lover Reem's body. The figural and the phantasmatic oscillate in this poetic novel on the power of touch in animating the layered history of mass violence. Bookended by Freud and Marx, Khanna's essay weaves a richly phenomenological reading of touch with an intellectual history of death from the individuated to the massified. WWI triggered Freud's reflections on mass death, as well as his claim that humankind has to perforce shed a civilizational urge to conserve life at all costs, and return to a primordial outlook where to endure life is to prepare oneself for death. Marx's writings figure death as the ground for grasping our species-being that transcends our singular subjectivity. The essay explores the shaping of intimacy by death on scales of both heightened individuation and as a condition

of the species. Antoon's novel offers a rich textual site for tracing what Khanna calls the phenomenology of the global, that is, the inextricability of the corporeal, the psychic, and the political in our collective experience of violence and war that marks the contemporary. Drawing on a rich body of scholarship, the essay offers a telegraphic history of the contemporary global novel as an afterlife, a form that carries traces of modernist and postcolonial histories, and that is now enmeshed in histories of globalization, mediatization, war, and environmental crisis.

The recursive historicity of afterlife narratives resonates with our reading of the global as a history of belatedness and accrual of the past, a history of sedimentation rather than of erasure. As we move to the two final essays in this volume, we begin to glimpse the precarity of the novel as global form, its incipient mutations in the face of catastrophes, both epidemiological and climatological. Even as I write these words, most of us around the world are sheltering in place in the face of a global viral invasion that, as epidemiologists tell us, will reappear in other forms the more we disturb natural habitats. One struggles to remember a previous catastrophe that shuttered the entire world and simultaneously exposed the fragility of our planetary-scale entanglement with nonhuman forces. Seismographers around the world have remarked that they can hear the planet's natural quavering much more clearly now that the "anthropogenic hiss" has quietened somewhat with the global pandemic lockdown.¹⁸ How equipped is the global novel to capture such cataclysmic capsizing of human lifeworlds? What is at stake in thinking of the global in planetary terms so as to contemplate our own unprecedented geological agency in agitating the earth and rewriting its fate for millions of years to come? Such phenomena fundamentally scramble modern philosophical ideas of human agency, subjectivity, and object-worlds that have been so foundational to the novel form these past two hundred years.¹⁹

Half a century ago, in the pages of this journal, Alastair Fowler reflected on the life and death of literary forms. Defining genre less as typology than as a series of form-complexes, Fowler notes that the obsolescence of a genre is a critical historical event, "for it alters the whole balance of significant forms, even making some of them insignificant."²⁰ Fowler's classic distinction between genre, form, and mode continues to be relevant in our quest for literary forms that might be equal to the task of embodying catastrophic geostories. If form is the structural carapace of genres, mode is independent of contingent embodiment. Mode is what we are left with when genres die. They acquire new forms. The nineteenth-century bourgeois realist novel—the standard bearer of a gradualist world view—may be dead. But in what form does the realist *mode* survive in our catastrophic times?

This is what my essay “Catastrophic Form and Planetary Realism,” explores by traversing an arc from the nuclear age to our era of climate catastrophe through the novels of George, Sinha, and Ghosh. These are not works of speculative or science fiction. They are written in a realist mode, albeit, as we shall see, a recombinant one. I revisit a nineteenth-century history of the relationship between geological science and the realist novel through the figure of Charles Lyell, author of *Principles of Geology*. Lyell promulgated a gradualist view of stratigraphic change in the earth’s constitution as against cosmological speculation on cataclysmic geological shifts. This led to a quest for an appropriate narrative form in which gradualism would find a home. Literary forms were often used as a tool to think through this problem.²¹ The realist form in particular came to be seen as factual and plausible, and as far removed from catastrophism as possible. This investment in a factual and gradualist matrix was not meant to accommodate implausible shifts in scale that threatened the collapse of a newly forged, rational, and demystified universe, both geological and novelistic. By the late nineteenth century, one perceives a clear distinction between the realist novel and other genre fiction, such as sci-fi, romance, gothic, and fantasy, that took liberties with time, space, and human experience. These, in the words of Ghosh, were banished “to the humbler dwellings that surround the manor house—those generic outhouses that were once known . . . as ‘the Gothic,’ ‘the romance,’ or the ‘melodrama,’ and have now come to be called ‘fantasy,’ ‘horror,’ and ‘science fiction.’”²² In the context of nuclear, industrial, and climatological catastrophes, how might we experience our ontological plurality as humans in a realist mode?²³ What might a reconstellated interiority look like, one that entwines the moral, the psychological, the techno-prosthetic, and the neuro-evolutionary? What constitutes justice across nonhuman scales? How do we theorize a planetary realism? Questions such as these animate my essay.

Our contemplation of the global novel reaches its terrestrial limits in the final essay of this volume, “Pluvial Time / Wet Form.” Sarah Nuttall here argues for an immersive ontology of the novel, one that dissolves its terrestrial features and its carefully demarcated zones of dryness. Nuttall’s reading is shaped by the idea of the pluvial, a term borrowed from the earth sciences to denote rain that floods and overflows land terrains. The pluvial is saturated by tropes of suffusion, infusion, immersion, and dissolution. It is marked by a storm vortex that rides roughshod over everyday weather patterns and any semblance of quotidian stability. Three recent novels from tropical zones—India, Thailand, and Zambia—feature in the essay: Ghosh’s *Gun Island*, Sudbanthad’s *Bangkok Wakes to Rain* and Serpell’s *The Old Drift*. The temporality of these works

is marked by monsoonal cycles, now skewed and exacerbated by global warming. By most scientific prognostication, south and southeast Asia, and central and southern Africa are particularly vulnerable to climatic shock. Nuttall's essay evokes the capsizing of centuries-long zones of human habitation on land.

Her focus on environmental catastrophe in the Global South urges one to contemplate the dramatically shifting contours of the postcolonial novel. This is a form that has been primarily shaped by a land-and-territory-based infrastructural logic. The pluvial unhouses the novel with walls of water and sheets of rain. It enables experimentation with time and space. It recasts colonialism as hydrocolonialism.²⁴ Inevitably, we encounter allegorical, mythic, and speculative modes of narration. It is as if these modes have survived, in the words of Ghosh, "extended periods of dormancy . . . as if the very rotation of the planet had accelerated, moving all things at unstoppable velocities, so that the outward appearance of a place might stay the same while its core was whisked away to some other time and location."²⁵ Ghosh's *Gun Island* experiments with seventeenth-century folk narrative forms from the Sundarbans regions in Bengal to weave a premodern tale of tidal connections and oceanic trade between south Asia and Venice with the crisis of climate refugees in the twenty-first century. The novel culminates in a deluge of rain that washes away the rot of certitude and triumphalism of human flourishing. Serpell's *The Old Drift*, set only partially in the future, is an audacious braiding of colonial-era history and techno-ecological transformations unfolding in our present. The novel's attunement to the ecological crisis on the African continent is captured not only in its representation of an epic deluge, but in its experimentation with point of view. Parts of it are narrated by a nonhuman collective intelligence, a mosquito swarm that appears as a "bare ruinous choir, a chorus of gossip mites."²⁶ Serpell's novel is a spectacular mash-up of the postcolonial historical novel, magical realism, speculative fiction, and Afrofuturism. Sudbanthad's novel is a tale of urban deluge and a perennially flooded Bangkok. Reckoning with what Nuttall calls amphibious cities is also to reckon with "future reals," a mode of hyperrealism of the what-is-to-come, inevitably, irrevocably. It is also to confront the defeat of visualization—if by this one means foresight, the ability to anticipate futures on a human scale. What happens to the novel form when it encounters a futural horizon that is both already written into the earth's stratigraphy and yet impossible to visualize?

NOTES

I am grateful to Bruce Holsinger for inviting me to convene a symposium on the global novel on April 10–11, 2019. All essays, except Michael Allan's, are based on papers presented at the symposium.

- 1 Marthe Robert, *Origins of the Novel*, in *Theory of the Novel: A Historical Approach*, ed. Michael McKeon (Baltimore: Johns Hopkins Univ. Press, 2000), 58.
- 2 Kalyan Nadiminti, "The Global Program Era: Contemporary International Fiction in the American Creative Economy," *Novel: A Forum on Fiction* 51, no. 3 (2018): 375–98.
- 3 Franco Moretti, ed., *The Novel*, vols. 1 and 2 (Princeton, NJ: Princeton Univ. Press, 2006); Joseph Slaughter, *Human Rights, Inc.: The World Novel, Narrative Form, and International Law* (New York: Fordham Univ. Press, 2007); David Palumbo-Liu, *The Deliverance of Others: Reading Literature in a Global Age* (Durham, NC: Duke Univ. Press, 2012); Rebecca L. Walkowitz, *Born Translated: The Contemporary Novel in an Age of World Literature* (New York: Columbia Univ. Press, 2015); Debjani Ganguly, *This Thing Called the World: The Contemporary Novel as Global Form* (Durham, NC: Duke Univ. Press, 2016); Baidik Bhattacharya, *Postcolonial Writing in the Era of World Literature: Texts, Territories, Globalization* (London: Routledge, 2018); Ignacio Sánchez Prado, *Strategic Occidentalism: On Mexican Fiction, the Neoliberal Book Market, and the Question of World Literature* (Chicago: Northwestern Univ. Press, 2018); Pheng Cheah, *What is a World? On Postcolonial Literature as World Literature* (Durham, NC: Duke Univ. Press, 2016); Margaret Cohen, *The Novel and the Sea* (Princeton, NJ: Princeton Univ. Press, 2010); and Ursula Heise, *Imagining Extinction: The Cultural Meanings of Endangered Species* (Chicago: Univ. of Chicago Press, 2016).
- 4 Madigan Haley, "Marginal Figures and the Ethos of the Global Novel," *Novel: A Forum on Fiction* 48, no. 1 (2015): 119.
- 5 See Julie Orlemanski, "Who has Fiction? Modernity, Fictionality, and the Middle Ages," *New Literary History*, 50, no. 2 (2019): 145–70. A set of responses to Orlemanski's essay appears in the *New Literary History* Forum, "Medieval Fictionalities," *New Literary History* 51, no. 1 (2020).
- 6 Mariano Siskind, "The Globalization of the Novel and the Novelization of the Global: A Critique of World Literature," *Comparative Literature* 62, no. 4 (2010): 337.
- 7 For insights into the premodern global history of the novel, see Steven Moore's *The Novel: An Alternative History* (New York: Continuum, 2010).
- 8 Abdelfattah Kilito, "Qissa," in Moretti, *The Novel*, vol. 1, *History, Geography, and Culture*, 262–68.
- 9 Michael Allan, "Dying to Read: Reflections on the Ends of Literacy," *New Literary History* 51, no. 2 (2020): 287.
- 10 Jacques Rancière, *Dissensus: On Politics and Aesthetics*, trans. Steven Corcoran (London: Continuum, 2010), 154.
- 11 Jean-Paul Sartre, cited in Rancière, *Dissensus*, 154.
- 12 Rancière, *Dissensus*, 154.
- 13 Bhattacharya, "Radical Illegibility and Democratic Futures," *New Literary History* 51, no. 2 (2020): 318.
- 14 Walkowitz, *Born Translated*, 5.
- 15 Walkowitz, "On Not Knowing: Lahiri, Tawada, Ishiguro," *New Literary History* 51, no. 2 (2020): 324.
- 16 Walkowitz, "On Not Knowing," 338.
- 17 Sánchez Prado, "The Persistence of the Transcultural: A Latin American Theory of the Novel from the National-Popular to the Global," *New Literary History* 51, no. 2 (2020): 368.

- 18 Robin George Andrews, "Coronavirus Turns Urban Life's Roar to a Whisper on World's Seismographs," *New York Times*, April 8, 2020, https://www.nytimes.com/2020/04/08/science/seismographs-lockdown-coronavirus.html?algo=identity&fallback=false&imp_id=738432002&imp_id=57269550&action=click&module=Science%20%20Technology&pgtype=Homepage.
- 19 As Bruno Latour writes in a 2014 essay, "Kant without bifurcation between object and subject; Hegel without Absolute Spirit; Marx without dialectics. But it is also in another radical sense that the Earth is no longer 'objective'; it cannot be put at a distance and emptied of all its humans. Human action is visible everywhere—in the construction of knowledge *as well as* in the production of the phenomena those sciences are called to register." Latour, "Agency at the Time of the Anthropocene," *New Literary History* 45, no. 1 (2014): 5 (*italics original*).
- 20 Alastair Fowler, "The Life and Death of Literary Forms" *New Literary History* 2, no. 2 (1971): 204.
- 21 See Adeline Buckland, *Novel Science Fiction and the Invention of Nineteenth-Century Geology* (Chicago: Univ. of Chicago Press, 2013).
- 22 Amitav Ghosh, *The Great Derangement: Climate Change and the Unthinkable* (Haryana, India: Allen Lane, 2016), 32.
- 23 The term "ontological plurality" is Ian Baucom's. See "'Moving Centers': Climate Change, Critical Method, and the Historical Novel," *Modern Language Quarterly* 76, no. 2 (2015): 156.
- 24 Isabel Hofmeyr, "Provisional Notes on Hydrocolonialism," *English Language Notes* 57, no. 1 (2019): 11–120. See also Kerry Bystrom and Hofmeyr, "Oceanic Routes: (Post-) Notes on Hydro-Colonialism," *Comparative Literature* 69, no. 1 (2017): 1–6.
- 25 Ghosh, *Gun Island* (London: John Murray, 2019), 181.
- 26 Namwali Serpell, *The Old Drift* (London: Hogarth, 2019), 19.

