

MATERIALITY
OF
AIR

EDITED BY
TATIANA KONRAD

EXETER

Materiality of Air

Environment, Senses and Emotions

Series editor: Tatiana Konrad, University of Vienna

Editorial Advisory Board members:

Debashree Dattaray (Jadavpur University, India)
Hsuan L. Hsu (University of California, Davis, USA)
Heather Houser (University of Texas at Austin, USA)
David Howes (Concordia University, Canada)
Jennifer Ladino (University of Idaho, USA)
Jean-Thomas Tremblay (York University, Canada)
Blanche Verlie (University of Sydney, Australia)

Environment, Senses and Emotions aims to provide a comprehensive exploration of how environmental crises are represented, perceived and understood through the senses and emotions and the human impulse to make sense of the world. Books in this series enhance understandings of environmental crises, engaging with these crises' sensory and emotional dimensions, highlighting this emerging area as important to a number of research disciplines. The series also promotes more-than-human perspectives and analyzes how stories narrated by plants, animals and other more-than-human or multisensory accounts of ecological interactions shape and convey environmental knowledge.

The series welcomes edited collections and monographs written by scholars, practitioners, activists and thinkers who address environmental crises, broadly understood from natural disasters and local problems to global issues, and who explore these crises' sensory and emotional dimensions, including eco-anxiety, eco-guilt, eco-shame and solastalgia, among others. The series welcomes contributions from the Global South and prioritizes decolonial perspectives, examining structures of power and subjugation related to activism, justice and ecological well-being.

To discuss your book proposal please contact:
the Series Editor: Tatiana Konrad, University of Vienna, tatiana.konrad@univie.ac.at
or Commissioning Editor: Becky Taylor, b.taylor@exeterpress.co.uk

Previous titles:

Imagining Air: Cultural Axiology and the Politics of Invisibility (2023),
edited by Tatiana Konrad

Materiality of Air

edited by
TATIANA KONRAD

UNIVERSITY
of
EXETER
PRESS

First published in 2025 by
University of Exeter Press
Reed Hall, Streatham Drive
Exeter EX4 4QR, UK
www.exeterpress.co.uk

Copyright © 2025 Tatiana Konrad and the various contributors

The right of the contributors to be identified as authors of this work has been asserted by them in accordance with the Copyright, Designs and Patents Act 1988.

A CIP catalogue record for this book is available from the British Library

<https://doi.org/10.47788/CDTZ5578>

Environment, Senses and Emotions
ISSN 2977-8360 Print
ISSN 2977-8379 Online

This publication is licensed, unless otherwise indicated, under the terms of the Creative Commons Attribution 4.0 International (CC BY 4.0) licence (<http://creativecommons.org/licenses/by/4.0/>), which permits use, sharing, adaptation, distribution, and reproduction in any medium or format, provided you give appropriate credit to the original author(s) and source, link to the Creative Commons licence, and indicate any modifications.

The images or other third-party material in this publication are covered by the publication's Creative Commons license, unless otherwise indicated in a reference to the material.

If the material is not covered by the publication's Creative Commons license and the intended use is not permitted by law or exceeds the permitted use, permission for use must be obtained directly from the copyright holder.

Despite careful editing, all information in this publication is provided without guarantee; any liability on the part of the author, the editor, or the publisher is excluded.

Published with the support of the Austrian Science Fund (FWF): 10.55776/PUB1197

FWF Austrian
Science Fund

ISBN 978-1-80413-161-9 Hbk
ISBN 978-1-80413-162-6 Pbk
ISBN 978-1-80413-163-3 ePub
ISBN 978-1-80413-164-0 PDF

EU Authorised Representative: Easy Access System Europe – Mustamäe tee 50, 10621 Tallinn, Estonia, gpsr.requests@easproject.com

Cover image: Becky Lyon, *Transcribing Our Weathers* (2024), stop-motion drawing exhibited as part of "I'm Weather Under The Feeling" solo exhibition at RAINBOWCUBE Seoul, May 2024. [@elastic_fiction](https://www.elasticfiction.co) www.elasticfiction.co

Typeset in Adobe Caslon Pro by S4Carlisle Publishing Services, Chennai, India

Contents

<i>List of Illustrations</i>	vii
<i>Contributors</i>	ix
<i>Foreword</i>	xii
JEFF DIAMANTI	
Introduction: Elemental, Material, and Representational Air	1
TATIANA KONRAD	
PART I: AIR AND POLLUTION: HEALTH, VIOLENCE, SURVIVAL	15
1 Breathing Violence: Airborne Plastics, Materiality, and Anthropogenic Harm	17
SAVANNAH SCHAUFLEER	
2 Firewood: Carbon-Neutral Fuel, or Threat to Human Health?	38
GORDON M. SAYRE	
3 Survival of the Most Collaborative: Climate Justice as a Logics for Flows of Air	60
SHEENA WILSON	
PART II: AIR AND SCIENCE FICTION: TOXICITY, SENSORIALITY, TRANSMISSION	81
4 A Microbiological Menace: Killer Spores and Toxic Pollen in Contemporary Young Adult Fiction	83
NATALIE DEDERICHS	
5 Estranging Air in Ted Chiang’s “Exhalation”	102
BRENT RYAN BELLAMY	
6 Thinking over the Airwaves: Immediate Connection in Geoff Ryman’s <i>Air</i> and Tade Thompson’s <i>The Wormwood Trilogy</i>	116
ARTHUR ROSE	

PART III: AIR AND ART: PRESENCE, SIGNIFICANCE, ACTIVISM	133
7 A Deep, Slow, Strenuous Breath: Art in the Shadows of Capitalist World-Ecologies RAPHAELLE OCCHIETTI	135
8 Creative Writing: On Air DAVINA QUINLIVAN	165
<i>Index</i>	174

List of Illustrations

- Fig. 2.1 The author, holding a hoedad, planting trees in the Oregon Coast Range, January 2024.
- Fig. 2.2 A feller-buncher clear-cutting un-thinned timber on private land near Noti, Oregon.
- Fig. 2.3 Remains of burned slash pile near Veneta, Oregon, January 2024.
- Fig. 7.1 José Alejandro Restrepo, *Musa paradisiaca*, 1996. Installation view at LAXART, Los Angeles, 2017. Photo Ruben Diaz. Courtesy the artist and The Brick, Los Angeles.
- Fig. 7.2 José Alejandro Restrepo, *Musa paradisiaca*, 1996. Installation view at FLORA ars+natura, Bogotá, 2016. Photo Gonzalo Angarita. Courtesy the artist and FLORA ars+natura, Bogotá.
- Fig. 7.3 Dineo Seshee Raisibe Bopape, *Lerole: footnotes (The struggle of memory against forgetting)* (detail), 2017. Installation view at Pirelli HangarBicocca, Milan, 2022. Courtesy the artist, Sfeir-Semler Gallery, Beirut/Hamburg and Pirelli HangarBicocca, Milan. Photo Agostino Osio.
- Fig. 7.4 Dineo Seshee Raisibe Bopape, *Lerole: footnotes (The struggle of memory against forgetting)* (detail), 2017. Installation view at Sfeir-Semler Gallery, Beirut/Hamburg, 2018. Courtesy the artist and Sfeir-Semler Gallery, Beirut/Hamburg. Photo Volker Renner.
- Fig. 7.5 Dineo Seshee Raisibe Bopape, *Lerole: footnotes (The struggle of memory against forgetting)* (detail), 2017. Installation view at Sfeir-Semler Gallery, Beirut/Hamburg, 2018. Courtesy the artist and Sfeir-Semler Gallery, Beirut/Hamburg. Photo Volker Renner.
- Fig. 7.6 Dineo Seshee Raisibe Bopape, *Lerole: footnotes (The struggle of memory against forgetting)* (detail), 2017. Installation view at Pirelli HangarBicocca, Milan, 2022. Courtesy the artist, Sfeir-Semler Gallery, Beirut/Hamburg and Pirelli HangarBicocca, Milan. Photo Agostino Osio.

- Fig. 7.7 José Alejandro Restrepo, *Musa paradisiaca*, 1996.
Installation view. Photo the artist. Courtesy the artist.
- Fig. 7.8 Dineo Seshee Raisibe Bopape, *Lerole: footnotes*
(*The struggle of memory against forgetting*) (detail), 2017,
in *Para | Fictions* at Kunstinstituut Melly, Rotterdam.
Photo Aad Hoogendoorn. Courtesy the artist and
Kunstinstituut Melly, Rotterdam.

Contributors

Brent Ryan Bellamy teaches literary criticism and theory, worldbuilding, and climate fiction at Trent University and Ontario Tech University. He is co-managing editor of *Imaginations: Journal of Cross-Cultural Image Studies*, (co-)editor of *An Ecotopian Lexicon* (2019), and (co-)editor of *Materialism and the Critique of Energy* (2018). He is the author of *Remainders of the American Century: Post-Apocalyptic Novels in the Age of US Decline* (2021). See more at brentryanbellamy.com.