Catastrophic Form and Planetary Realism

Debjani Ganguly

AS WE HURTLE TOWARD THE SECOND quarter of the twenty-first century, catastrophism appears to pervade global thinking. On January 23, 2020, the Doomsday Clock maintained by the Bulletin of Atomic Scientists was moved forward by fifty seconds to rest at a hundred seconds to midnight.¹ This is the closest the clock has come to the zero hour of catastrophe in its seventy-three year history—twenty seconds closer to Doomsday than it was in its previous high point in 1953 during the early stages of the Cold War, just a few years after the US conducted its first test on a thermonuclear device. The accelerating pace of anthropogenic climate change combined with the threat of a renewed nuclear arms race and global cybersecurity concerns have prompted this fearful predictive gesture, this deployment of a universally recognized symbol of catastrophe—however political its use may be. The scientists who advanced the minute hand of this Doomsday Clock refer to our age as the “new abnormal,” thus definitively signaling the press of catastrophic futures in the present. Philosophers Giorgio Agamben, Jean-Luc Nancy, Isabelle Stengers, and Slavoj Žižek have variously written of our “catastrophic time,” the “end times,” and the era of “ultra history.”² Will Steffen, the earth-system scientist who has written extensively on the Anthropocene and the Great Acceleration of the 1950s, observes: “The atmospheric concentrations of the three greenhouse gases—carbon dioxide, nitrous oxide and methane—are now well above the maximum observed at any time during the Holocene. . . . Ocean carbonate chemistry is likely changing faster than at any time in the last 300 million years . . . and biodiversity loss may be approaching mass extinction rates. . . . In little over two generations—or a single lifetime—humanity . . . has become a planetary-scale geological force . . . many biophysical indicators have clearly moved beyond the bounds of Holocene variability. We are now living in a no-analogue world.”³ Not since the nuclear era has the rhetoric of catastrophism been so explicit in scientific and philosophical writing.

This essay explores the entanglement of radical humanisms and realist ontologies in theorizing catastrophe in the contemporary global novel.

Both humanism and realism have been declared dead a few times this past century. I do not propose to rehearse this gesture, especially in an era when the imprint of the human is beginning to acquire geological and planetary proportions, and the boundaries of realism extend far beyond the ordinary visible rhythm of bourgeois life.⁴ Rather, I am intent on exploring how their interplay shapes the twenty-first-century global novel as the latter mediates human and nonhuman life forms in our era of technogenetic and biogenetic capitalism and anthropogenic climate change.

Catastrophism typically belongs in the realm of popular culture rather than in serious scientific or philosophical discourse or, for that matter, in modern literary theory.⁵ There is no dearth of speculative fiction, films, and television series that portend our cataclysmic race toward extinction. Sublime allegories of survival and various forms of fabular textuality typically mark the catastrophic imagination. Indeed, there is something deeply elevating about postapocalyptic scenarios. The trope of the sublime that is the aesthetic correlative of the catastrophic in Immanuel Kant's exegesis in his *Third Critique* operates precisely when we ourselves remain protected from the direct impact of nature's cataclysms—when we view them at a safe distance as fearful spectacles. In Kant's famous words, "provided our own position is secure, their [i.e. natural disasters'] aspect is all the more attractive for its fearfulness; and we readily call these objects sublime, because they raise the forces of the soul above the height of vulgar commonplace, and discover within us a power of resistance of quite another kind, which gives us courage to be able to measure ourselves against the seeming omnipotence of nature."⁶ Temporally speaking, literary and cinematic representations of apocalypse dwell in an indeterminate future. This temporal as much as spatial distantiation is key to the experience of the sublime.

What happens when the postapocalyptic imagination perforce confronts climate catastrophes unfolding in real time in our present? During the recent cataclysmic bushfires in eastern and southern Australia, my family and friends, for instance, were not in the fortunate position of viewing them from a safe distance and registering their "sublimity." A bookshop in the fire-ravaged town of Cobargo put up a sign: "Post-Apocalyptic Fiction has been moved to Current Affairs." Cobargo and other picturesque artisanal towns such as Bega adorn the southeastern coast of Australia. These, along with some of most popular beachfront getaways, such as Malua Bay, Bateman's Bay, and Ulladalla, burned for days. The global media has been saturated with images of fires too large to contemplate. Rough estimates spell out the staggering scale of the damage. The vast world heritage forest in the Blue Mountains near

Sydney has lost eighty percent of its reserves. Fifty-three percent of the Gondwana world heritage rainforests in Queensland have been burned. Approximately one billion animals are dead, over two thousand homes have been destroyed, and, by some recent estimates, nearly twenty-five million acres have been devastated by the fires. Cities renowned for their sparkling blue skies—Melbourne, Canberra, and Sydney—were covered in dense smoke for weeks. NASA images show that the smoke was visible from outer space and circumnavigated the globe. Reporters have struggled to find appropriate language to describe the apocalyptic horror unfolding in the driest continent in the world. The Tasmanian novelist and climate change activist Richard Flanagan writes:

Australia today is ground zero for the climate catastrophe. Its glorious Great Barrier Reef is dying, its world-heritage rain forests are burning, its giant kelp forests have largely vanished, numerous towns have run out of water or are about to, and now the vast continent is burning on a scale never before seen.

The images of the fires are a cross between “Mad Max” and “On the Beach”: thousands driven onto beaches in a dull orange haze, crowded tableaux of people and animals almost medieval in their strange muteness—half-Bruegel, half-Bosch, ringed by fire, survivors’ faces hidden behind masks and swimming goggles. Day turns to night as smoke extinguishes all light in the horrifying minutes before the red glow announces the imminence of the inferno. Flames leaping 200 feet into the air. Fire tornadoes. Terrified children at the helm of dinghies, piloting away from the flames, refugees in their own country.⁷

To reiterate the question I asked earlier, but this time from the point of view of novel theory: What happens when we are forced to confront *futuristic* postapocalyptic scenarios in the *present*? Can the distinction between speculative fiction and realist fiction be maintained in the face of all-too-real climate cataclysms? If the weight of the present sits most heavily on the realist novel, as Fredric Jameson avers, literary theorists need to reflect seriously on the changing shape of the novel in these catastrophic times.⁸ The contemporary global novel of the realist variety, I suggest, can begin to be reconceived as a mutant or recombinant form that has as its pulse our catastrophic present. Mutants, notes Joseph Masco in his brilliant ethnography on the Manhattan project, embody a complex coding of time both past and future, a new species logic in the nuclear age. Genetic mutations caused by radioactivity temporally mark cellular transformation in one of three ways: through evolution or enhanced adaptation to the changed environment; through damage and deformation; and through “genetic noise” that marks neither evolution nor irrevocable damage, but that can still have an intergenerational impact.⁹ A unpredictable future at the cellular level ramifies across social,

cultural, and political spheres. Extrapolating from this complex temporal logic of biogenetic and social mutation, this essay makes a case for the contemporary realist novel as a mutant literary form, one that encodes futurity in the present as it registers the shock of unpredictable biosocial and geological transformations on a planetary scale. My argument about futurity differs significantly from Jameson's observation that we have gotten "so far ahead of ourselves that only our imaginary futures are adequate to do justice to our present, whose once buried pasts have all vanished into our presentism."¹⁰ Jameson refers here to the irresistible temporality of science fiction. In contrast, I urge us to pay attention to mutations in realist fiction that encode not an imaginary future of humankind, but nonhuman planetary futures that are already being written into the earth's stratigraphy by our radioactive and carbon-intensive lifeworlds. Specifically, I compare novels in which iconic catastrophic scenarios from our contemporary era figure: megascale industrial accidents involving radioactive toxins, atomic testing and nuclear explosions, and climate change. These include Indra Sinha's *Animal's People*, James George's *Ocean Roads*, and Amitav Ghosh's *The Hungry Tide*.¹¹ Each, as we shall see, variously encodes complex biosocial and geological temporalities by weaving strands of the allegorical, the gothic, the speculative, and the mythic within a recombinant realist frame. Three overarching questions inform the analysis that follows: What are the challenges to realism in constellating human assemblages at their limit as they become coextensive with biochemical, technological, and geological forms of life? What might the novels of Sinha, George, and Ghosh tell us about a growing divergence between the human-centered (and human-exceptionalist) story of globalization and the nonhuman force of the planetary? What constitutes the theoretical ground of a planetary realism that captures the collision of form, genre, and geohistory?

The exposition in this essay unfolds in three layers. The first reflects on the challenge of catastrophism to thinking the realist novel form, especially in relation to questions of scale and magnitude that surpass the normal bounds of human experience. The strong bonds between a normative humanist epistemology and the rise of the modern realist novel is a familiar story in literary history. One remembers Georg Lukács's Marx-inspired account of history as a progress of the human species whose three features include the unbroken upward evolution of mankind into an endless future; the complete human personality; and the "organic, indissoluble connection between man as a private individual and man as a social being."¹² The Hegelian idea of *Gattungswesen*, a species-being thoroughly in itself and for itself, constitutes the bulwark of such theory. What we find in Lukács's work is a modern epistemology

of human exceptionalism, that is, the human is specifically *not* animal, thing, or machine. The realist novel is the genre in which this exemplary human figure takes aesthetic shape.

We are now witnessing a fundamental mutation in this modern conception of the human, one in which the figure of the human is seen as increasingly entangled in, and coproduced by, biochemical, technological, and geological phenomena. Anthropogenic climate change forces us to confront the problem of our biological and geological imprint on the planet, and to acknowledge the collision of human and nonhuman forces and our “structural alienation” from our own geological agency, revealing, in the words of Catherine Malabou, “the split between an agent endowed with free will and the capacity to self-reflect and a neutral inorganic power which paralyses the energy of the former.”¹³ Marx’s idea of the social, reprised by Lukács and Émile Durkheim in the twentieth century, has begun to be reformulated in Latourian terms to include not just human actors but nonhuman species, material, and technological agents or *actants*.¹⁴ Advanced capitalism profits from databanks of biogenetic, neural, and mediatic information about individuals, population, and species—a phenomenon variously named as biogenetic, bioinformatics, or simply biocapitalism.¹⁵ Oceanic contamination by plastic loops back into the food chain and makes its way into fish products we consume. Radioactive isotopes of iodine, cesium, and strontium nestle in living tissues of humans inhabiting sites of nuclear testing and waste disposal, not to mention catastrophic zones like Fukushima and Chernobyl. The historian Michelle Murphy speaks of our “chemical embodiment,” stating plainly that in the twenty-first century humans are chemically transformed beings.¹⁶ The idea of an unbroken human evolution into an infinite future is countered by climatologists and artificial intelligence experts. What are the challenges posed to realism by this shift in the ontology of the human presaged by these technoplanetary shifts? How do we address the problems of scale that arise when nuclear and quantum physics, the biological sciences, and Earth System Science (ESS) impinge on the novelistic imagination? What are prior moments in history when the novel has been so provoked to think with science?