Natalie Dederichs is a senior lecturer and postdoctoral researcher in the Department of English II at the University of Cologne. She is the author of *Atmosfears: The Uncanny Climate of Contemporary Ecofiction* (2023). Her current research focuses on the intersection of ecocritical theory, cultural plant studies, English language teaching, and education for sustainable development. In addition to pursuing an academic career, she has gained work experience as an English and German language teacher at different lower secondary schools in Germany.

Jeff Diamanti is Associate Professor of Philosophy and Cultural Analysis at the University of Amsterdam. His first book, *Climate and Capital in the Age of Petroleum: Locating Terminal Landscapes* (2021), tracks the political and media ecology of fossil fuels across the extractive and logistical spaces that connect remote territories like Greenland to the economies of North America and Western Europe. His new research, *Bloom Ecologies*, follows the mining of phosphorus in the occupied Western Sahara to the aquatic currents forcing algal bloom and hypoxic milieux all over the planet.

Tatiana Konrad is the principal investigator of “Air and Environmental Health in the (Post-)COVID-19 World,” a postdoctoral researcher in the Department of English and American Studies, University of Vienna, Austria, and the editor of the “Environment, Health, and Well-Being” book series at Michigan State University Press and the “Environment, Senses and Emotions” book series at University of Exeter Press. She holds a PhD in American Studies from the University of Marburg, Germany. She was a Visiting Fellow at the University of Chicago (2022), a Visiting Researcher at the Forest History Society (2019), an Ebeling Fellow at the American Antiquarian Society (2018), and a Visiting Scholar at the University of South Alabama (2016).

She is the author of *Climate Change Fiction and Ecocultural Crisis: The Industrial Revolution to the Present* (2024) and *Docu-Fictions of War: U.S. Interventionism in Film and Literature* (2019), as well as being the editor of *Disability, the Environment, and Colonialism* (2024), *Imagining Air: Cultural Axiology and the Politics of Invisibility* (2023), *Plastics, Environment, Culture, and the Politics of Waste* (2023), *Cold War II: Hollywood's Renewed Obsession with Russia* (2020), and *Transportation and the Culture of Climate Change: Accelerating Ride to Global Crisis* (2020), and a co-editor of *Cultures of War in Graphic Novels: Violence, Trauma, and Memory* (2018).

Raphaëlle Occhietti is an art historian. She prepared this chapter while being a postdoctoral fellow at the University of Guelph, Canada, and was a guest researcher at the Amsterdam School for Cultural Analysis at the University of Amsterdam, the Netherlands, in 2023–24. Her postdoctoral research has been funded by the Fonds de recherche du Québec—Société et culture, and by the Social Sciences and Humanities Research Council of Canada. She has recently co-edited a special issue of *La Furia Umana: International Journal of the History and Theory of Cinema* on Donna Haraway's *Staying with the Trouble: Making Kin in the Chthulucene*. Her recent writing has appeared in *ESPACE art actuel*, *Senzacornice*, and *Afterimage: The Journal of Media Arts and Cultural Criticism*. Her current book project explores contemporary art's ability to represent and confront the capitalist socioecological system.

Davina Quinlivan is an AHRC-funded Research Fellow in the Department of English and Creative Writing, at the University of Exeter. She is the author of *Shalimar: A Story of Place and Migration* (2022), *The Place of Breath in Cinema and Filming* (2012), and *The Body in Crisis: Trauma, Healing and Hopefulness* (2015). Her groundbreaking research on breath and narratives of healing in visual culture, in particular, has led to public engagement activities with the Serpentine Gallery, the Freud Museum, and the Delfina Foundation / Wellcome Trust. Quinlivan is an advisory board member of *Venti: Air, Experience and Aesthetics*.

Arthur Rose is a Senior Research Fellow in the Department of English and Creative Writing at the University of Exeter, and a Research Associate of the Department of English Studies at Wits University. His recent books include *COVID-19 and Shame: Political Emotions and Public Health in the UK* (2023), co-authored with Fred Cooper and Luna Dolezal, and *Asbestos: The Last Modernist Object* (2022).

Gordon M. Sayre is Professor of English and Folklore at the University of Oregon. He is participating faculty in Environmental Studies and teaches a course entitled "Car Cultures" that examines the history of the car industry and the environmental issues caused by automobility. He is the author of

Foreword

Jeff Diamanti

Air and the means of nutrition are necessary, but life is still something else than these things. Life comes to be determinate and active as purpose. Its own purposive activity is the sufficient ground of itself.

Georg Hegel, *Lectures on Logic*¹

To recall that air is at the groundless foundation of metaphysics amounts to ruining metaphysics through and through. To conning it out of everything. To rendering ever fleeting and expandable, compressible and elastic ... its properties. Nothing maintains itself in the same way any longer in air. Free?

Luce Irigaray, *The Forgetting of Air in Heidegger*²

The turn to various elements (both classical and modern) has been a long time coming in the humanities and social sciences. At least as long as Western philosophy has been seeking an adequate distinction between what constitutes the terms by which reflection can evaluate itself, and what exceeds or precedes such an evaluation. For Aristotle in the *Physics*, this question of the elemental contraries—every *thing* a particular composition of wet/dry, cold/hot—can be neither excluded from philosophy nor fully internalized to a system of logic, since the elemental forces provisionally held to a particular form (this rock, your body) will always predicate the object and result from its deterioration. The principle of non-contradiction would hold that a thing cannot be what it is not, and yet the elementals are there materially in everything without fixed measure. The elemental turn has allowed for a wide range of scholars and theorists to admit this incommensurability between an attention to form and a sensitivity to forces, licensing attention to aleatory and subterranean currents in philosophy that often involve renewed attention to milieu and media, affect, and irreducible difference that always exceeds sameness. More urgently, the (re)turn to elements has also allowed for a more precise attention to the forms of environmental, racialized, and gender violence that unfold under the radar of event-based discourses of justice and liability, as for instance in the groundbreaking work of Rachel Carson, more recent work on slow violence by Rob Nixon, and the field-changing scholarship by Max Liboiron in *Pollution Is Colonialism*.³

Air is perhaps the most enigmatic of the milieu-bound elements, at least from the perspective of an analytic style intimated by its properties and character. For that reason alone, *Materiality of Air* is both urgent and remarkable for its extended attention to aeolian entanglements. Because the historicity of the present is literalized *in media res* with each breath assumed here, now, by us. For close readers of traces and textual mediations, intermediation and contradiction, this means practicing a shared tenderness of attention to the scales bound up intimately in the respiratory real of your body. The particulate matters gathered into the molecular exchange of so many capillaries and tissues; capillaries and tissues that bio-accumulate a body's experience of food chains; toxic exposures and assumptions about what a gender ought to eat and the class violence of wellness influencers and organic gentrification. Attention to air bridges vast scales of reference, from the aerobic exchange of molecules to the capitalist mode of production. In retrospect, it strikes me as awfully strange that it took us until this century to centralize these elemental intimacies. Remarkable to me is how much energy the capitalist mode of production needed to exhale before the trace of the elemental licensed the scholarly revision to what had previously been a resolutely anti-materialist concept of political struggle and belonging. And it is not as though there have not been counter-tendencies to what Tim Ingold calls the "hylomorphic" model of Western reason:⁴ the rage against industrial pollution is laced through the cultural archive of the West, from the atmospherics of Dickens to the anti-colonial poetics of Césaire, but the literal confrontation with elemental violence has been slow to arrive in the university. Strange, because the breathing body indexes all the information one would need to enumerate an account of the present, if by the present we mean the conjunctural determinations that give coherence and resolution to *this* historicity of *this* air. As particulate as it gets, the air we breathe is also the opposite of particular: black carbon and carbon dioxide and aerosols and the intoxicating rot of a petroculture asphyxiating itself like some anabolic misogynist caught in the current of its own death drive; every breath literalizes a molecular trace of the history of planetary life in the present.

Elemental turns to water, soil, ice, temperature, fire, air, and so many chemo-ethnographic entanglements have helped consolidate the matter of materiality in disciplines long barred from the stuff of historicity. And the specific signatures of air in the critical conditions occasioning its consideration today ask for a particular set of analytic postures, lexicons, and habits of thought. It is no easy task, to be sure, and *Materiality of Air* is a stunning step forward for everyone working in an academic context saturated in the epistemic obstinacy of late liberalism.

Hegel's claim above is not that air and food—classic examples of common necessities—are outside of a definition of purposive activity (that is, what we might call intentional will) but quite the opposite: that the freedom exercised in purposive activity *needs* necessities in and of themselves as the fabric through which human freedom is exercised and articulated. Air is a

necessity for all living beings. Indeed, we could make the argument that elementality is at first glance a synonym for necessities: the fundamentals variably composed so literally into every *thing*, from trees and frogs to continents and cargo ships. The volitional range of actions into which the frog *frogs* and the tree *trees* are distinct categorically from the determinations sufficient to explain a cargo ship (supply chains, value-added services, the organic composition of capital) and continents (tectonic drift, geological history, cartographic convention), but that is because air and food in *life* are what enliven each and every breath taken collectively on this planet. Necessity is not secondary, nor is it anthropocentric; necessity is the fundamental primacy from which anything like the freedom of reason or the autonomy of the collective will can unfold. It is also, for that same reason, the antinomy of reason and contingency of will, since the air we breathe and the food we eat make up the material fabric by which the violence of intersectional designation is reproduced *in media res*.

In media res: in the thick of things. Environmental racism and the liberal justification for vapid economic inequality all over the globe are most meaningfully conditioning on lives lived in the toxic media of air and food. Feminist materialists like Michelle Murphy and Stacy Alaimo have been foregrounding this immediacy at the interface of the body for many decades.⁵ With the normalization of climate change in the epistemic cultures of the university, it is as if the crude fact of our mammalian bodies immersed in the materiality of milieu is suddenly legible for analytic scrutiny. We could ask if this (re-)turn to the body at the more general vocabulary of the university is evidence that indeed the return of the repressed contingencies insufficiently addressed on the march through modernity have now marked the ends of the modern project itself: air and nutrition *finally are* the grounds of freedom, simply because the exhaust of fossil-fueled capitalism and the torment of poverty unleashed by colonialism are so extreme and extremely shared today that the horizon of freedom is humbled by necessity.

But that would be a hasty and self-evidently defeatist position for any critical inquiry attached to the promise of emancipation. Instead, what scholarship like that gathered in *Materiality of Air* makes evident is that it is no longer possible for the corporate states, elite owners of capital, or Western liberals to justify the uneven distribution of toxicity and harm through the elemental milieu of our shared present. Unregulated emissions of toxic particles in the air are now regularly tracked back to the source by citizen scientists, artists, and activists who simply refuse the illusion of legal equality as normatively sufficient to justify economic and environmental inequality. Frontline communities all over the world are fighting back against the climate realism of capital accumulation, in a crescendo of what Joan Martinez-Alier first called “the environmentalism of the poor” in 2002,⁶ but the point here is that there are no longer viable criteria to justify the unleashing of toxins and ecological risk on communities classed and raced in a recursive loop to the weathering of environmental racism.

In a legal sense, this critical precedence is massively inspiring, but there is still virtually no viable alternative to ongoing capitalist inequality offered by university researchers. Instead, we are offered tepid priority areas and funding platforms on “sustainable prosperity” and “environmental innovation” as if all along the empirical markers and motivations of bourgeoisie prosperity as such has not been the motor of environmental catastrophe.

The turn to air amidst the elemental awakening of critical inquiry more generally is a lifeline for the humanities and social sciences in particular—not just because as a political and intellectual constellation it is enormously generative for up-and-coming researchers, but because it involves a crucial return to the grounds of our material entanglements with one another and the structures of domination responsible for some of the most urgent challenges of our day: from the atmospheric mitigation of global warming to the promise of environmental justice in the postcolonial world. *Materiality of Air* is an urgent tool for both.

Notes

- 1 Georg W. Hegel, *Lectures on Logic* (Bloomington, IN: Indiana University Press, 2008), § 121/141.
- 2 Luce Irigaray, *The Forgetting of Air in Martin Heidegger* (London: Athlone Press, 1999), 5–6.
- 3 Rachel Carson, *Silent Spring* (Boston, MA: A Mariner Book, 1962/2002); Rob Nixon, *Slow Violence and the Environmentalism of the Poor* (Cambridge, MA: Harvard University Press, 2011); Max Liboiron, *Pollution Is Colonialism* (Durham, NC: Duke University Press, 2021).
- 4 Tim Ingold, “The Textility of Making,” *Cambridge Journal of Economics* 34 (2010): 91–102.
- 5 Michelle Murphy, *Seizing the Means of Production* (Durham, NC: Duke University Press, 2012); Stacy Alaimo and Susan Hekman, eds, *Feminist Materialisms* (Bloomington, IN: Indiana University Press, 2008).
- 6 Joan Martinez-Alier, *The Environmentalism of the Poor* (Michigan: Edward Elgar Publishing, 2002).

Introduction

Elemental, Material, and Representational Air

Tatiana Konrad

This book emerges from my ongoing research on air in the context of the “Air and Environmental Health in the (Post-)COVID-19 World” project funded by the Austrian Science Fund (FWF), and specifically from the 2024 lecture series *Materiality of Air: Representation, Crisis, Health* at the University of Vienna.¹ Along with other publications, including book chapters, journal articles, and special journal issues, that the project has generated so far, I edited the book *Imagining Air: Cultural Axiology and the Politics of Invisibility*, which was published in 2023 with University of Exeter Press. That book was an endeavor to approach air from the perspectives of the environmental and health humanities in order to grapple with air’s alleged invisibility in the contexts of the COVID-19 pandemic, air pollution, and climate crisis. This initial interest and the research that it has generated through collaboration with international contributors have not only paved a way to the intersectional understandings of air but also inspired the current book, initiating the discussion of air’s materiality.

Materiality of Air is a more in-depth exploration of air, which provides new perspectives on air’s material qualities through the lenses of violence, toxicity, pollution, capitalism, climate change, and transmission, among others, and thus directly engages with representation, crisis, and well-being. Continuing and expanding the research conducted for *Imagining Air: Cultural Axiology and the Politics of Invisibility*, this book responds to the growing scientific explorations of elements and the elemental, as well as the complex environmental, sociopolitical, economic, and cultural issues that come to the fore through these elements. Here, the focus is exclusively on air. Drawing on perspectives from the environmental humanities, health humanities, cultural studies, literary studies, art, and history, studying literature and culture, ecology and society, the chapters in this book consider the complex

relationships between humans, more-than-humans, and the environment more broadly. The book also highlights future directions for engaging with the medium of air.

My co-authors, Chantelle Mitchell and Savannah Schaufler, and I provide a detailed exploration of air—from its chemical qualities to cultural meanings and understandings—in the introduction to *Imagining Air: Cultural Axiology and the Politics of Invisibility*.² The approaches examined there effectively contextualize air as an environmental and health phenomenon. Air is ideologically intricate. Air defines and enables relations and entanglements on Earth. It is possible to tackle air from various perspectives, all of which shape the meaning of air and clarify the role it plays in formulating and transforming the ways humans interact among ourselves as well as with more-than-humans and the environment more broadly. Thus, when approached from a scientific perspective, air is a gas mixture, of which oxygen and carbon dioxide are the two that characterize breathing—a complex health, environmental, cultural, and political phenomenon in itself. The chemical elements that make up air enable its airiness, due to which air can be perceived as a truly planetary phenomenon, as the atmosphere itself. Air emerges as a lived environment—one that ensures life for aerobic beings and simultaneously serves as a habitat itself, enviroing bodies and objects. When recognized in such a way, air is an overtly political phenomenon, one through which injustice, inequality, toxicity, violence, and privilege come to the fore. It is exactly this multiplicity of air’s meanings and functions that produces the “cultural axiology” of air, emphasizing that air is much more than—*just*—an element that sustains life (although this function, of course, should not be underestimated). How air is understood aesthetically, environmentally, politically, socially, and culturally matters to infer what air actually is. Various events and phenomena that are most intricately connected to air, including the Industrial Revolution, global warming, and airborne diseases such as the COVID-19 pandemic, challenge air’s alleged invisibility and urge us to recognize air’s presence, its role on the planet, and how air can be (mis)used to secure power and cause injustice.³ Such an approach to air helps clarify how and why certain types of violence and harm, toward both the environment and its inhabitants, remain invisible, and paves a productive way to recognize, sense, and see such crime and injustice—a complex subject matter that has been vigorously researched by social scientists.⁴ While for the most part engaging with ideas from Western philosophy, *Materiality of Air* also draws on perspectives from the Global South, revealing diverse ways in which humans engage with and understand air.

In what follows, I focus on the materiality of air to advance the understandings of air through the analysis of its important categories, qualities, and modalities.⁵ This is done to illuminate the porous nature of air both literally and figuratively: air as space that contains and engages with other elements, particles, and beings, and air as matter that moves, envelops, and penetrates objects, spaces, and time.