The second part of the essay turns to Sinha’s *Animal’s People* and George’s *Ocean Roads* in order to explore the ontological plurality of the human and the challenges to the scale of the realist novel as these are manifested across two catastrophic real-world events: the deadly methyl-isocyanate gas leak in the Indian city of Bhopal and the fallout of the Manhattan project that gave the world the atomic bomb. Sinha’s *Animal’s People* is a black comic, hyperreal allegory of an eco-industrial

catastrophe that befell Bhopal in 1984. Over a million people died, were rendered severely disabled, or gave birth to deformed babies as a result of having inhaled deadly gas methyl isocyanate (MIC). Sinha's novel tests the limits of an allegorical realism that strains to recompose shattered voices, bodies, languages, and personhood in the wake of this biochemical catastrophe. George's *Ocean Roads* traverses twentieth-century breakthroughs in the science of light and energy and, especially, the convergence of these in the Manhattan project, leading to the creation of the atomic bomb. I trace the novel's formal capture through scales of the miniscule atomic and the gigantic space age satellite technovision, which together coalesce a global history of nuclear irradiation and militarization of atmosphere in the Cold War era—what Peter Sloterdijk calls “atmosterrorism”—stretching from the American West (Los Alamos, the 1945 Trinity Bomb test site) to the Pacific islands, New Zealand, the Pacific Northwest, and Antarctica.¹⁷ This arc of Cold War nuclear history is closely linked to the crisis of climate change in our time. Scientists have termed the nuclear irradiation of earth's atmosphere as a major man-made geophysical event, one that precedes the emergence of ESS as an integrated interdisciplinary field in the NASA laboratories of the 1980s, and the subsequent knowledge generated by ESS of our own geological agency in precipitating climate change. A significant corpus of interdisciplinary scholarship traverses the arc from Cold War militarism, the space race, and nuclearism to our current understanding of climate change.¹⁸ James Lovelock famously arrived at his theory of Gaia while working in the 1960s with Carl Sagan's unit in NASA.¹⁹ Paul Crutzen, the atmospheric chemist renowned for suggesting the term “anthropocene” in 2000 to mark our new geological age and the winner of the Nobel Prize for discovering the Antarctic ozone hole, is also the coauthor of an important Cold War-era text warning of the dangers of a nuclear winter that connects atmospheric science to human history.²⁰

This Cold War nuclear history offers an important bridge to the final part of my exposition where I turn to Ghosh's novel *The Hungry Tide*. This novel prefigures climate change in the estuarine delta region of the Sundarbans in Bengal before the rise of cli-fi as a global genre. The questions that animate my reading of Ghosh's novel include the following: How does *The Hungry Tide* illuminate the figure of the human as a force that straddles multiple temporal scales, the everyday present, the historical, and the geological? What might the novel's multispecies geosociality augur for the normative humanist epistemology of the realist novel? How might we trace the forcings of the planetary as they impinge on the global novel? Planetary thought is not human-centered, but an alter-global conception of our transitional, and almost incidental, relation

with other life forms across vast biological and geological scales.²¹ In her strident critique of “global” as a literary paradigm, Gayatri Chakravorty Spivak distinguishes it from the planet. “The planet,” she observes, “is in the species of alterity, belonging to another system; and yet we inhabit it.”²² At the same time, the amplifying effect of capitalist globalization on climatological forcefields compels humans to confront our agency in transforming our planet for thousands, if not millions, of years to come. In this sense, the global and the planetary are deeply entangled. In a recent powerful intervention clarifying the complex relationship between the globe, earth, and planet, Dipesh Chakrabarty writes, “the harder we work the earth in our increasing quest for profit and power, the more we encounter the planet. *Planet* emerged from the project of globalization, from ‘destruction’ and the futile project of human mastery. . . . Yet it is neither the globe nor the world and definitely not the earth. It belongs to a domain where this planet reveals itself as an object of astronomical and geological studies and as a very special case containing the history of life—all of these dimensions vastly out-scaling human realities of space and time.”²³ To talk of planetary realism is to register—linguistically, tropologically, and narratologically—the paradoxical imprint of this fundamental shift in calibrating the scale of human habitation on earth as at once monumental and insignificant.

Catastrophism and the Challenge of Realism

The idea of catastrophe is a challenge both to the modern novel form and to systems of scientific thought, not to mention everyday common sense. A fascinating history linking the rise of geology and the evolutionary sciences to literary forms, and particularly the rise of the realist novel, is worth recounting here. In 1833, Charles Darwin’s mentor Charles Lyell, author of *Principles of Geology*, proposed the idea of a new interglacial interval of the quaternary period that was relatively stable as well as highly habitable, and that began about 11,700 years ago. He used the term “recent” for this new geological epoch in which, as he put it, “the earth has been tenanted by man.”²⁴ In 1867, the French palaeontologist Paul Gervais named Lyell’s idea the “Holocene,” coined in French from *holo* (whole) and the Greek term *kainos* (new). The epoch was formally named “Holocene” by the Third International Geological Congress in Bologna in 1885. This event marked three key developments of relevance to this essay: the victory of gradualist views in the sciences, a denunciation of catastrophism as unmodern, and an affirmation of the figure of the man of science as one who writes in the style of the

“ethically and socially humble recorder of reality.”²⁵ Lyell’s rise to the pinnacle of scholarly achievement in geology in nineteenth-century Britain is marked by a distinctive turn away from cosmological and speculative approaches to thinking about the ancient history of the earth, and to geology as an empirical science marked by a meticulous accumulation of factual data from fossils. Key to this shift were extensive debates about the appropriate narrative form in which to present this *factual* history of the earth. Earth’s form was only beginning to be scientifically excavated. What narrative form would be equal to this task? This question exercised the minds of geologists in the nineteenth century. As Adelene Buckland notes, “Problems of literary form were often used as a conceptual tool for thinking through the problem of geological form.”²⁶

This was also an era marked by a general epistemological crisis about the question of “truth” in narrative, and by furious debates between the antinomies of the *factual* and the *fictional* in literary history.²⁷ While cosmological approaches to the history of the earth encouraged speculative modes of writing, often in the form of romances and epics, geologists like Lyell consciously distanced themselves from these fanciful genres. Ruminating over the danger of thinking the history of the earth through a biblical lens, Lyell writes: “Such a portion of history would immediately assume the air of a romance; the events would seem devoid of credibility, and inconsistent with the present course of human affairs. . . . There would be the most violent transitions from foreign or intestine war to periods of profound peace, and the works effected during the years of disorder or tranquillity would be alike superhuman in magnitude.”²⁸ Along with his rhetorical repudiation of fanciful and speculative genres, Lyell’s disquiet about catastrophic ruptures is also evident in the above passage. Not only does Lyell go on to write in a deliberately factual and realist mode. He also advocates a theory of gradualism for geological history under the term “uniformitarianism.” This concept valorizes patterns of incremental change over a vast span of time and pays attention to minute causal chains. It also makes the “human” the measure of all past geological transformation, as seen in his idea of the earth “tenanted” by man. Not the human as “superhuman in magnitude”—that is, as a disruptive geological agent conceived by the term anthropocene—but the species that thrives at the scale of the ordinary and the everyday due to the interglacial habitability and stability of the Holocene. Darwin’s idea of the evolution of species as a slow and gradual event spanning millennia and even millions of years owes its origins to Lyell’s theory of gradualism or uniformitarianism. For both, catastrophic ruptures belonged in the realm of cosmological speculation, not in empirical science.

This scientific consensus on gradualism emerged in tandem with the consolidation of the status of the realist novel, and of realism itself, as the epitome of literary fiction—a formal development that broke definitively with the generic conventions of the catastrophic and the unnatural, which shaped other literary modes, such as fantasy, gothic, and science fiction. Darwin's evolutionary theory and its impact on thinking the scale of the human in Victorian realist fiction have been the subject of substantial scholarship since the 1980s.²⁹ George Levine's *Darwin and the Novelists: Patterns of Science in Victorian Fiction*, for instance, traces the convergence of gradualism in evolutionary, cultural, and literary worlds of the Victorian era.³⁰ Rather than explore the direct influence of Darwinian thought on Victorian novelists, Levine puts forward a theory of Victorian gradualism as "an idea that popped up in geology (on a Newtonian model), fought its way into biology, and was the groundwork of nineteenth century 'realism.'"³¹ The gradualist view of the world and conceptions of stable universe were so widely shared that even as "unscientific" an author as Anthony Trollope is portrayed as an exemplary Darwinian. The realism in Trollope's novels is slow and gradualist, leaving scarcely any room for sudden upheavals in the social or moral order. His words in his autobiography reveal his distaste for both speed and sudden ruptures: "Nothing surely is so potent as a law that may not be disobeyed. It has the force of the water-drop that hollows the stone. A small daily task, if it be really daily, will beat the labours of a spasmodic Hercules. It is the tortoise which always catches the hare. The hare has no chance."³²

But by 2000, in the realm of science, the hare had recognizably outpaced the tortoise, leaving behind the pervasive gradualism of Lyell and Darwin in what we now retrospectively call the Holocene era. A decided rhetoric of catastrophism marks Crutzen's and Eugene Stoermer's celebrated inauguration of the idea of the "Anthropocene" in the year 2000, published in the newsletter of the International Geosphere-Biosphere Programme (IGBP) of the International Council of Science: "The expansion of mankind, both in numbers and per capita exploitation of earth's resources has been astounding . . . more than half of all accessible fresh water is used by mankind; human activity has increased the species extinction rate by thousand to ten thousand fold in the tropical rain forests. . . and several climatically important "greenhouse" gases have substantially increased in the atmosphere. . . mankind will remain a major geological force for many millennia, maybe millions of years, to come."³³ This catastrophic vision of humankind's impact on the planet is couched not in a speculative or fantastical mode, but in a *realist* one.

At the same time, this is not the realism of Lyell's uniformitarian vision of earth tenanted by man where the human becomes the measure of

the gradual and the everyday. The challenge to thinking realism in our catastrophic times, I contend, is to confront the limits of a paced-out, gradualist discourse of interiority and social change, and to recast its “antinomies”—speculation, scalar experimentation, improbable occurrence, hypernaturalism—as belonging in its sphere. It is also to attend to the braiding of the gradual with the catastrophic in the way that Rob Nixon elaborates in his idea of slow violence.³⁴ The critical gesture called for here is not an overthrow of the distinction between realist fiction and science/speculative fiction, but a careful tracing of mutations in the former as it discovers its new generic provenance without losing its two foundational attributes—the ability to capture a “sense of the ontology of the present as a swiftly running stream” and an orientation toward a collective social destiny. A synthesis of both has been its hallmark.³⁵ Questions of scale and temporality are key to tracing this mutation. The novel’s collective social destiny now spans the planet. Its temporal frame extends far beyond an individual’s or a society’s lifetime.

The problem of scale has emerged as an important issue in considering nuclear and climate catastrophes, one that is of particular relevance to thinking the realist novel.³⁶ The scale of human observation and experience, notes evolutionary biologist D’Arcy Wentworth Thompson, “lies within the narrow bounds of inches, feet or miles, all measured in terms drawn from our own selves or our own doings. Scales which include light-years, parsecs, Angstrom units, or atomic and sub-atomic magnitudes, belong to other orders of things and other principles of cognition.”³⁷ “Visible incongruity” and the challenges of empiricism have featured in discourses on the rise of the novel since the time of the Enlightenment.³⁸ John Bender’s *Ends of Enlightenment*, for instance, explores the evolution of the novel in the era of experimental natural philosophy of the seventeenth and eighteenth centuries, especially in relation to questions about the kind of knowledge novels made in this era of scientific revolutions.³⁹ Optical enhancement through the telescope and microscope, in particular, brought into view new conceptions of the real. These, in the words of Mark McGurl, “also occasioned a literal derangement at the point of scalar observation and disembedding of the category of the human from its assumed place of pride on the *scala naturae*.”⁴⁰ Jonathan Swift’s *Gulliver’s Travels* captures this derangement in its creative experimentation with miniature and gigantic scales of the human form, and it is well known how important a part the scientific work of the Royal Society played in Swift’s novels.

Overall, as we noted earlier, gradualism gained currency throughout much of the nineteenth century, and there appears to have been a century-long consensus that the realist novel ought to represent human

life on a plausible scale. When Ian Watt writes in his celebrated book *The Rise of the Novel* that the realist novel is the aesthetic equivalent of a more “dispassionate and scientific scrutiny of life than had ever been attempted before,” he is not talking of time-scales associated with geological and evolutionary phenomena, which are inassimilable to the relatively miniscule timescale of modern human history.⁴¹ Nor is he thinking about quantum, molecular, or nanoscales. The alignment of science and literature that Watt envisions, in the context of the nineteenth-century novel, is less about a deeper engagement with scientific breakthroughs than with a particular mode of apprehension of the world: dispassionate, objective, deliberate, and detailed. This investment in a factual and rational everyday matrix was not meant to accommodate implausible shifts in scale that threatened the collapse of a newly forged rational and demystified novelistic universe. The language of nonlinearity, irreversibility, and tipping points could not be part of this conception of formal realism.

In the Cold War era, the rise of nuclear power and the fear of nuclear war compelled writers to confront the problem of scale anew in a nongradualist frame. “Nuclear energy,” notes Susan Stewart, “can be seen as the most extreme embodiment of technological abstraction, for it incorporates the most miniature abstraction (the split atom) with the most gigantic abstraction (that of a technological apocalypse).”⁴² Nuclear criticism generated new work on ideas of the sublime, species death, philosophical ruptures, and apocalyptic art. Scholars have noted the significance of the nuclear age to the rise of poststructuralism, and especially to Jacques Derrida’s formulation of the idea of the “trace” as a disruptive supplement akin to the force of nuclear deterrence, one that threatens total destruction even as it secures a carefully balanced, nondisruptive presence.⁴³ Conjectures about instantaneous destruction (as against a glacially slow evolutionary process) posed by an all-out nuclear war, not just to human civilization, but to most life forms, were frequently captured in a quasi-theological register that appeared to strain the boundaries of recognizably secular narrative and literary forms such as the realist novel.⁴⁴ Nevil Shute’s postapocalyptic novel *On the Beach*, and J. G. Ballard’s apocalyptic quartet of novels, *The Wind from Nowhere*, *The Drowned World*, *The Burning World*, and *The Crystal World*, are good examples. Recent nuclear catastrophes such as those in Chernobyl and Fukushima have generated substantial literary writing, and raise a range of questions about the scale of contamination (visible and invisible) and the transformation of human bodies through radioactive isotopes of iodine that are only beginning to be measured in ways not amenable to ordinary biomedical perception.⁴⁵

The temporal scale of climate change poses a problem of scale of yet another kind. An example of this appears in paleoecologist Curt Stager's book *Deep Future: The Next 100,000 Years of Life on Earth*. In discussing the impact of carbon emission and nuclear contamination on our bodies, Stager notes how the current method of radiocarbon dating to determine prehistoric and deep geological pasts will no longer be reliable when future generations try and date fossils from our contemporary era. So saturated are human bodies with carbon that those born in the immediate Cold War era could expect their "radiocarbon age to be something like 580 years. In the Future." Offering himself as an example of an even more absurd temporal leap, Stager continues, "According to Darden Hood's calculations, I was seemingly born in 5300 AD. In reality, I entered the world in 1956, but the food molecules that Mom inadvertently passed along to me through my fetal umbilical cord were infested with [radioactive carbon] atoms that formed in mushroom clouds, probably somewhere over the Pacific. The bomb carbon that flooded the food webs of 1956 made me so radioactive that my new born body lay three virtual millennia ahead of me in the future."⁴⁶ Here is a conundrum that reverses the standard temporal trope of science fiction as defined by Jameson: the quality of "transforming our own present into the determinate past of something yet to come."⁴⁷ For Stager, the future or the *yet-to-come* is embodied in his carbon-saturated self *here and now*, not in some past of an imagined postapocalyptic future. How does the contemporary global novel capture this temporal torsion within the conventions of realism? The following sections explore some possibilities.

Toxic Bodies, Ab-Human Form

The eponymous protagonist of Sinha's novel *Animal's People* begins his narrative with the words "I used to be human once" (AP 1). As the novel progresses, we realize that he refers not just to his physical deformation—he has a twisted spine that forces him to walk on all fours—but to a radical disturbance in his ontological status. Animal is not just a deformed human body but a living specimen of toxic irradiation and chemiconatural hybridization, a product of a methyl isocyanate that leaks from a catastrophic industrial accident, the remnants of which now inhabit his body. Animal has learned to live with inorganic toxins and even capitalize on his grotesque form. He races through the novel as a raging, profane, full-blooded creature, desiring, hating, bullying, pontificating, and cheating his way through a blighted world. The novel can well be read as a "posthuman comedy" in McGurl's terms, replete

as it is with black humor that renders absurd vainglorious assumptions about the bipedal human form as the epitome of advanced evolution.⁴⁸ “Poor four-foot Animal, for you what is normal?” his adopted mother Ma Franci laments (*AP* 61). As a mutant being—neither animal nor human nor thing—this novelistic character shatters our given understandings of the organic boundedness and exceptionalism of the human form, the political and affective regime of personhood and character, and a narrative lexicon of the human—sovereignty, sympathy, rights—all of which have all been so central to conceptions of the novel these past three centuries.

Feisty, ribald, and unrelenting in its dark humor, *Animal’s People* is a barely-concealed allegory of what has been called the foulest act of corporate homicide in modern history. At five minutes past midnight on December 3, 1984, Bhopal, an industrial town in central India, experienced an eco-industrial catastrophe in the form of a leak of more than forty tons of the deadly gas methyl isocyanate from a pesticide plant of a US multinational, Union Carbide. Faulty equipment and inadequate safety regulations were cited as causes. The initial effects of exposure were coughing, severe eye irritation, burning in the respiratory tract, stomach pains, and vomiting. An estimated 3,800 people died the following morning. Findings during autopsies revealed alarming changes not only in the lungs but also in the brain, kidneys, liver, and intestines. The stillbirth rate increased by 300 percent and the neonatal mortality rate by 200 percent over the next few months. Children born to chemically damaged mothers displayed genetic deformities that defeated the medical community. Union Carbide has long since wound up its business in India, and its remnants were absorbed by Dow Chemical in 2001. Despite being criminally prosecuted, its CEO Warren Anderson escaped without punishment, and the company paid a mere \$470 million as compensation to the victims, though by many estimates the liability was greater than the \$10 billion for which the company was insured.

Animal’s People is set in an imaginary town called *Khaufpur*, Hindi for “City of Terror,” and referred to in the novel as “the world capital of fucked lungs” (*AP* 231). The multinational company responsible for the industrial catastrophe, Union Carbide, is simply referred to as the “kampani” in the colloquial demotic Hindi in which the main character, Animal, narrates the story. Sinha appends an editor’s note: “This story was recorded in Hindi on a series of tapes by a nineteen-year-old boy in the Indian city of Khaufpur. True to the agreement between the boy and the journalist who befriended him, the story is told entirely in the boy’s words as recorded on the tapes” (*AP* np). The journalist (jarnalis) happens to be from Kakadu country (or Australia), and in a letter to

Animal he writes: “‘Animal, you must imagine that you are talking to just one person. Slowly that person will come to seem real to you. . . . You must trust them and open your heart to them, that person will not judge you badly whatever you say.’ Animal then talks to the reader and says ‘You are reading my words, you are that person. I’ve no name for you so I will call you Eyes’” (AP 12-13). The befriending of Animal by the Australian journalist is preceded by an eruption of black humor about the global humanitarian media apparatus that records the voices of victims without an adequate understanding of their lifeworlds. Animal’s rage when he hears that an Australian journalist wants to publish his story is worth hearing. Out spews the rough-n-ready street lingo full of swear words: “Makes no sense. How can foreigners at the world’s other end . . . decide what’s to be said about this place? . . . Well, I’m in a shining fucking rage . . . this Jarnalis should not be allowed to tell my story. Comes here strutting like some sisterfuck movie star. What? Does he think he’s the first outsider ever to visit this fucking city? . . . For his sort we are not really people. . . . Extras we’re, in his movie. Well bollocks to that. Tell mister cunt big shot this is my movie he’s in and in my movie there is only one star, and it’s me!” (AP 9). The global reader of Animal’s testimony is interpellated by the term “Eye.” Thus begins our visual witnessing of the unfolding catastrophe narrated in Animal’s profane tongue.

Much of the narrative recounts the prolonged aftermath of the deadly gas leak: the chronic toxicity affecting the people of this unfortunate region and decades of activism by NGOs and health professionals. While the company wound up its operations following the disaster, it failed to clean up the industrial site completely. The plant continues to leak several toxic chemicals and heavy metals that find their way into local aquifers. Dangerously contaminated water has now been added to the legacy left by the company. Methyl isocyanate and other assorted toxins survive stubbornly in this land of the living dead. As a character in the novel tells the US doctor Elli, “Our wells are full of poison. It’s in the soil, water, in our blood, it’s in our milk. Everything here is poisoned” (AP 107-8).

Animal’s People begins in the wake of catastrophe. Yet the novel is not written in a postapocalyptic mode in the way this latter is typically understood. A postapocalyptic work is set in an imaginary future. Its chronotopes and characters illuminate humankind’s deepest fears of what might happen should we cross certain forbidden thresholds: social, political, technological, moral. Satire and comedy are rarely its forte. Postapocalypticism’s future perfect temporality—something will have happened—is not a luxury available to the protagonists in Sinha’s

novel. Nor do we have a picture of what normal life was in Khaufpur before the industrial accident. The apocalypse saturates its present and forecloses a future beyond toxins. This is precisely what Ma Franci tells Animal when he comes to her recounting the wickedness of the justice system that will not pay compensation to the victims. “Don’t you see, my poor little Animal,” reasons Ma Franci, “the Apokalis [apocalypse] has already begun? It started on that night in Khaufpur” (*AP* 63). In the rest of the novel, Animal refers to himself and the inhabitants of his poisoned city as “the people of the Apokalis.” The horrors of the apocalyptic present bear down on the novel’s realist frame as it recasts the protagonist’s *bildung* as a journey of learning to live in the wake of catastrophe. The nominalist correspondences—Khaufpur with Bhopal, Animal with a real-life person who suffered a similar spinal deformation, Kha with the aborted fetuses in the medical research center—are riven home with a mimetic force that leaves no room for speculation about the real-life setting of this story.

At the same time, the novel’s graphic depiction of the pervasive invasion of toxins bring to mind other nonrealistic genres, in particular the gothic.⁴⁹ The novel “stay[s] with a dying world,” in the words of Timothy Morton, who offers a gothic reading of dark ecologies in another work.⁵⁰ Toxic remnants of the industrial behemoth—the Kampani—haunt the survivors. Animal is a creature of this spectral world. The ruins of this deadly factory are his nighttime haunt and his habitus. Here he is, undeterred, giving the reader a tour of this blighted, apocalyptic site:

Imagine you’re in the factory with me. See that thing rising above the trees, those rusty pipes and metal stairs going nowhere? That’s the place where they made the poisons.... Each big wind pulls more iron sheets loose. We hear them banging like angry ghosts. All that’s left now is its skeleton. . . . At the top of the highest stair, a single black pipe continues into the sky. . . . Up this pipe the poisons flew on that night. . . . Step through one of these holes, you’re into another world. Gone are city noises, horns of trucks and autos. . . . No bird song. No hoppers in the grass. No bee hum. Insects can’t survive here. . . . Sometimes moving through this jungle *I’d get dizzy and feel a sharp metallic taste on my tongue* (*AP* 30, 31, emphasis mine).

Toxins not meant to be inside the protagonist’s body are now in his entrails and nervous system, and from this monstrous admixture has emerged a creature hailed in the novel as “Animal,” itself a misnomer, and deeply inadequate to the ontological status of this mutated creature in whose body rests a catastrophic molecular history without end. The phrase “technogenic catastrophe” (*Tekhnohenna Katastropha*) used frequently in the context of Chernobyl is apt here. It emphasizes the

nonclosure of biological and cellular effects, a genetic drift of toxins that continue to infect generations to come.⁵¹ After Chernobyl, tens of thousands of people were exposed to radioactive iodine-131, which had been absorbed rapidly in the thyroid. The region around Ukraine witnessed a massive onset of thyroid cancers as soon as four years later. As for the immediate effect, Svetlana Alexivich's *Voices from Chernobyl* has this disturbing interview with a newly married woman whose husband was exposed to radioactive iodine: "I changed that little sheet every day, and every day by evening it was covered in blood. I pick him up, and there are pieces of his skin on my hand. I ask him: 'Love. Help me. Prop yourself up on your arm, your elbow, as much as you can, I'll smooth out your bedding, get the knots and folds out.' Any little knot, that was already a wound on him. I clipped my nails down till they bled, so I wouldn't accidentally cut him."⁵²

To turn the comparative lens back to Bhopal, and to Sinha's city of terror (Khaufpur), methyl isocyanate once inhaled turns the body and brain into mush, and victims often drown in their own fluids—a condition called pulmonary oedema or cerebral oedema. The body literally cannot prevent its insides from spilling out. Those who survive suffer severe neurological, neurobehavioral, genetic, and reproductive abnormalities. "I was six when the pains began," says Animal, "plus the burning in my neck and across the shoulders. . . . My first memory is that fire . . . the burning in the muscles became a fever . . . after that my back began to twist . . . when the smelting in my spine stopped the bones had twisted like a hairpin, the highest part of me was my arse" (AP 15) The survivors live as "ab-human" subjects characterized by morphic variability and the collapse of the recognizable human form.⁵³ This ab-human form is not the end product of technogenic and biomedical crises alone, but a byproduct of technocratic governance, corporate greed, and biomedical reason—an anomalous figure of a catastrophic biocapitalism managed as a terminal illness.

While the figure of Animal is a powerful rendering of this ab-human form in the novel, another is a two-headed embalmed fetus, simply called "Kha-in-the-Jar." An animated mutant and a frequent interlocutor of Animal, Kha-in-the-Jar is a remediated entity, first emerging in public consciousness in India through images of the famous art photographer Raghbir Rai, who exposed the work of medical practitioners interested in preserving deformed fetuses so they could conduct experiments on the effect of methyl isocyanate on human bodies. Dr. Satpathy was one such doctor. He was the director of the forensic medical unit in Bhopal and dedicated decades to treating gas victims. After preserving the fetuses of the Bhopal catastrophe for twenty years, his unit had to discard them as

he could not generate any interest among medical grant bodies to fund his research.⁵⁴ Kha's ab-human status as detritus of biomedical reason is expressed in this throwaway line in the novel: "Hospital decided to chuck us out. After twenty fucking years nothing did they learn from us except that when you poison people bad things happen" (*AP* 138).