Toward Materiality of Air

Materiality of Air demonstrates how, through such issues as violence, toxicity, breath, health, aesthetics, representation, and crisis, among others, it becomes possible to attend to air's materiality: *perceiving* (seeing, smelling, breathing, confronting, filtering, appreciating, etc.) air as an elemental force. This book understands air as an element and thus a part of a larger system, as air integrates with and into other substances and beings. But it also sees the elemental texture of air through the multiple elements, large and tiny, with which it is enmeshed—from individual airborne viruses or pollution particles to clouds of smoke that can cover large distances and take up considerable spaces. This approach to air through its elemental function and nature overtly reveals air's materiality, and ultimately air's complexity. In their analysis of "elemental agency," Moritz Ingwersen and Timo Müller posit that through elements it becomes possible to approach "an entropic outside, a material milieu whose forces resist containment and clear boundaries" and to examine "lines of causation" where "first principles are ... re-inscribed and dispersed." Disentangling the relationship between air and materiality reveals that complex interaction between the two and dependence of each on one another: addressing air through materiality shatters the myth of air's invisibility, imperceptibility, and elusiveness, whereas studying materiality through air helps recognize the fluid, flexible, and at times nonexistent boundaries that incise the allegedly tangible and fixed nature of materiality. The key characteristic of elements is that they are not fixed but move "between the material and the immaterial, the interior and the exterior." Such is air, too. But so, too, are the elements that interact or come in contact with, spread through, and exist in the air. This elemental approach to air contributes to the understanding of elements' function, as described by Ingwersen and Müller, and reinforces "the compositional, animated, and aesthetic dimensions of subject-formation and perception amid climatological and micrological forces" that cannot be influenced or determined by humans.⁶

Air possesses an elemental form. As described by Cymene Howe, Jeff Diamanti, and Amelia Moore, "Elemental forms are those specific and situated characteristics of forces as they cohere and inhere in phenomena and experience—wind insinuating knots into a tree trunk, water cooling the skin, solar waves that spark photosynthesis in a wildflower."⁷ In their analysis of solarly, Howe, Diamanti, and Moore not only pay attention to solarly's materiality through its positioning "across distinct kinds of embodied, infra-structural, and materialized experiences," but also probe other functions of the sun that both inform and reinforce its materiality, claiming that along with being a "force," the sun is "a source of myth and symbol."⁸ Air, like the sun or any other element, works along similar systems of formation and identification that sustain and inform the material nature of these elements. Yet air is also a distinctly different element. Being vital for the survival of aerobic beings, humans and more-than-humans alike, air is an inescapable

and essential environment to which aerobic beings must have direct, proximal access. Air's material nature—literally understood in this case as pollution, broadly defined, accounting for the multiple particles, viruses, and other elements and organisms that travel through air or in its absence—is of particular importance due to its overt impact on health and well-being.⁹ Focusing exclusively on air, this research, however, by no means attempts to suggest that air—and concerns about air—should take precedence over those pertaining to water and soil. While providing an exploration of air's materiality, I urge scholars and the lay public to equally consider various forms of injustice enabled through other elements that result in deterioration of human and more-than-human health. For aerobic beings, it is impossible, on the planetary level, not to engage with air. Such a relationship is, however, not necessarily unique. Albeit it might seem easier for aerobic beings to escape such domains as water or land, compared to air—because of *borders* that might be easier to imagine in the case of water and land, and much harder in the case of air, although in all three instances the borders are not necessarily fixed and identifiable—this is a false assumption. Billions of people cannot avoid coming into contact with polluted or infected water, which is a consequence of global poverty and environmental inequalities.¹⁰ Moreover, people often get sick and die because they do not know that their water is polluted or infected—as illustrated by, for example, the well-publicized crisis in Flint, Michigan, that began in 2014. Those in positions of power can avoid the disasters they create, which reflects a good degree of privilege, yet the notion that *everyone* can choose not to encounter polluted or infected water is not true. Other forms of environmental pollution, for example water or soil contamination, are, therefore, as urgent issues as air pollution.

Despite the recent debates among geologists regarding the validity of naming the current geological epoch *the Anthropocene*, and the ultimate rejection thereof, the profound cultural impact of the concept and its contribution to foregrounding the role of the human in causing the ongoing climate crisis must not be undermined.¹¹ The Anthropocene also effectively helps recognize the materiality of air. Focusing on the “unseens” in the Anthropocene, Celia Lowe claims that “[t]he Anthropocene is full of invisible and barely perceptible objects and processes lying in wait along a trajectory set to shape our future.” These objects range from toxins that will provoke—or are already provoking—diseases in human and more-than-human bodies to emissions that intensify the global climate crisis. Despite the invisibility of these objects, humans are forced to find ways to turn the invisible into the visible in order to know what the future will hold. According to Lowe, this can be done with the help of different technologies, including, for example, satellites and microscopes, which, quite literally, give us glimpses into what was earlier considered imperceptible.¹² The desire to *see* what is yet unseen is the sign of humanity's recognition of the surrounding materiality broadly conceived—to search for ways to make the invisible visible is the acknowledgment of *existence* that is (in some cases) unknown, unexplored, and unattainable. There is also a rather

pragmatic explanation for why the unseen has to become perceptible or tangible for humans in some way. In her analysis of post-World War II public health films, Kirsten Ostherr emphasizes that the invisibility of viruses and bacteria generates fears that surround contagion, so making those pathogens and contagions visible—for example, in cinema—helps “fix the location” of these organisms and processes, helping people learn how to stay away from them; the logic is that “if one can see the contaminant, one can avoid infection.”¹³

Through the various objects, organisms, particles, and phenomena that air is in contact with, air transforms into an elemental object with representational qualities. Scholarly attempts to contextualize air’s alleged invisibility vary from a focus on the virus to explorations of the meaning of odors and beyond.¹⁴ These invisible yet otherwise sensible phenomena not only shape air’s materiality, but also uncover how air is related to other objects and, through them, can gain new meanings. In her analysis of the 1900 Sydney plague, Philippa Nicole Barr classifies odors as distinctly different from filth in linguistic terms: odors can be understood only through another object, i.e., an odor always comes from something or someone and thus ultimately symbolizes a certain phenomenon.¹⁵ Barr notes that in the context of the 1900 Sydney plague: “The air itself had become a disgust object.”¹⁶ Odors are arguably one reason why this happened. The realization that one shares the airspace with other beings—healthy and unhealthy, clean and unclean, known and unknown—can generate disgust toward the inescapable, i.e., air, and what is in it. This also helps illustrate the diversity of human perceptions of air, varying from fresh air as a remedy against illnesses and a symbol of a healthy lifestyle, to a stuffiness that comes from pollution with pathogens, gases, and someone else’s breath felt in close proximity.¹⁷ Such possibilities lead to a desire to control the air in a certain way. For example, in the case of the plague that Barr analyzes, fumigation was the solution to the filthy air, which ultimately did not make the air less dangerous but simply veiled various dangers through fumes and chemicals, which essentially toxified the air even further.¹⁸ Along with fumigation, however, there are other ways in which humanity transforms air, and generally the atmosphere around us, including via chemical sprays, aerosols, air conditioners, waterproof clothing and infrastructure, etc.¹⁹ All these interventions are responses to air’s materiality and challenges that humans have been posing to it.

Whether through airborne viruses, air pollution, or any other phenomena that reinforce air’s presence, air’s materiality can be conceived of through how what-is-in-the-air interacts with and impacts humans and more-than-humans, and how they, in turn, construct what-is-in-the-air. As I have analyzed elsewhere, air can be viewed as “a mediator between humans and more-than-humans,” gaining a “dual meaning as both life-giving to those beings who breathe and life-taking”—the latter can occur through airborne viruses, air pollution, and other forms of danger to health and well-being that come from air.²⁰ Thinking about the materiality of air thus can help open a larger discussion about

planetary health. Through planetary health, the relationship between health and the environment comes to the fore, explaining the ongoing climate and health crises and foregrounding the profound role of the elemental and material recognition in both understanding these crises and minimizing their effects.²¹ Viewing air as “an environment, a substance, matter,” and acknowledging that it is not a void space, helps attain air’s materiality “as a substance that is both visible and invisible, safe and dangerous, healthy and unhealthy,” and through this revelation fight anthropocentrism, for it becomes apparent that the human is, indeed, only a tiny element in the vast air space.²² There are two main approaches to perceiving air’s materiality: first, through the atmosphere that surrounds Earth and that helps illustrate the role of air on a broader spectrum, as a current that connects individual beings, but also everything and everyone on the planet at once; and second, through breathing, a process that is much more intimate and localized, yet which ultimately establishes vast connections similar to those created by the atmosphere.²³ As I have discussed elsewhere, breathing is material, and through breathing, air can be perceived as material, too, unveiling various forms of injustice that are part of but also go beyond air. When understood in such a way, air emerges as a segmented element, some parts of which are toxic while others are healthy, foregrounding the question of *who* has access to clean air and *why*. At the same time, viewing air as a segmented element can be problematic, for both toxic and healthy air are parts of “one larger air space.”²⁴ Air’s materiality, like numerous other phenomena, practices, and processes, has been composed through colonization, and continues to be impacted by colonialism’s long-lasting effects, showcasing how aerial conditions are among the factors that control and deteriorate the health and well-being of some humans and more-than-humans and sustain the health and well-being of others.²⁵

The desire to partition the air can be understood as a safety measure: to distinguish between polluted territories and (relatively) clean ones, or to outline the space of contagion, for example. The very process of such division and the objects or measures used to achieve it—from social distancing to mask-wearing and beyond—reinforce the material nature of air as well as the desire to materialize air, to imagine it architecturally, as a room that, for better functioning, needs walls. This approach, however, produces false ideas, namely that air “can be divided and even avoided.”²⁶ But the avoidance of air is impossible—at least in a lived condition. Whether viewing air from a chemical perspective, as a fusion of gases and other chemical elements, or moving beyond these life-giving/taking understandings of air toward air’s interaction with and influence on time, ecologies, and stories, air’s importance, and specifically air’s material importance, should not be underestimated.²⁷ While humans have been irrevocably transforming air through industrialization, anti-environmental policies, airborne diseases, and other factors, air has also been impacting humans, especially human health.²⁸ This complex web of relationships and dependencies foregrounds the value of air and reinforces its material structures and conditions. It is also illustrative of the vision of health

that health humanities scholars have been energetically putting forth, namely that it cannot be curbed into merely “medical contexts” and that, generally, it is important to transform discussions about health and well-being by adding a humanistic lens to the study of these issues.²⁹

The porous nature of air that perhaps most vividly reveals air’s materiality is conditioned through air’s interaction with other elements and phenomena, and the interaction of these elements and phenomena with air. According to David Macauley, air can impact our mood through weather, “exercis[ing] a strong aesthetic and emotional influence,” as becomes clear through the multiple ways in which humans describe wind.³⁰ Marina Peterson writes about the intricate linkages between air, ground, and noise, explicating how flight illuminates air “as distinct from life on the ground.”³¹ Derek P. McCormack focuses on air’s ability to envelope objects—“a kind of ‘extrusive’ shaping of things in relation to an atmospheric milieu.”³² McCormack contends:

[E]nvelopment is critical for thinking about atmospheres because it allows us to hold in generative tension a relation of material continuity between entities and the elemental conditions in which these entities are immersed and in which they participate. Envelopment is a process for sensing a condition; it is a process through which atmospheric things emerge whose form, shape, and duration depends upon their capacity to sense and respond to the atmospheres in which they are immersed. It is the process by which entities emerge within a milieu from which they differ without becoming discontinuous, in the same way that a cloud is a process of differentiation within an atmosphere without necessarily being discontinuous with it.³³

Enveloped things, according to McCormack, turn into “atmospheric things,” i.e., “objects, processes, or events that in some ways disclose, generate, or intensify the condition of being enveloped by the elemental force of atmospheres,” which points toward both the objects themselves and “a sense of something happening.”³⁴ There is a distant kinship created, enabled, and facilitated through and in air’s materiality, one that helps illuminate the linkages among environmental catastrophes, health risks, anthropogenic activities, elemental interactions, and planetary processes at large. This book uncovers, tackles, and deconstructs these complex phenomena, attending to the materiality of air.

Organization of the Book

The book includes eight chapters, each uniquely contributing to the understanding of air’s materiality as they tackle this issue through the lenses of violence, toxicity, pollution, capitalism, climate change, and transmission, among others. The chapters are grouped into three parts. Part I, “Air and Pollution: Health, Violence, Survival,” explores how, through pollution, air’s

materiality comes to the fore, revealing generated forms of violence and harm, and how they inform understandings of health and survival in times of environmental crisis. Part II, "Air and Science Fiction: Toxicity, Sensoriality, Transmission," provides ecocritical explorations of air's use in literature, addressing the issues of toxicity, sensoriality, and transmission and, through them, attending to how air is sensed and recognized. Finally, Part III, "Air and Art: Presence, Significance, Activism," investigates creative forms of engaging with air and how, through them, it becomes possible to challenge air's invisibility. While this arrangement of chapters should help guide the reader through the key pathways that the authors take to explore the materiality of air, it by no means should be considered fixed, for, like air itself, the issues at the core overlap and re-emerge in each contribution, layering multiple perspectives on air and its material qualities.

Part I, "Air and Pollution: Health, Violence, Survival," opens with Savannah Schaufler's "Breathing Violence: Airborne Plastics, Materiality, and Anthropogenic Harm" that analyzes how, through air pollution, the materiality of air comes to the fore. Air pollution poses a significant threat to human health and planetary well-being. Among the various contributors to air pollution, airborne plastics represent a prevalent and often neglected form of environmental harm. This chapter examines how plastic pollution affects air quality, with a particular focus on micro- and nanoplastics, as these microscopic particles can release chemical compounds that pose health and environmental risks to aerobic organisms that depend on oxygenated environments to survive. Chapter 1 explores the material and noxious qualities of airborne plastics and addresses the pervasive violence woven into the shared atmospheric experience. Drawing on existing understandings of violence and research on the chemical composition and toxicity as well as the distribution and prevalence of airborne plastics, the chapter frames air as a medium through which violence is silently perpetrated by the inhalation of harmful plastic particles. This approach challenges perceptions of air as an inert and neutral space and highlights the need to recognize air as a dynamic and vulnerable ecosystem. Ultimately, the chapter seeks to assess how thinking about airborne plastics as active agents of breathing violence in the atmosphere contributes to the reimagination of air's materiality, rendering air more palpable. Chapter 1 emphasizes that air is not merely a passive backdrop but an active and vital element in our material world, constantly affected by anthropogenic activities.

Gordon M. Sayre's "Firewood: Carbon-Neutral Fuel, or Threat to Human Health?" provides another perspective on the materiality of air through the process of burning firewood. Earth's warming climate is causing forest wildfires to spread more quickly, burn hotter, and ignite during longer seasons. Climate change thus increases the direct risks to life and property from wildfire, and also indirect risks to air quality. How can policymakers and individuals respond? This chapter examines the damage forest wildfires pose to air quality, both near to and distant from the fire, measured against the benefits of burning wood for home heat and for power generation. The implications of

greenhouse gas (GHG) emissions from fossil fuels intersect with the implications for human health from the aerosols and particulates from burning wood, which is not a fossil fuel. GHG emissions from burning coal and natural gas for electric power generation and home heating, and from burning gasoline and diesel in cars and trucks, both contribute to warming temperatures and thereby to fire risk. However, thanks to modern emissions controls in power plants and furnaces, as well as in transportation motors, gasoline and natural gas are considered clean with respect to air pollution, while a woodstove, which contributes far less to GHG emissions, is considered a source of significant particulate air pollution, like forest fires. In Oregon, USA, for example, many households relied on woodstoves for heating until late in the twentieth century, but recently some cities have restricted woodstoves, with the goal of protecting air quality. Forest fires in the USA have caused severe air quality issues in recent years, and, as a response, forest managers are trying to thin forests, using prescribed burns and logging. Chapter 2 argues that burning firewood should remain an option for home heating and for power generation, because trees that are cut down in forests being thinned to reduce fire danger are also burned (in slash piles or in prescribed burns). Until the mid-twentieth century, wildfires were more common and the average air quality was worse than today. We must accept a return to these conditions, because climate change will bring more and larger fires, and more smoke. These are the material conditions of air in the twenty-first century, and it is foolish to expect to maintain air quality by burning natural gas or “clean” coal. Firewood should be a viable fuel. This will make consumers more aware of their connection to forests, and of how air is connected to ecosystems that include forests.

Sheena Wilson’s “Survival of the Most Collaborative: Climate Justice as a Logics for Flows of Air” approaches air’s materiality through the issues of climate change, survival, and adaptation. Like air quality, climate change is an issue experienced locally, but its flows do not adhere to borders. Using a feminist and decolonial perspective, this chapter outlines that it is problematic to expect national governments to enforce international agreements on climate, when the primary goal of states has always been to manage their own lands, resources, and bodies, both within and outside their territorial borders. Is it reasonable to now expect these same governments to manage responses to the climate crisis, when they are often in direct conflict with national interests as they have been understood up to now? Chapter 3 uses air quality and the flows of air to illustrate how the climate crisis and the polycrises of the twenty-first century demand more agile and nimble social infrastructures. Survival of the fittest is a popularly misunderstood concept. It never was about the one who could kill before being killed. It was about the most adaptive, the most collaborative. Will the nation-state be able to adapt and collaborate enough to survive climate change? The chapter explores how we can approach these questions through the materiality of air, and how climate change and survival contribute to our understanding of the materiality of air.