Together, Animal and Kha-in-the-Jar constitute a devastating world picture of a necropolitics of disaster entwined with a biopolitics of resilience. A term one frequently hears in relation to eco-industrial catastrophes is resilience. Resilient subjects, as Nicole Shukin notes in her work on Fukushima, constitute the biopolitical *double* of lethal energy that is released in the form of nuclear radiation or poisonous gases.⁵⁵ Resilient subjects are akin to mutant lifeforms who survive industrial and nuclear catastrophes despite extensive damage to their cellular selves. Witness the exchange between Animal and Kha on this *doubleness* of biopolitical resilience:

"Brother Animal," says he [Kha], "you and I are not so different, Doublers both, we're. Two of me there's, two also of you."

"What do you mean?" I ask, not best pleased by this comparison.

"My two heads rise from one neck. From your hips, at the point where your back bends, rises a second you who's straight, stands upright and tall. This second you's there all the time, has been there all along, thinks, speaks and acts. . . ." (*AP* 139).

Although resilience gets fetishized as a resourcefulness inherent in human nature and the ecosystems in which humans are embedded, in recent years the term has been recast as a contingent form of biocapital that is shocked into existence by neoliberal catastrophe, which is to say, catastrophe caused and managed by an economic rationality now installed within every sphere of life.⁵⁶ Resilient subjects, much like Animal in Sinha's novel, acclimatize to unimaginable thresholds of life and death.

A brief anecdote on the grotesque politics of toxic haunting and ab-human resilience, which was staged in Bhopal in 2009 on the twenty-fifth anniversary of the disaster, illustrates this phenomenon graphically. A group of survivors hosted a lunch for government officials, forensic scientists, and administrators of Bhopal's medical establishment. The event was a protest against a scientific study commissioned by the state government that declared that the effects of chemicals in the factory's vicinity were benign, thus nullifying their lived experience of chronic toxicity or what I have called toxic haunting. The "Benign Buffet," as the lunch was called, offered a menu that appropriated and renamed the chemical wastes that the scientists and officials referred to as "benign" in their report. The menu included:

Semi-Processed Pesticide on Watercress
Naphthol Tar Fondue

Reactor Residue Quiche

Sevin Tar Souffle

Lime Sludge Mousse

All served with B'eu Pal Water Cocktail.⁵⁷

This tragicomic lunch protest brings to mind not just the idea of animate matter so central to the work of new materialists like Karen Barad and Jane Bennett, but also Sianne Ngai's term "animatedness" for the politically charged affect of racialized, disadvantaged, and non-mainstream groups who are simultaneously perceived as overly agitated and emotive and also as pliant and ineffective in making an impact on the world. Animatedness, notes Ngai, is a matter of proportion: a combination of too much agitation and too little agency.⁵⁸ This is a classic trait of ab-human resilient beings. The resonance with "Animal" in Sinha's novel is hard to miss. Animal's final words are: "All things pass, but the poor remain. We are the people of the Apokalis. Tomorrow there will be more of us" (*AP* 366). Animated resilience, indeed!

Nuclear Haunting, Extraterritorial Worlds

The disasters of Bhopal, Chernobyl, and Fukushima have triggered deep anxiety about our large-scale exposure to radioactive and other industrial toxins, and have revived catastrophic modes of thinking and narrating our planetary futures. Hiroshima and Nagasaki as sites of the first atomic bomb explosions continue to haunt our present.⁵⁹ George's *Ocean Roads* is powerful realist novel on nuclear catastrophism, and it offers an intriguing contrast to the mid-century, postapocalyptic works of Ballard, especially *The Burning World*. A prize-winning novel from the Southern Pacific region, *Ocean Roads* is written by a Maori New Zealander. The Pacific, we might recall, has been a site of nuclear testing and nuclear waste dump in the Cold War arms race. Between 1946 and 1958, the US detonated twenty-four nuclear devices at seven test sites in the Bikini Atoll, part of the Marshall Islands in the Pacific. These detonations were made on the reef itself, on the sea, in the air, and underwater. Even before the Marshall Islands appeared on the global climate horizon as a zone most vulnerable to inundation from sea level rise, many of its islands were rendered uninhabitable due to these nuclear tests. Tracing the arc of a nuclear imaginary from the Cold War era to the end

of the twentieth century, *Ocean Roads* depicts irradiated and militarized lifeforms across the globe.

While the novel's present is 1989 in New Zealand, its historical frame is haunted by anniversaries of nuclear and chemical warfare—the testing of the atomic bomb in the deserts of New Mexico; the bombing of Pearl Harbor; Hiroshima and Nagasaki; the VJ Day celebrations of August, 1945; and the 1969 napalm gas attack in Vietnam. Each of these is captured through the photographic lens of one of its key characters, Etta, a Maori woman and a Pulitzer Prize winner whose filial bonds stretch across these global histories of irradiated violence. At the heart of this novel is Etta's ex-husband Isaac Simeon, a British physicist and a core member of the Manhattan project who helped design the first plutonium bomb. The novel tracks his travels from Los Alamos and the Trinity bomb testing site to Nagasaki in order to witness the aftermath of the atomic attack, and from there to Antarctica where he experiences a psychosis from which he never recovers.

Ocean Roads is saturated with what Elizabeth DeLoughrey calls “helio-graphic” tropes.⁶⁰ The motif of light in photography, cinema, nuclear energy, and quantum physics shapes the novel. Events unfold in the form of snapshots from a photographic lens. Sometimes they are narrated with the compressed force of a tightly wrought atom. In witnessing the shattered lives of Etta and Isaac, a photographer and a nuclear physicist, one cannot help being reminded of Paul Virilio's throwaway remark that nuclear explosion functions like a camera flashing an apocalyptic snapshot.⁶¹ Radio-autographs of irradiated people fleeing the blast have, in fact, been found on building surfaces and staircases in Hiroshima and Nagasaki.⁶² Etta's first husband, Joaquin Alvarez, gifts her her first camera. A US soldier during World War II, he dies in the Pacific atoll of Tinian during the 1944 battle with the Japanese. In global nuclear history, Tinian is also the testing site for B-29s that created the two plutonium bombs—Little Boy and Fat Man—that destroyed Hiroshima and Nagasaki respectively. We learn that Isaac, Etta's second husband, participated in the creation of Fat Man in Tinian. Years later, Joaquin's son and Isaac's stepson, Troy, contemplates his toxic paternal inheritance at the Trinity bomb site:

Jornada del Muerto

The Trinity site. The atomic bomb site.

The only things he knows about his father is that he was born in the deserts of New Mexico and died on a Pacific atoll. An atoll where they built the airfield that launched the B-29s that dropped the atomic bombs on Japan to end World War Two. *His father's blood was in that coral runway. And that bomb was in his stepfather's blood.* (OR 121, emphasis mine).

Later in the novel, Troy will marry the daughter of a Nagasaki survivor, Akiko. Isaac and Etta's son Caleb will die of a type of leukemia suffered by Japanese survivors of the bomb. These radioactive entanglements create patterns of lightness and darkness that shimmer through the novel. We see this in the halting exchange between Akiko and Caleb:

The day she was born was the day her parents began to die. . . .

"You talk of birthdays," she [Akiko] says. "The day I was born my mother and father carried me through streets of people shambling, slipping, falling. The sky was red, purple, yellow, black. Ash fell like dying butterflies."

. . . .

"Where were you born?" says Caleb.

"Nagasaki."

He closes his eyes

"You know about Dad," he says.

"Yes, I know who he is." (*OR* 115, 48)

A radioactive visuality saturates *Ocean Roads*. Akiko refers to the nuclear flash in Nagasaki as "pika"—the term used by the Japanese to describe the bomb. Etta, in describing the effect of the Napalm gas attack during the Vietnam war, notes that "no one looked at the flames, they were too bright. Like the sun had fallen into the trees" (*OR* 94). Her Pulitzer prize-winning photo of a family of three with blackened faces fleeing the Napalm attack is described as "an unholy trinity," a phrase that haunts the narrative (*OR* 95). It catalyzes her son Caleb's antiwar activism and his subsequent self-immolation on Armistice Day. Her husband Isaac, one of the creators of the Trinity Bomb, is described as a disciple of the sun. His father was worried about Isaac's fascination as a boy with "what made the sun shine" (*OR* 73). This fascination would eventually shatter many worlds, including his own.

The novel's realist mode can well be called traumatic as the narrative proceeds in flashes and flashbacks.⁶³ Significantly for the purposes of this essay, we can also call this realist mode planetary for its depiction of the radical alterity of light and vision to the human scheme of things. The scale of the visible in this novel, when tracked through nuclearism, operates beyond the realm of ordinary human visual experience. Quantum physics renders light as both wave and particle and, in the process, upends our fundamental grasp of empirical reality. It is a scientific breakthrough of momentous impact not just on the empirical foundations of modern science, but on the very idea of vision itself. All aids to vision prior to the emergence of quantum physics—the microscope, the telescope, the camera—were conceived as tools to enhance human visualization of natural phenomena, and to measure with accuracy the

perceptual range of what was scientifically knowable and certain. The subatomic scale shatters this epistemic certainty, and radically shifts the horizon of perceptibility. Werner Heisenberg's uncertainty principle and the famous thought experiment Shroedinger's Cat, by the eponymous scientist Erwin Schroedinger, highlight the fundamental instability of perception at subatomic levels. In the latter, the cat can be seen as both dead and alive instead of one or the other. When conjugated with the nuclear, this subatomic shift in visual logic generates an "A-visibility," a nonhuman visual field that bursts forth from the release of energy after an atomic explosion. Akira Mizuta Lippit, who coined this term, refers to the post-Nagasaki world as characterized by the "destruction of visual order."⁶⁴ The ab-human fallout of A-visibility saturates *Ocean Roads*. The Nagasaki survivor, Akiko, has a scar running from her throat to her chest. She is a *hibakusha*, one who lives on after nuclear catastrophe. Her body is exposed to radiation from the bomb and, later, from X-rays, as she perforce participates in medical research on radioactive survivors. She stands at the cusp of a world history now split into preatomic and postatomic stages. The latter symbolizes the penetration of radioactive isotopes of carbon, plutonium, and strontium into human bodies. This is what we see Stager refer to—discussed in an earlier part of this essay—as living in the future-present. Carbon-dating the Cold War generation will reveal the dates of their birth as a few hundred years *after* they were born. Akiko is a vivid embodiment of this posthuman future-present.

Earth system scientists have identified radioactive remnants in layers of rocks as a significant benchmark for dating the Anthropocene.⁶⁵ The geological imprint of radioactivity that may be found among human fossils in the future is invoked in two powerful images of human bones in the novel. Isaac chooses dried bone fragments in the sands of the Jornada Del Muerto desert to measure the impact of the Trinity bomb blast:

Jornada Del Muerto—the journey of death—had been named by sixteenth century Spaniards after a party of travellers had perished there for want of water. . . He reached beside him, searching for something he could throw when the bomb's shockwave hit so that he could gauge the force of the wave. He scratched about in the sand, following his torch beam to where *a few fragments of desiccated bone lay half-buried*. Some creature that had died of thirst. . . . His fingers held the bone fragments clasped tight. When the shockwave hit *he tossed the bones high above him. They vanished in an instant*. He lifted the slide rule from his pocket. The numbers flickered red and blue and violet in a strange new light" (*OR* 244-47, 47-48, emphasis mine).

Isaac's gesture links multiple catastrophic histories at various scales—the destruction of indigenous lifeworlds by Spanish colonization, the

devastation of the two World Wars, and the irremediable radioactive violence his team of scientists has just unleashed on earth. A quarter of a century later, Isaac's son Caleb is diagnosed with acute lymphoblastic leukemia associated with the survivors of Hiroshima and Nagasaki. His experience is variously described as a "shuddering in his bones" (*OR* 200) and "spiked wheels turning in his bones" (*OR* 305). On one occasion, he can scarcely conceal his bitter smile when his oncologist suggests "radiation" as his treatment. On another occasion, Caleb looks up at the sun and contemplates the effect of its searing light on his dying bones.