From pollution, the book turns to the issue of toxicity in Natalie Dederichs' "A Microbiological Menace: Killer Spores and Toxic Pollen in Contemporary Young Adult Fiction," which opens Part II, "Air and Science Fiction: Toxicity, Sensoriality, Transmission." We live in suffocating times. Surrounded by greenhouse gases and toxic particles of all kinds, we are gasping for air on a planet whose upper atmosphere is continuously thinning. Besides airborne pollutants, we are, however, also haunted by biological aerosols such as viruses, bacteria, spores, and pollen, some of which seriously threaten human survival. As the planet seems to turn against humanity in a time of climate crisis, it is little wonder that stories about contagious encounters with microbiological pathogens in the plant kingdom have become more prevalent in young adult fiction. With readings of Dale Carlson's *The Plant People* (1977), Polly Ho-Yen's *Boy in the Tower* (2014), and Kenneth Oppel's *Bloom* (2020), Chapter 4 shows how far imaginations of a parasitic and infectious botanical world link teenage life with the life of plants through the metaphor of monstrous growth. In most of these texts, the adolescent protagonists undergo transformation processes not only because of puberty but also because they are bodily invaded by vegetal matter. More than responding to environmental fears and anxieties, the chapter suggests that such stories remind us of the fact that humans truly are what we breathe. In doing so, these stories force us to reconsider our position as a species as well as our concept of humanity in a larger biosphere. This also includes coming to terms with the unsustainability of sheer endless growth, both population- and economic-wise, which in these novels is problematized through horrific imaginations of uncontrollable vegetal reproduction and invasion.

Brent Ryan Bellamy's "Estranging Air in Ted Chiang's 'Exhalation'" provides another literary perspective on air through the genre of science fiction. This chapter explores the materiality of air in Ted Chiang's work, focusing on his story "Exhalation" (2008) and its unique use of science-fictional mechanisms. "Exhalation" is narrated by a scientist who takes on the problem of why time seems to be speeding up. The story begins, "It has long been said that air (which others call argon) is the source of life. This is not in fact the case, and I engrave these words to describe how I came to understand the true source of life and, as a corollary, the means by which life will one day end."³⁵ Here, the problem, mechanism, and plot entwine: the slow dispersal of argon is what grants life, and the impossibility of its replenishment aligns with the entropic turn in the scientist's words. Chiang's story presents a unique estrangement of a real-world atmospheric bias and the occasion to develop language for the carbon-dense air currently blanketing Earth. Chapter 5 reads the estrangement of air in Chiang's story to work through its implications for the nitrogen-dense, oxygen-rich atmosphere of Earth. First, despite its sensory invisibility, air cannot be taken for granted. Second, experimentation offers a viable way of sensing the otherwise insensible. Third, the representation of air, experimentation, and their description provides a tool for humanistic inquiry, and even intervention, into problems typically associated with scientific inquiry alone.

Arthur Rose's "Thinking over the Airwaves: Immediate Connection in Geoff Ryman's *Air* and Tade Thompson's *The Wormwood Trilogy*" engages with how air's materiality becomes particularly apparent in the case of wireless telecommunications, where it becomes both conduit and potential impediment to the free transmission of information. In *The Matter of Air* (2010), Steven Connor observes that, at the same time that "wireless signalling unleashed a dream of absolute communication and universal contact," it also presented new problems for the protection of such communication, including the prying ears of potential eavesdroppers, but also from the air itself, which would be "given voice by being given over to the electromagnetic carriage of voice."³⁶ In the twenty-first century, science fiction writers such as Geoff Ryman and Tade Thompson revitalize these earlier debates about instant communication to consider the possibilities and pitfalls they pose. Chapter 6 examines the representation of air in these earlier debates, as well as in Ryman's *Air* (2004) and Thompson's *The Wormwood Trilogy* (2016; 2019), to recall how air's very materiality imposes limits on its transmissive potential. And yet it is efforts to overcome these limits that frequently present crises of anxiety, as in recent debates surrounding 5G. By attending to the ways these writers respond to air's dialectical relation with transmission and suppression, the chapter suggests that we might consider new ways to address fears about our too-connected world.

In "A Deep, Slow, Strenuous Breath: Art in the Shadows of Capitalist World-Ecologies," which opens Part III, "Air and Art: Presence, Significance, Activism," Raffaella Occhietti assesses the contribution of olfactory art, as an overlapping yet distinct form of art engaging with aerial issues, to the critique of the Capitalocene. Air is increasingly sought as an allied medium in contemporary art, and particular attention has been given to atmospheric artworks that foster awareness of climate change through their staging and/or tweaking of air, for instance by charging it in humidity, contaminating it, coloring it, etc. Chapter 7 instead considers artworks that move away from a technical restaging of air, thus mobilizing air as a total presence and phenomenon. Through the combined analysis of *Lerole: footnotes (The struggle of memory against forgetting)* (2017) by South African artist Dineo Seshee Raisibe Bopape, and *Musa paradisiaca*, created by Colombian artist José Alejandro Restrepo (1996, 2016, 2017), the chapter shows how these two seemingly very different installations foster a specific and poignant use of air in art. In both instances, the artists conjure episodes of past colonial and neocolonial exploitation that resulted in violent deaths; both artists rely on olfactory elements, subtle or pungent, to reshape the atmosphere of the exhibition space. Occhietti argues that by transcending an exclusive attention to smells and instead making these scents exude directly from materials that signal human death under exploitative and conquering logics, Bopape and Restrepo unveil the pervasive process of ripping open new commodity frontiers in capitalist world-ecologies. The chapter highlights how the artworks' reshaping of the composition of the exhibition space's air, through the

emanations of organic matter and inorganic compounds, actively contributes to redefining a critical political ecology of air through art.

Davina Quinlivan's "Creative Writing: On Air" examines what is at stake, creatively and critically, when air is embedded as signifier or philosophical modus operandi in creative writing. Chapter 8 explores what is revealed and what is concealed, and to what extent this informs the kind of "fictional activism" Quinlivan writes now, after eighteen years of teaching and researching haptic phenomenology. Moreover, the chapter considers pedagogical approaches to the discipline in the context of air and breath studies across the arts. Drawing on her own creative-critical practice, alongside the feminist and postcolonial writings of Noreen Masud (*A Flat Place*, 2023) and Dalia Neis (*Zephyrian Spools: (An Essay, A Wind)*, 2020), Quinlivan examines the role of the mystic, the transcendental, and the material world in the post-pandemic era, searching for new methodological ways to think through air, breath, subjectivity, and the politics of writing the body in the contemporary world.

Through these approaches to air, airborne phenomena, and elemental representation, the chapters in this book dissect the materiality of air, a materiality that comes to the fore more and more vigorously given the ongoing environmental and health crises. Air's materiality is unavoidable, and understanding it is essential to outline clear solutions to these crises as well as to generate new meanings of an environmentally safe and healthy future and the steps to achieve it.

Notes

- 1 For more on the project, including the publications generated in the context of this project, see: <https://airproject.univie.ac.at/>.
- 2 See Tatiana Konrad, Chantelle Mitchell, and Savannah Schaufler, "Introduction: Toward a Cultural Axiology of Air," in *Imagining Air: Cultural Axiology and the Politics of Invisibility*, ed. Tatiana Konrad (Exeter: University of Exeter Press, 2023), 1–34.
- 3 In this brief contextualization of air, I draw on the introduction to *Imagining Air: Cultural Axiology and the Politics of Invisibility*. For a more detailed overview, see Konrad, Mitchell, and Schaufler, "Introduction," 1–34. The book, including this introduction, is available open access: https://library.oapen.org/viewer/web/viewer.html?file=/bitstream/handle/20.500.12657/76667/PUB_1019_Konrad_Imagining_Air.pdf?sequence=1&isAllowed=y.
- 4 See, for example, Steve Vanderheiden, *Atmospheric Justice: A Political Theory of Climate Change* (Oxford: Oxford University Press, 2008); Pamela Davies, Peter Francis, and Tanya Wyatt, eds, *Invisible Crimes and Social Harms* (Basingstoke: Palgrave Macmillan, 2014); Toine Spapens, Rob White, and Marieke Kluin, eds, *Environmental Crime and Its Victims: Perspectives within Green Criminology* (Farnham: Ashgate, 2014); Avi Brisman and Nigel South, eds, *Routledge International Handbook of Green Criminology* (London: Routledge, 2020); Nina Peršak and Anna Di Ronco, eds, *Harm and Disorder in the Urban Space: Social Control, Sense and Sensibility* (London: Routledge, 2021); Bill McClanahan, *Visual Criminology* (Bristol: Bristol University Press, 2021).