This trope of catastrophic light—irradiated, desiccating, atmosterifying—makes its way into a zone of nonhabitation, the continent of Antarctica. "The glow of the Antarctic sun," we read, "is bright enough to sting even downcast eyes" (*OR* 65). George positions one of the climactic points of the novel in Antarctica. Especially significant is the novel's stunning depiction of Antarctica as an extraterrestrial zone, a proxy for outer space with which to contemplate both our geological agency in transforming this planet and our jolting experience of alterity in inhabiting the earth. It is the one continent that, as Mariano Siskind notes, has defied the territorial expansion of universal reason and world history that marked the rise of European modernity and its colonial globality.⁶⁶ The ability of explorers to discover, name, narrate, and inscribe remote territories has been critical to imperial expansionism. Antarctica has repeatedly defeated explorers. Siskind's insight emerges from his work on Captain James Cook's failed attempts at Antarctic exploration in 1773-1774. Captain Cook famously referred to Antarctica as a space "doomed" by nature, one amenable to neither empiricial observation nor territorial conquest. His words relegate Antarctica to a radical exceptionality that has since reverberated in discourses on this icy continent at the bottom of the earth. The race to militarize the seventh continent escalated throughout the twentieth century, and culminated during the Cold War when it served as the site of experimentation for space-age technologies for two superpowers, the US and the Soviet Union.⁶⁷

As an extraterritorial space, Antarctica represents the limits of human habitation on earth and a space of our planet's alterity. "I may as well have been on Mars," remarks Isaac at one point in the novel (*OR* 336). Of all the militarized landscapes he has mapped in *Ocean Roads*, George turns to Antarctica to set the scene for his protagonist's realization of his complicity in nuclear violence: "Antarctica,' he [Isaac] says. 'I'd 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 foot with my flesh instead of my mind, my imagination. You know what

hurts most . . . that I gave it all up when I was satiated. But I'd already spoonfed the monster, fed and clothed it and pushed it out in a little red wagon, out into the world" (*OR* 342). A little later Isaac says: "We make our own Antarticas." He has a breakdown in Antarctica in the very year (1959) when the first images of planet are taken from a US satellite in outer space. His psychosis literally renders him speechless for over a decade. Antarctica is described as a place of endless twilight and a desert. Isaac at one point reflects that "the only green for a couple of thousand miles is that of military fatigues" (*OR* 65). His geologist friend mentions casually, "It hasn't rained here in a million years." "What do you mean, a million years?" asks Isaacs. "I mean a *million* years" (*OR* 66). In wandering the Antarctic desert, Isaac finds phantom footprints and an uncanny silence that replicate his experience of visiting postatomic Nagasaki. His experience of the latter's blighted landscape haunts him incessantly and is magnified on the icy continent: "He moves among them, among their death caravan. . . . Their desiccated bodies could be dozens or hundreds or even thousands of years old" (*OR* 340). The novel captures Isaac's psychosis through a dream sequence involving dramatic scalar shifts in time and space. At one point Isaac panics and "begins to run, knowing that this tiny figure is covering in seconds what the glacier covers in a century." Isaac's mental scape gradually becomes detached from his own corporeal form, as he appears to acquire both an atomic and a top-down satellite vision. He dreams of the lights of a city below "like a Lilliput landscape" (*OR* 338) even as his own being merges with the plutonium-239 bomb that he created, the so-called "Fat Man" dropped on Nagasaki: "The B-52 bombers doors open for me and I slip away. . . . My head and my body, encased in their metal sarcophagus, are two separate nuclear weapons. In my head a ring of high explosives surround a central compressible core of plutonium 239 . . . An implosion bomb, a Fat Man . . . I have begun . . . My heat and pressure is more a child of the sun than the earth . . . from first trip of the altimeter switch to explosion has taken me 600 billionths of a second. Beneath me, skin peels, eyeballs melt, bones become liquid" (*OR* 340). The narrative here carefully pans the shift in visual scale from the subatomic to the satellite: "Someone shadowing my flight might glimpse my skin buckling, crackling, the first rip sending searing light into the last picoseconds of blue sky" (*OR* 340). This dream sequence is a formal moment wrenched from the plot, as it were, a mode of closure as much as a reprisal.

This novelistic capture of both the moment of atomic blast and of satellite vision on the continent of Antarctica is informed by a large body of scientific research. Historians of science have highlighted the

significance of Antarctica to the rise of Cold War militarism and the emergence of space age technologies. Drawing on their insights on a project called International Geophysical Year (IGY) that ran from 1957-1958, DeLoughrey notes how significant the project was “to creating new scientific and juridical models of extraterritorial spaces of the deep seas, outer space, and Antarctica.”⁶⁸ The IGY’s research in Antarctica (the reason Isaac spent so much time there), led to the launch of the first artificial satellites: *Sputnik* in 1957 by the USSR and *Explorer* in 1958 by the US. The project also led to the creation of three crucial legal instruments: the Law of the Seas, the Antarctic Treaty, and the Outer Space Treaty. Through these instruments, “the extraterrestrial spaces of the planet were completely territorialized in an unprecedented remapping of the planet.”⁶⁹

As I noted earlier, this arc of Cold War nuclear and military history interpellating Antarctica serves as an indispensable bridge to thinking climate change in our time. The poles resonate with fears of environmental apocalypse when ozone depletion, permafrost melting, and icesheet meltdown unleash cascading effects ranging from catastrophic sea-level rise to oceanic acidification, and the destruction of biomes critical to the preservation of life. In the final part of this essay, I turn to a novel on a region far removed from Antarctica, but one caught up in the same history of catastrophic geophysical change due to global warming. The place is the Sundarbans, a vast area of tidal mangrove forests in the Bay of Bengal threatened by rapidly rising sea levels that has taken centerstage in discourses on climate refugees.

Nonhuman Worlds and Geosocial Mediation

Ghosh’s *The Hungry Tide* appeared in 2004 when the idea of catastrophe was associated with geopolitical upheavals like 9/11 and the global war on terror. The term “climate change” was beginning to emerge in public consciousness, and the idea of the Anthropocene had not yet gained the global currency it has today. Neither term appears in *The Hungry Tide*. Before the emergence of climate change as an overarching frame, concerns about population growth, industrial pollution, nuclear contamination, endangered species, and resource shortage dominated perceptions of ecological crisis. Climate change brought the phenomenon of global warming into focus, as it did catastrophic scenarios of sea-level rise and inundation of large coastal zones. Ghosh’s novel prefigures this shift and works formally at the cusp of this transition in global environmental consciousness.

The novel is set in the Sundarbans, a vast deltaic region of mangrove forests straddling two districts in the state of West Bengal in India and southern Bangladesh. Sundarbans is one of the most complex and endangered ecological zones in the world, and is designated by UNESCO as both a World Heritage Site and an International Biosphere Reserve. Spread over approximately 3900 square miles, the delta originates at the confluence of four rivers—the Ganga, the Brahmaputra, the Padma, and the Meghna—as these flow into the Bay of Bengal. A dense ecozone where freshwater mingles with saltwater, the Sundarbans has evolved over millennia through the deposition of upstream sediments intercut by multidirectional tidal currents. It is a physiographical mesh of agricultural land, mudflats, tidal sandbars, swamps, islands, and estuaries. This deltaic region is home to rare megafauna like the Bengal tiger. The uniquely brackish nature of the water in the region nurtures some of the richest aquatic life in the world including sawfish, electric rays, king crabs, mud crabs, king prawns, silver carp, olive ridley sea turtles, and the Gangetic dolphins. It also has one of the most dense human habitations in the world with over four million people. The cultural complexity of Sundarban society derives from its centuries-long history of contact and migratory patterns of exchange with Arab trading communities and Portuguese pirates, and the vagaries of its subsequent governance by the Mughal rulers, the British, and the postcolonial Indian state. A combination of human and nonhuman factors—industrial scale fishing, unsustainable agricultural and forestry practices, wildlife conservation projects, refugee settlements, rapid extinction of rare megafauna, accelerated depletion of biodiversity, and alarming sea-level rise due to global warming—have rendered the Sundarbans one of the most endangered places on the planet.

Since its publication, *The Hungry Tide* has overwhelmingly been read as a postcolonial classic staging an agonistic battle between the demands of environmental conservation, species extinction, and the urgency of social justice for refugees in the global South.⁷⁰ The humanitarian catastrophe that constitutes the political epicentre of this novel is the Morichjhapi massacre of refugees in 1979. A real-life battle between the forces of conservation and the rights of landless refugees in post-independence India, the massacre scarcely registered in the India mediascape outside of Bengal, and has now all but vanished from public memory. Ghosh's novelistic retrieval of the Morichjhapi massacre sheds light not only on the deadly aporia of refugee rehabilitation and wildlife conservation in the subcontinent, but also on the precarious habitability of the Sundarbans for both humans and nonhumans in the era of global warming. The massacre is a devastating fallout of a conservation project launched

by the Indian government in 1973 to protect the endangered Bengal tiger and other rare species. This conservation project established ten wildlife reserves across India in which no humans were allowed to settle. One of these was located in the Sundarbans. Morichjhapi, an island within the borders of this wildlife reserve, became a flashpoint when a group of refugees, predominantly from Bangladesh, decided to settle there in the late 1970s. Since the subcontinental Partition of 1947 and the Bangladesh Liberation War of 1971, thousands of refugees were forced to resettle in the Dandakaranya camp, a semiarid region in the central Indian state of Madhya Pradesh.⁷¹ Dandakaranya, as Annu Jalais notes, is “an area entirely removed, both culturally and physically, from the refugee’s known world.”⁷² In 1978, when the Communist Party took power in West Bengal, many refugees, confident that the Left Front state government would support their cause, moved back to West Bengal. Around 30,000 settled in Morichjhapi, the site of the wildlife reserve. The Left Front government, far from protecting the refugees, tried to drive them out by blockading supplies to the island. When that did not work, they hired policemen and gangs to forcibly evict them and shoot those who refused to leave. Over 4,000 families were killed in the shootout. *The Hungry Tide* powerfully stages the irreconcilable agendas of wildlife conservation bodies, local social justice warriors, left political movements, and the brutal identitarian politics of the postcolonial Indian nation-state.

In the final pages of this essay, I shift my interpretive focus from postcolonial environmentalism and read the novel through the lens of the planetary that illuminates the forcings of the geophysical and climatological on the Sundarbans. A significant feature of *The Hungry Tide* is the way in which the narrative thread of the Morichjhapi massacre is woven throughout with the larger tidal catastrophe unfolding in the cyclonic environs of the Sundarbans. Both are mediated through the journal of a dead character called Nirmal, a Marxist social activist with a deep poetic sensibility who quotes from Rainer Maria Rilke’s *Duino Elegies* as he reflects on the precarity of human and nonhuman lives in the Sundarbans. The braiding of geophysical and humanitarian catastrophes is captured in the novel’s textual design such that Nirmal’s diary appears in italics and alternates with the rest of the diegesis in normal typography.

The Hungry Tide brilliantly illustrates what I have been calling planetary realism. Three features are particularly worth noting. The first is the novel’s magnificent depiction of the Sundarbans as an ecological and geological force, an actant more powerful than humans, and one that determines the fate of both human and nonhuman actors. An aesthetics

of alterity and nonbelonging saturates *The Hungry Tide*. The Sundarbans appear as a beguiling yet treacherous ecosystem that is neither land nor water, and where streams and mangrove forests appear and disappear in the course of a single day. This deltaic mesh of land and water looms over the novel as no other character does. The novel begins with a character called Kanai, who reads pages from a diary that we retrospectively know to be Nirmal's. Our first glimpse of this diary does not reflect Nirmal's activist zeal to protect the refugees of Morichjhapi, but his poetic description of the Sundarbans as an geoscape that defeats our normal perception of habitable landscapes:

Until you behold it for yourself, it is almost impossible to believe that here, interposed between the sea and the plains of Bengal, lies an immense archipelago of islands . . .

The islands are the trailing threads of India's fabric, the ragged fringe of her sari . . . half wetted by the sea. They number in the thousands . . . some are immense and some no larger than sandbars. . . . The rivers' channels are spread across the land like a fine-mesh net, creating a terrain where the boundaries between land and water are always mutating, always unpredictable. . . . There are no borders here to divide fresh water from salt, river from sea . . . When the tides create new land, overnight mangroves begin to gestate, and if the conditions are right they can spread so fast as to cover a new island within a few short years. A mangrove forest is a universe unto itself . . . There are no towering, vine-looped trees, no ferns, no wildflowers, no chattering monkeys or cockatoos. Mangrove leaves are tough and leathery, the branches gnarled and the foliage impossibly dense. . . . At no moment can human beings have any doubt of the terrain's hostility to their presence, of its cunning and resourcefulness, of its determination to destroy or expel them (HT 6-7, italics original)

While not exactly envisioning an outer space-like, extraterritorial entity like Antarctica, this passage jolts us into an awareness of Sundarbans' uncanny ecoscape as a metonym of our planet's alterity to the human scheme of things. This aesthetics of geoalterity seeps through the novel. The paradoxical nature of climatological patterns—simultaneously slow and furiously rapid—is captured in yet another diary entry:

To me, a townsman, the tide country's jungle was an emptiness, a place where time stood still. I saw now that this was an illusion . . . What was happening here, I realized, was that the wheel of time was spinning too fast to be seen. In other places it took decades, even centuries, for a river to change course; it took an epoch for an island to appear. . . . But here . . . rivers stray from week to week, and islands are made and unmade in days. In other places forests take centuries, even millennia, to regenerate; but mangroves can recolonize a denuded island in ten to fifteen years. Could it be that the very rhythms of the earth were quickened here so that they unfolded at an accelerated pace? (HT 224, italics original)

A second aspect of this novel's planetary aesthetic is its displacement of human exceptionalism and its painstaking, scientifically informed depiction of multispecies relationality through the figure of the endangered Irrawady dolphin, the cetologist Piya Roy, the fisherman Fokir, and the tides in which they explore, swim in, and even fatally encounter a world teeming with cetacians, crabs, shrimps, and other aquatic creatures. This multispecies entanglement constitutes the novel's biotic surround, and its scientific underlay, much as nuclear science and Cold War militarism inform George's *Ocean Roads*. At one stage, Piya reflects on the challenges of researching the Irrawady dolphin: "She would have to acquire a working knowledge of a whole range of subjects—hydraulics, sedimentation geology, water chemistry, climatology; she would have to do seasonal censuses of the *Orcaella* population" (*HT* 125). The perception that human nature is an interspecies relationship, and that the recent rise of multispecies ethnographies traces human encounters with plants, animals, fungi, and microbes, has gained substantial traction among humanists and literary scholars.⁷³ *The Hungry Tide* devotes pages to the taxonomy and behavior of the Irrawady dolphin, as well as to the history of its scientific discovery in the colonial era of natural history expeditions. The symbiotic bond between Piya, Fokir, and their aquatic surround is captured in this short passage that brings to life the multispecies geosociality of the Sundarbans:

Piya remembered a study that had shown there were more species of fish in the Sundarbans than could be found in the whole continent of Europe. . . . The waters of river and sea did not intermingle evenly in this part of the delta; rather, they interpenetrated each other, creating hundreds of different *ecological niches*, with streams of fresh water running along the floors of some channels, creating variations of salinity and turbidity. These micro-environments were like balloons . . . Each balloon was a *floating biodome* filled with endemic fauna and flora, and as they made their way through the waters, strings of predators followed, trailing in their wake. This proliferation of environments was responsible for creating and sustaining a dazzling variety of aquatic life forms—from gargantuan crocodiles to microscopic fish. (*HT* 125, italics added)

The narrative overflows with multispecies entanglements, both contemporary and mythic. Mythic entanglements appear in the legends of Bon Bibi and Dokkhin Rai, a goddess who is worshipped as the guardian spirit of the mangrove forest, and a demon who morphs into a tiger, respectively. The native inhabitants of this tidal country perceived the dolphins as Bon Bibi's benign messengers. Experiments with nonhuman points of view punctuate, and periodically shatter, human perception, as we see in an excerpt from Nirmal's diary that mediates the direct

gaze of a dolphin through Rilke's poetry: "*Some mute animal/raising its calm eyes and seeing through us, and through us/ This is destiny . . .*" (HT 235, italics original).

Planetary realism, we noted earlier, is a formal and figural recalibration of the scale of human habitation on this planet in relation to nonhuman lifeforms and inorganic matter. The novel's self-reflexive braiding of mythographic and geological time with the historical and the contemporary—its third feature—is a fine illustration of this scalar recalibration. Here, I would like to draw attention to the metaleptic work that Nirmal's diary does. In narratology, metalepsis is the transgression of the border that separates narrator and action, and the narrator's interaction with the story, for heightened effect. In contemplating Sundarbans' mythological, geological, and climatological history, Nirmal writes how he would teach potential students this history: "*Tell me children, I would begin, 'What do our old myths have in common with geology?'. . . . Look at the size of their heroes, how immense they are—heavenly dieties on the one hand, and on the other the titanic stirrings of the earth itself—both equally otherworldly, equally remote from us. . . . And then, of course, there is the scale of time—yugas and epochs, Kaliyuga and Quaternary. And yet—mind this!—in both, vast durations are telescoped in such a way as to permit the telling of a story*" (HT 180, italics original). The diary entry overflows with mythic analogues of geological phenomena that culminate in the mythical story of the Ganges river's merging with the tidal estuaries of the Sundarbans. It then opens onto a breathtakingly long geological frontier that created the subcontinental landmass of the India:

I would take them back to the deep, deep time of geology and I would show them that where the Ganga now runs there was once a coastline—a shore that marked the southern extremity of the Asian landmass. India was far, far away then, in another hemisphere. It was attached to Australia and Antarctica . . . I would show them how it happened that India broke away 140 million years ago and began its journey north from Antarctica. They would see how their subcontinent had moved, at a speed no other landmass had ever attained before; they would see how its weight forced the rise of the Himalayas; they would see the Ganges emerging, as a brook on a rising hill. (HT 181, italics original)

This geological passage, braided with colonial, postcolonial, and global histories of the Sundarbans, and with the lives of its key characters Kanai, Piya, Fokir, Nilima, and Moyna in the face of a catastrophic cyclone, lends the novel a weight that is planetary. Nirmal's diary transgresses the diegetic universe of the novel and captures the convergence of human histories of capitalist globalization and postcolonial nation-making with the vastly longer temporality of stratigraphic shifts and climate cataclysms in geological record.

These latter can only be experienced indirectly through various forms of scientific modelling obtained from what climatologists call proxy data. Ghosh makes Nirmal's diary function with the legibility of such proxy data, that is, with "climate variables from times prior to the existence of measuring instruments" that make possible some understanding of climatological time.⁷⁴ These include tree rings, ice cores from Greenland and Antarctica, bore holes, pollen, corals, and ocean sediments. One could say that these are factoid forms that compensate for the cognitive and phenomenological limitation of the human to experience deep time. Nirmal's diary functions precisely as such a device, such that "*vast durations are telescoped in such a way as to permit the telling of a story*" (HT 180, italics original). At one point in his diary, Nirmal notes how the signs of death and decay emerged slowly and were few and far between earlier but are now rapid. His words model the language of tipping point and irreversibility that marks climate change science: "*It was as if I could see those signs everywhere, not just in myself but in this place that I had lived in for almost thirty years. The birds were vanishing, the fish were dwindling and from day to day the land was being reclaimed by the sea. What would it take to submerge the tide country? Not much—a miniscule change of sea level would be enough*" (HT 215, italics original). When juxtaposed with the climactic scene in the novel, Fokir's and Piya's devastating battle with the cyclone that takes Fokir's life, this passage from Nirmal's diary (itself a posthumous mode) becomes analogous to predictive models of sea-level rise periodically published by climate scientists.

Ghosh's *The Hungry Tide*, George's *Ocean Roads*, and Sinha's *Animal's People* powerfully illustrate what we in our current conjuncture call planetary realism, a recombinant literary mode that registers human-generated climatological shocks as they reverberate in the present, and whose cataclysmic effects will last well beyond human habitation on this planet. A few years ago Jameson envisioned a novel of the future that would span a planetary-scale grand narrative exceeding the conventional measures of human history. This novel of the future is already here with us. Few works depict with greater power the uncanny reality of our ontological plurality as humans in this era of technoplanetary catastrophes.

NOTES

I am grateful to Anna Brickhouse, Deborah Baker, Amitav Ghosh, and Julia Adeney Thomas for their thoughtful comments on prior drafts of this essay. Parts of the essay would have been impossible to write without Elizabeth DeLoughrey's rich cultural work on Pacific nuclear testing. I also gratefully acknowledge my debt to her inspirational work on satellite planetarity.

1 *Bulletin of the Atomic Scientists*, accessed January 30, 2020, <https://thebulletin.org/doomsday-clock/>.

2 Isabelle Stengers, *In Catastrophic Times: Resisting the Coming Barbarism*, trans. Andre Goffey (London: Open Humanities Press, 2015); Slavoj Žižek, *Living in the End Times* (New York: Verso, 2011); Jean-Luc Nancy, *After Fukushima: The Equivalence of Catastrophes*, trans. Charlotte Mandell (New York: Fordham Univ. Press, 2015); and Giorgio Agamben, *The Open: Man and Animal*, trans. Kevin Attell (Stanford, CA: Stanford Univ. Press, 2004).

3 Will Steffen et al., "The Trajectory of the Anthropocene: The Great Acceleration," *The Anthropocene Review* 2, no. 1 (2015): 92, 94.

4 This is not to hold on to either classical or modern forms of humanist thought, but to examine how the various radical humanist epistemologies that go by the name of antihumanism, posthumanism, or entangled humanism are contending with massive advancements in science and technology, and consequently with vastly different scales of the "human," from the cellular, the quantum, and the nano, to the geological and the climatological. On realism's revival and new provenance, see Fredric Jameson, *The Antinomies of Realism* (London: Verso, 2015); Joe Cleary, Jed Esty, and Colleen Lye, eds., special issue, *Peripheral Realisms*, *MLQ* 73, no. 3 (2012); Lauren M. E. Goodlad, ed., special issue, *Worlding Realisms, Novel: A Forum on Fiction* 49, no. 2 (2016); Zadie Smith, "Two Paths for the Novel," *New York Review of Books* (November 20, 2008). See also monographs on vernacular realisms by Ulka Anjaria and Subramaniam Shankar, to name only two authors in the South Asian literary context: Anjaria, *Realism and the Twentieth Century Indian Novel: Colonial Difference and Literary Form* (Cambridge: Cambridge Univ. Press, 2012); and Shankar, *Flesh and Fish Blood: Postcolonialism, Translation, and the Vernacular* (Berkeley: Univ. of California Press, 2012).

5 There are exceptions, of course, as in the deliberations of Enlightenment era philosophers Gottfried Wilhelm Leibniz, Voltaire, and Immanuel Kant in the wake of the Lisbon earthquake of 1755. See, for instance, Srinivas Aravamudan, "From Enlightenment to the Anthropocene," *Studies in Eighteenth-Century Culture* 47 (2018): 7-25. Theories of catastrophe also appear in mathematics and astrophysics.

6 Kant, *The Critique of Judgement*, trans. James Creed Meredith (Oxford: Clarendon, 1952), 110-11.

7 Richard Flanagan, "Australia is Committing Climate Suicide," *New York Times*, January 3, 2020, <https://www.nytimes.com/2020/01/03/opinion/australia-fires-climate-change.html>.

8 Jameson writes, "realism requires a conviction as to the massive weight and persistence of the present as such, and an aesthetic need to avoid recognition of deep structural social change as such . . ." Jameson, *Antinomies of Realism*, 145.

9 Joseph Masco, *The Nuclear Borderlands: The Manhattan Project in Post-Cold War New Mexico* (Princeton, NJ: Princeton Univ. Press, 2006), 301.

10 Jameson, *Antinomies of Realism*, 313.

11 Indra Sinha, *Animal's People* (New York: Simon and Schuster, 2007); James George, *Ocean Roads* (Wellington, New Zealand: Huia Publishers, 2006) (hereafter cited as *OR*); and Amitav Ghosh, *The Hungry Tide* (New Delhi: Ravi Dayal, 2004) (hereafter cited as *HT*).