- 5 See also Tatiana Konrad, "The Environing Air and Health-Environmental Crisis," in *The Routledge Handbook of Health and Environmental Humanities*, ed. Amber Abrams, Victoria Bates, and Rocio Gomex (London: Routledge, 2025), forthcoming.
- 6 Moritz Ingwersen and Timo Müller, "The Aesthetics and Politics of Elemental Agency," *Zeitschrift für Anglistik und Amerikanistik* 70, no. 1 (2022): 5.
- 7 Cymene Howe, Jeff Diamanti, and Amelia Moore, "Introduction," in *Solarities: Elemental Encounters and Refractions*, ed. Cymene Howe, Jeff Diamanti, and Amelia Moore (Earth, Milky Way: punctum books, 2023), 17.
- 8 Howe, Diamanti, and Moore, "Introduction," 18, 17.
- 9 For more on the complex and changing meanings of pollution in the era of environmental and health crises, see Tatiana Konrad, "Planetary Health: Sickness, the Environment and Air in Film," *Journal of Environmental Media* 5, no. 2 (2024): 251. https://doi.org/10.1386/jem_00103_1
- 10 See, for example, "Globally, 3 Billion People at Health Risk due to Scarce Data on Water Quality," *UN Environment Programme*, March 19, 2021, <https://www.unep.org/news-and-stories/story/globally-3-billion-people-health-risk-due-scarce-data-water-quality>; "Drinking-Water," *World Health Organization*, September 13, 2023, <https://www.who.int/news-room/fact-sheets/detail/drinking-water>.
- 11 Raymond Zhong, "Are We in the 'Anthropocene,' the Human Age? Nope, Scientists Say," *New York Times*, March 5, 2024, <https://www.nytimes.com/2024/03/05/climate/anthropocene-epoch-vote-rejected.html>; Tatiana Konrad, *Climate Change Fiction and Ecocultural Crisis: The Industrial Revolution to the Present* (Reno: University of Nevada Press, 2024), especially Introduction and Chapter 1.
- 12 Celia Lowe, "Unseens," in *Anthropocene Unseen: A Lexicon*, ed. Cymene Howe and Anand Pandian (Earth, Milky Way: punctum books, 2020), 511.
- 13 Kirsten Osther, *Cinematic Prophylaxis: Globalization and Contagion in the Discourse of World Health* (Durham, NC, and London: Duke University Press, 2005), 2.
- 14 Lowe, "Unseens," 511; Philippa Nicole Barr, *Uncertainty and Emotion in the 1900 Sydney Plague* (Cambridge: Cambridge University Press, 2024), 44.
- 15 Barr, *Uncertainty and Emotion*, 44.
- 16 Barr, *Uncertainty and Emotion*, 46.
- 17 For more, see Tatiana Konrad, ed., *Imagining Air: Cultural Axiology and the Politic of Invisibility* (Exeter: University of Exeter Press, 2023), especially Part III: "Trans-Sensory Air: Bodies and Environments" and in particular Clare Hickman, "The Importance of 'Open Air' for Health: Environmental and Medical Intersections," 180–99.
- 18 Barr, *Uncertainty and Emotion*, 48–49.
- 19 See also Yuriko Furuhashi, *Climatic Media: Transpacific Experiments in Atmospheric Control* (Durham: Duke University Press, 2022).
- 20 Konrad, "Planetary Health," 246.
- 21 Konrad, "Planetary Health," 247.
- 22 Konrad, "Planetary Health," 251.
- 23 See also Robert-Jan Wille, "Keep Focusing on the Air: COVID-19 and the Historical Value of an Atmospheric Sensibility," *Journal for the History of Environment and Society* 5 (2020): 189; Konrad, "Planetary Health," 252.
- 24 Konrad, "Planetary Health," 252.
- 25 Konrad, "Planetary Health," 254; for more on the relationship between health, the environment, and colonialism, see Tatiana Konrad, ed., *Disability, the Environment,*

- and Colonialism* (Philadelphia: Temple University Press, 2024); for more on air and environmental racism, see Tatiana Konrad, “Atmoracism: Air and Precarities of Health, Environment, and Race,” in *Race and Environmental Justice in the Era of Climate Change and COVID-19*, ed. Tatiana Konrad (East Lansing: Michigan State University Press, 2025), 3–21; for more on environmental injustice and (post)colonialism, see Tatiana Konrad, *Climate Change Fiction and Ecocultural Crisis: The Industrial Revolution to the Present* (University of Nevada Press, 2024), especially Chapter 4, “The Postcolonial: Environmental Racism, Fragmentation of the World, and Survival in Climate Change Fiction.”
- 26 Konrad, “Planetary Health,” 255.
- 27 Konrad, Mitchell, and Schaufler, “Introduction,” 1, 6.
- 28 Konrad, Mitchell, and Schaufler, “Introduction,” 6.
- 29 Christian Riegel and Katherine M. Robinson, “Introduction: What Does It Mean to Do the Health Humanities in Application?” in *Health Humanities in Application*, ed. Christian Riegel and Katherine M. Robinson (Cham: Palgrave Macmillan, 2023), 3; Paul Crawford, Brian Brown, Charley Baker, Victoria Tischler, and Brian Abrams, *Health Humanities* (London: Palgrave Macmillan), 1.
- 30 David Macauley, *Elemental Philosophy: Earth, Air, Fire, and Water as Environmental Ideas* (New York: State University of New York Press, 2010), 29.
- 31 Marina Peterson, *Atmospheric Noise: The Indefinite Urbanism of Los Angeles* (Durham: Duke University Press, 2021), 24.
- 32 Derek P. McCormack, *Atmospheric Things: On the Allure of Elemental Envelopment* (Durham: Duke University Press, 2018), 5.
- 33 McCormack, *Atmospheric Things*, 5.
- 34 McCormack, *Atmospheric Things*, 10.
- 35 Ted Chiang, “Exhalation,” 2008, *Lightspeed* 47 (2014), <https://www.lightspeedmagazine.com/fiction/exhalation/>.
- 36 Steven Connor, *The Matter of Air* (London: Reaktion, 2010), 195, 198.

PART I

AIR AND POLLUTION:
HEALTH, VIOLENCE, SURVIVAL

Breathing Violence: Airborne Plastics, Materiality, and Anthropogenic Harm

Savannah Schauffer

A quiet park on a sunny fall day in the middle of a busy city. Families and groups of friends gather for a picnic, children play among the fallen leaves, and a gentle breeze rustles through the trees, creating a sense of calm and serenity—a moment that seems far away from the complexities of the modern world. Yet beneath this seemingly serene scene lies a hidden narrative of pervasive anthropogenic harm. Invisible to the naked eye, the air around us carries a myriad of microscopic particles, such as soot particles, pollen grains, dust particles, bacteria and viruses, heavy metals, as well as airborne micro- and nanoplastics. These tiny fragments of our human-made world have quietly infiltrated the very air we breathe and are embedded in our environments. As people enjoy their time in nature, they are unknowingly inhaling these invisible travelers, as is every aerobic organism that depends on an oxygenated environment to survive. These pollutants circulate seamlessly through water, soil, and air, blurring the lines between human activity and the natural world.

Air is rarely seen, yet it is profoundly material, saturated with pollutants and particles that reshape the environment in ways that are far from intangible. This contradiction between its invisibility and its very real, material impact underscores a reality—that everyday experiences are intertwined with a complex network of materials and pollutants that reshape the dynamics of the environment. Pollution infiltrates both natural ecosystems and organismal health, pervading spaces with contaminants. In this way, the materiality of air recognized through pollution demonstrates the extent to which we are entangled in global structures of power and consumption, where invisible harms are made visible through their tangible effects. Acknowledging this reality leads us to recognize our own positionality within the broader context of global structures in which certain societies and economies contribute

disproportionately to the climate crisis, while others are left to suffer from its violent consequences.

Air pollution remains a critical challenge of modern times, driven by a complex interplay of factors that disrupt the natural balance of the atmosphere.¹ The rapid expansion of megacities, the globalization of industrial production, the widespread use of pesticides and toxic chemicals, and the increasing reliance on automobiles all contribute significantly to this issue.² Additionally, the release of volatile organic compounds (VOCs) from fabric softeners and detergents, scented candles, perfumes, and smoke from wood-burning stoves and fireplaces contributes to air pollution. These activities have led to an increase in pollutants—chemicals, particulate matter, VOCs, and especially microplastics—that now permeate the air around us, silently degrading its quality.³ Importantly, much of the concern about air pollution stems from anthropogenic or secondary carbon emissions.⁴ Within the broader discourse on air pollution, plastic-induced air pollution demands focused attention, yet its sociopolitical aspects have not been adequately considered, despite a growing scientific discourse, particularly in Western academic research.⁵ This chapter examines the impact of plastic pollution on air quality, with a particular focus on micro- and nanoplastics. These microscopic particles release chemical compounds that pose risks to aerobic organisms that depend on oxygenated environments for survival.