- 12 Georg Lukács, *Studies in European Realism* (London: Hillway, 1950), 8.
- 13 Catherine Malabou, "The Brain of History, or, the Mentality of the Anthropocene," *South Atlantic Quarterly* 116, no. 1 (2017): 40.
- 14 Jane Bennett, *Vibrant Matter: A Political Ecology of Things* (Durham, NC: Duke Univ. Press, 2010); Karen Barad, *Meeting the Universe Halfway: Quantum Physics and the Entanglement of Matter and Meaning* (Durham, NC: Duke Univ. Press, 2007); and Diana Coole and Samantha Frost, eds. *New Materialisms: Ontology, Agency, and Politics* (Durham, NC: Duke Univ. Press, 2010).
- 15 Rosi Braidotti, *The Posthuman* (Cambridge: Polity, 2013); Kaushik Sunder Rajan, *Biocapital: The Constitution of Postgenomic Life* (Durham, NC: Duke Univ. Press, 2006); and Nikolas Rose, *The Politics of Life Itself: Biomedicine, Power and Subjectivity in the Twenty-First Century*, (Princeton, NJ: Princeton Univ. Press, 2007).
- 16 Cited in Julia A. Thomas, "History and Biology in the Anthropocene: Problems of Scale, Problems of Value," *American Historical Review* 119, no. 5 (2014): 1599.
- 17 The term can be found in Peter Sloterdijk, "Airquakes," *Spheres Vol III*, trans. Eduardo Mendietta, in *Environment and Planning D: Society and Space* 27 (2009): 41-57.
- 18 An important recent work in literary and cultural theory is Elizabeth Deloughrey's *Allegories of the Anthropocene*, especially chapter two, "Planetary: Militarized Radiations" (Durham, NC: Duke Univ. Press 2019), 63-97. See also Denis Cosgrove, *Apollo's Eye: A Cartographic Genealogy of the Earth in the Western Imagination* (Baltimore: Johns Hopkins Univ. Press, 2001); Paul Edwards, "Entangled Histories: Climate Science and Nuclear Weapons Research" *Bulletin of the Atomic Scientists* 68, no. 4 (2012): 28-40; Robert Marzec, *Militarizing the Environment: Climate Change and the Security State* (Minneapolis: Univ. of Minnesota Press, 2015); and Perrin Selcer, *The Postwar Origins of the Global Environment: How the United Nations Built Spaceship Earth* (New York: Columbia Univ. Press, 2018).
- 19 James Lovelock, *Gaia: A New Look at Life on Earth* (Oxford: Clarendon, 1979).
- 20 Paul J. Crutzen and John Birks, "The Atmosphere after a Nuclear War: Twilight at Noon," *Ambio* 11, nos. 2-3 (1982): 114-25. Cited in DeLoughrey, "Satellite Planetary and the Ends of the Earth," *Public Culture* 26, no. 2 (2014): 276.
- 21 See various theoretical positions on the planetary in Amy J. Elias and Christian Moraru, eds., *The Planetary Turn: Relationality and Geoaesthetics in the Twenty-First Century* (Evanston, IL: Northwestern Univ. Press, 2015). Two powerful recent accounts are William Connolly, *Facing the Planetary: Entangled Humanism and the Politics of Swarming*, (Durham, NC: Duke Univ. Press, 2017); and Dipesh Chakrabarty, "The Planet: An Emergent Humanist Category," *Critical Inquiry* 46, no. 1 (2019): 1-31.
- 22 Gayatri Chakravorty Spivak, *Death of A Discipline* (New York: Columbia Univ. Press, 2003), 72.
- 23 Chakrabarty, "The Planet," 3 (emphasis original).
- 24 See an account of the holocene in Neil Roberts, *Holocene: An Environmental History* (1989; Oxford: Blackwell, 1998).
- 25 The words are attributed to Sir Thomas Sprat, the founder of the Royal Society. Cited in Adelen Buckland, *Novel Science: Fiction and the Invention of Nineteenth-Century Geology* (Chicago: Univ. of Chicago Press, 2013), 16.
- 26 Buckland, *Novel Science*, 18.
- 27 See Michael McKeon, *The Origins of the English Novel: 1600-1740* (Baltimore: Johns Hopkins Univ. Press, 1987); Catherine Gallagher, "The Rise of Fictionality," in *The Novel*, vol. 1, *History Geography, and Culture*, ed. Franco Moretti (Princeton: Princeton Univ. Press, 2006), 336-63; and Mary Poovey, *A History of the Modern Fact: Problems of Knowledge in the Sciences of Wealth and Society* (Chicago: Univ. of Chicago Press, 1998).
- 28 Charles Lyell, *Principles of Geology: Being an Attempt to Explain the Former Changes of the Earth's Surface, By Reference to Causes Now in Operation* (London: Murray, 1830-33), 1:79.

- 29 For example, Gillian Beer, *Darwin's Plots: Evolutionary Narrative in Darwin, George Eliot, and Nineteenth Century Fiction* (London: Routledge and Kegan Paul, 1983).
- 30 George Levine, *Darwin and the Novelists: Patterns of Science in Victorian Fiction* (Cambridge, MA: Harvard Univ. Press, 1988).
- 31 Levine, *Darwin and the Novelists*, 5.
- 32 Cited in Levine, *Darwin and the Novelists*, 177.
- 33 Crutzen and Eugene F. Stoermer, "The Anthropocene," *IGBP Newsletter* 41 (May 2000): 17-18.
- 34 Rob Nixon, *Slow Violence and Environmentalism of the Poor* (Cambridge, MA: Harvard Univ. Press, 2011).
- 35 The quotation is from Jameson's *Antinomies of Realism*, 146. See also Esty's comment from a related perspective in his essay "Realism Wars": "If new realist novels find ways to represent 'combined and uneven development' in the global frame where it cannot be mediated into the destiny of a single people, this may well explain the rising force of apocalyptic and Anthropocene models as ways to identify collective problems operating at planetary scale." Esty, "Realism Wars," 336.
- 36 See Ghosh, "Stories" in *The Great Derangement: Climate Change and the Unthinkable* (Chicago: Univ. Chicago Press, 2016), 1-84; Mark McGurl, "Gigantic Realism: The Rise of the Novel and the Comedy of Scale," *Critical Inquiry* 43, no. 2 (2017): 403-30; and Ursula Heise, *Imagining Extinction: The Cultural Meaning of Endangered Species* (Chicago: Univ. of Chicago Press, 2016).
- 37 D'Arcy Wentworth Thompson, *On Growth and Form* (1961; Cambridge: Cambridge Univ. Press, 1992), 17.
- 38 The term "visible incongruity" is McGurl's. See his essay, "Gigantic Realism," 405.
- 39 John Bender, *Ends of Enlightenment* (Stanford, CA: Stanford Univ. Press, 2012), 23.
- 40 McGurl, "Gigantic Realism," 406.
- 41 Ian Watt, *The Rise of the Novel: Studies in Defoe, Richardson, and Fielding* (Berkeley: Univ. California Press, 2001), 11.
- 42 Susan Stewart, *On Longing: Narratives of the Miniature, the Gigantic, the Souvenir, the Collection* (Durham, NC: Duke Univ. Press, 1993), 102.
- 43 Aravamudan, "The Catachronism of Climate Change," *Diacritics* 41, no. 3 (2013): 6-30. See p. 7 for the Derrida reference.
- 44 The journal *Diacritics* published an issue in the mid-1980s that captured the many strands of nuclear criticism. "Nuclear Criticism," *Diacritics* 14, no. 2 (1984).
- 45 Adriana Petryna, *Life Exposed: Biological Citizens after Chernobyl* (Princeton, NJ: Princeton Univ. Press, 2002); and Kath Weston, *Animate Planet: Making Visceral Sense of Living in a High-Tech Ecologically Damaged World* (Durham, NC: Duke Univ. Press, 2017).
- 46 Curt Stager, *Deep Future: The Next 100,000 Years of Life on Earth* (New York: Thomas Dunne Books, 2011), 100.
- 47 Jameson, *Archaeologies of the Future: The Desire Called Utopia and Other Science Fictions* (London: Verso, 2005), 288.
- 48 McGurl, "The Posthuman Comedy," *Critical Inquiry* 38, no. 3 (2012): 533-53.
- 49 See Pramod Nayar, *Bhopal's Ecological Gothic: Disaster, Precarity, and the Biopolitical Uncanny* (London: Lexington Books, 2017).
- 50 Timothy Morton, *Ecology Without Nature: Rethinking Environmental Aesthetics* (Cambridge, MA: Harvard Univ. Press, 2007), 185.
- 51 See Petryna, *Life Exposed*.
- 52 Svetlana Alexivich, *Voices from Chernobyl: The Oral History of a Nuclear Disaster*, trans. Keith Gessen (London: Dalkey Archive Press, 2005), 17.

- 53 Here I'm extrapolating from Kelly Hurley's use of the term "ab-human" in her book, *The Gothic Body: Sexuality, Materialism, and Degeneration at the Fin de Siècle* (Cambridge: Cambridge Univ. Press, 1996).
- 54 "Bhopal gas tragedy: A doctor preserved victims' samples for 20 years but govt never studied them," *India Today*, December 3, 2019, <https://www.indiatoday.in/india/story/bhopal-gas-tragedy-35-anniversary-dr-dk-satpathy-victims-autopsy-samples-1624811-2019-12-03>.
- 55 Nicole Shukin, "The Biocapital of Living—and the Art of Dying—After Fukushima," *Postmodern Culture* 26, no. 2 (2016).
- 56 Naomi Klein, *The Shock Doctrine: The Rise of Disaster Capitalism* (New York: Random House, 2007).
- 57 See Rahul Mukherjee, "Toxic Lunch in Bhopal and Chemical Publics," *Science, Technology, and Human Values* 41, no. 5 (2016): 858.
- 58 Sianne Ngai, "Animatedness," in *Ugly Feelings* (Cambridge, MA: Harvard Univ. Press, 2005), 89-125.
- 59 See references to Petryna's, Alexievitch's and Rose's works above. Other scholarly works include Catherine Caulfield, *Multiple Exposures: Chronicles of the Radiation Age* (New York: Harper, 1989); Joseph Masco, *The Nuclear Borderlands: The Manhattan Project in Post-Cold War New Mexico* (Princeton, NJ: Princeton Univ. Press 2006); and Kath Weston's *Animate Planet: Making Visceral Sense of Living in a High-Tech Ecologically Damaged World* (Durham, NC: Duke Univ. Press, 2017).
- 60 My analysis of *Ocean Roads* is indebted to insights in DeLoughrey's essay, "Radiation Ecologies and The Wars of Light," *Modern Fiction Studies* 55, no. 3 (2009): 468-98.
- 61 Paul Virilio, *War and Cinema: The Logistics of Perception*, trans. Patrick Camiller (London: Verso, 1989), cited in DeLoughrey, "Radiation Ecologies," 483.
- 62 See more on radio-autographs in Masco, *The Nuclear Borderlands*, especially chapter 7, "Mutant Ecologies: Radioactive Life in Post-Cold War New Mexico," 289-327.
- 63 The term traumatic realism is Michael Rothberg's in *Traumatic Realism: The Demands of Holocaust Representation* (Minneapolis: Univ. of Minnesota Press, 2000).
- 64 Akira Mizuta Lippit, *Atomic Light (Shadow Optics)* (Minneapolis: Univ. of Minnesota Press, 2005), 4.
- 65 "On Monday 16 July 1945, about the time that the Great Acceleration began, the first atomic bomb was detonated in the New Mexico desert. Radioactive isotopes from this detonation were emitted to the atmosphere and spread worldwide entering a sedimentary record to provide a unique signal of the start of the Great Acceleration, a signal that is unequivocally attributable to human activities." Steffen, "The Trajectory of the Anthropocene," 93.
- 66 Mariano Siskind, "Captain Cook and the Discovery of Antarctica's Modern Specificity: Toward a Critique of Globalism," *Comparative Literature Studies* 42, no. 1 (2005): 1-23.
- 67 See Stephen Pyne, "The Extraterrestrial Earth: Antarctica as Analogue for Space Exploration," *Space Policy* 23, no. 3 (2007): 147-49.
- 68 DeLoughrey, "Satellite Planetarity and the Ends of the Earth," *Public Culture* 26, no. 2 (2014): 270.
- 69 DeLoughrey, "Satellite Planetarity," 271.
- 70 Some recent works in this vein include Upamanyu Pablo Mukherjee, *Postcolonial Environments: Nature, Culture and the Indian Novel in English* (London: Palgrave Mcmillan, 2010); Nixon, "Unimagined Communities: Megadams, Monumental Modernity, and Developmental Refugees," in *Slow Violence*, 150-98; Heise, "Biodiversity, Environmental Justice, and Multispecies Communities," in *Imagining Extinction*, 127-61; and Pheng Cheah, "World Heritage Preservation and the Expropriation of Subaltern Worlds," in *What is a World? On Postcolonial Literature as World Literature* (Durham, NC: Duke Univ. Press, 2016), 246-77.

71 Interestingly, Dandakaranya features in the Indian epic *The Ramayana* as a forest refuge for its key characters, Rama, Sita and Lakshman.

72 Annu Jalai, "Dwelling in Morichjhanpi: When Tigers Became 'Citizens, and Refugees 'Tiger-Food,'" *Economic and Political Weekly* 40, no. 17 (2005): 1758.

73 Recent powerful accounts include Anna Tsing, *The Mushroom at the End of the World: On the Possibility of Life in Capitalist Ruins* (Princeton, NJ: Princeton Univ. Press, 2015); and Eben Kirksey, ed., *The Multispecies Salon* (Durham, NC: Duke Univ. Press, 2014).

74 Eric Winsberg, *Philosophy and Climate Science* (Cambridge: Cambridge Univ. Press, 2018), 7. I owe this insight on Ghosh's novel to Brandon Jones, "A Postcolonial Utopia for the Anthropocene: Amitav Ghosh's *The Hungry Tide* and Climate-Induced Migration," *Modern Fiction Studies* 64, no. 4 (2018): 639-58.