This analysis is guided by a reimagination of air's materiality—not just as an inert and neutral space, but as a dynamic and vulnerable ecosystem. It explores the “space of ‘invisibility’” that air occupies, and how air interacts with and influences the body, the environment, and societal structures.⁶ Beyond the “usual” pollutants such as atmospheric compounds, emissions, and industrial contaminants, air also carries the invisible burden of micro- and nanoplastics—remnants of the material culture that has infiltrated the very air we breathe. This combination not only shapes the ambient environment but also holds reverberations of significant past events and anthropogenic harm. This chapter emphasizes that air is not merely a passive backdrop but an active and vital element in our material world that is constantly affected by anthropogenic practices and activities. Drawing on existing understandings of violence and research on the chemical composition, toxicity, distribution, and prevalence of airborne plastics, it reframes air as a medium through which violence is silently perpetrated by the inhalation of plastic toxicants. Framing the environmental degradation caused by airborne plastics as a form of violence, the chapter highlights the subtle yet pervasive ways in which human actions disrupt ecosystem equilibrium, manifesting environmental degradation as a form of violence that permeates the very air that breathing bodies depend on for sustenance. In exploring the material and noxious qualities of airborne plastics, it addresses the suffocating violence woven into the shared atmospheric experience. It underscores how aerial encounters are fraught with systemic violence, often shaped by the structures of capitalist and neoliberal structures.⁷ Though indispensable to all aerobic life forms, the commonality of air does

not automatically ensure equality; instead, it accentuates multiple narratives of abuse and suffering embedded in its very nature.⁸ This perspective aims to contribute to a reimagining of air's materiality, rendering air more palpable.

In addressing the issue of aerial toxicants, I want to emphasize the complexity of humanity's role in environmental degradation. While humanity is often portrayed as a homogeneous entity that contributes equally to these problems, it is crucial to acknowledge the disproportionate impact of industrialized nations and global actors in perpetuating anthropogenic harm. As a European (I come from and live in Austria), I am also inherently implicated in these systemic issues and must admit my own contribution to the broader narrative. The use of pronouns such as "us," "we," and "our" is not intended to homogenize humanity, but rather to engage readers and foster a sense of collective responsibility. These pronouns serve to draw attention to the reader's potential contributions to systemic problems and the violent affronts to aerial spaces. By using these pronouns, I want to encourage readers to question their individual roles within these geopolitical and capitalist structures, and engage in critical self-reflection and awareness.

Meanings of Violence: Toward Environmental Violence

Violence as a concept spans various academic disciplines and is known for its complex and multifaceted nature.⁹ Its elusive definition stems from its omnipresent existence, permeating almost every aspect of human life, with its interpretation evolving in different historical, political, and social contexts.¹⁰ Anthropologist Neil L. Whitehead defines violence as the convergence of irrationality and physical harm, emphasizing its complex interplay with perceptions and social constructs. The scope of violence, however, extends beyond immediate physical harm to encompass broader social and environmental injustices. It transcends mere natural occurrences to become a moral reality that defies classification based on predetermined human behaviors or explicit physical consequences. The historical legacy of colonialism and neocolonialism not only shapes the norms that govern violent practices but also serves as a mirror reflecting the violent systems embedded within society.¹¹ Whitehead asserts that the issue is not simply the cessation of violence, but the nuanced understanding of its underlying causes.¹² This requires recognizing violence as an integral facet of human existence, intertwined with notions of disruption of cultural and social order, as articulated by anthropologist Robert Thornton.¹³ Thornton argues that violence, despite its statistical predictability, is only apparent retrospectively, making it difficult to articulate causal models beforehand. Violence emerges as a spontaneous element of experience, shaped by specific circumstances rather than intentional social processes.¹⁴ While violence can shape social and psychological realms, it is misleading to view it as a direct agent of change, as is often presumed by revolutionaries or those who use violence against social and political structures.¹⁵ Rather, it serves as a transporting act of change, challenging and potentially destroying these structures.

According to peace researcher Johan Galtung, violence manifests in three distinct forms: personal or direct violence, cultural violence, and structural violence.¹⁶ Personal violence involves direct acts of harm by one person against another, such as sexual harassment, torture, or physical assault. Cultural violence operates in the realm of ideas and justifies tangible violence, often rooted in religious or ideological beliefs, language, or art.¹⁷ It is less visible and focuses on an individual level, whereas structural violence is deeply embedded within societal norms and power structures, and is typically hidden within broader social networks.¹⁸ Thus, structural violence involves powerful actors who deliberately impede not only basic human needs but also broader societal rules, resulting in avoidable limitations on the quality of life for (marginalized) individuals and/or groups.¹⁹ This form of violence, often amplified by capitalist and neoliberal structures, is rooted in societal frameworks influenced by political, social, cultural, and economic factors.²⁰ Expanding on this concept, American anthropologist Paul Farmer describes structural violence as the harm that results from institutional practices and economic policies that subject individuals to violence, harm, vulnerability, suffering, and abuse.²¹ In sum, violence is a multifaceted and ongoing process that is intertwined with historical forces, institutional practices, and societal frameworks.²² The physical expression of this systemic suffering may not always be tangible, but the acceptance and normalization of structural harm allows various forms of violence to continue unnoticed in everyday life.²³

This seemingly “unseen” structural harm is echoed by environmental scholar Rob Nixon, who proposes to study “slow violence.” The concept of “slow violence” refers to the gradual and often imperceptible harms to humans, more-than-humans, and the environment more broadly, caused by toxic contamination that unfolds over long periods of time and within large spaces.²⁴ Drawing on Galtung’s work on structural violence, “slow violence” challenges the conventional notion of violence as an immediate event and emphasizes change and movement over time.²⁵ This requires a broader conception of accountability—one that goes beyond individual actors to include systemic structures and power relations—in response to contemporary environmental problems that often occur at speeds and scales that escape public attention and disproportionately affect vulnerable populations.²⁶ The disproportionate exposure of certain populations to toxicants exacerbates the effects of “slow violence” on marginalized groups and highlights the interplay between toxicity, pollution, and power dynamics at both the individual and collective levels, resulting in environmental injustice. These communities face a double-edged sword: not only are they disproportionately affected by environmental degradation, but their voices, sufferings, and concerns are often sidelined in decision-making processes.

Expanding on this concept, cultural theorist Lauren Berlant coins the term “slow death” to illustrate the gradual dismantling of certain populations that is intimately intertwined with their daily routines. This idea encapsulates the notion that a population physically and gradually “wears out,” indicating a

decline that profoundly shapes its experience and historical context.²⁷ Berlant's conceptualization of "slow death" resonates with the broader notion of "slow violence," emphasizing the prolonged duration of harm and underscoring how marginalized communities endure sustained suffering and vulnerability over time. Thus, Berlant's exploration of "slow death" enriches the comprehension of how individuals and communities grapple with the insidious effects of structural inequalities and neoliberal governance, thereby contributing to a broader, more personal understanding of how violence is enmeshed in today's modern capitalist world.²⁸

Within environmental conversations, the dimensions of time and space are fundamental to transforming how we perceive environmental challenges, particularly with regard to the persistent effects of toxicants.²⁹ While temporality traditionally delineates a linear progression from past to present to future, its non-linear aspects are increasingly examined in relation to human perception and social organization of time. In this context, historian and political science scholar Achille Mbembe introduces the concept of "necropolitics," which expands the understanding of violence beyond direct acts of causing death to include the right to expose individuals to the possibility of death.³⁰ This challenges the dominant (biopolitical) narrative and underscores the exploitation of death over life, shifting the focus to controlling death rather than managing life. Mbembe emphasizes that "necropolitics" encompasses not only physical death but also social or political death, when individuals lose sovereignty over their bodies due to external influences. When nation-states exercise control that limits autonomy, they embody "necropolitics," creating spaces where individuals are like the "*living dead*," deprived of agency over their own bodies.³¹ This concept is clearly illustrated in environmental contexts, such as the deliberate placement of hazardous waste sites or industrial facilities on the periphery of marginalized communities. Consider, for example, a scenario in which a large corporation decides to locate a chemical plant in a low-income neighborhood. Despite being aware of the health risks associated with invisible pollutants released into the air, water, and soil, the company chooses this location because of lax regulations and the community's limited political influence. As a result, residents are exposed to elevated levels of toxins, leading to increased rates of respiratory diseases, cancer, and/or other health complications.

A real-life example of "necropolitics" unfolds in Ogoniland, located in the Niger Delta of southern Nigeria.³² For decades, the Ogoni people have suffered from the environmental violence of multinational oil extraction. Oil spills, gas flaring, and pollution have devastated the land and waterways, decimating farmland, fisheries and livelihoods.³³ Despite the cessation of most oil extraction activities in Ogoniland during the early 1990s, efforts to restore the area have been complicated by ongoing spills due to "pipeline sabotage, theft, and ... corrosion."³⁴ The Nigerian government's failure to address environmental concerns have perpetuated the suffering of the Ogoni people. The health, prosperity, and livelihoods of local communities continue to be threatened by the lingering consequences of more than half a century of oil spills.³⁵

In both scenarios, “necropolitics” is evident in the deliberate sacrifice of residents’ health and well-being for corporate profits or the supposed “common good.” The (political) common good refers to the collective benefits or resources that support the well-being of all members of a society, such as public safety, legal systems, public health, clean air, water, land and soil, infrastructure, freedom of speech, public schools and education, and a stable environment.³⁶ The term can refer either to the common interests of members of a society or to the resources that serve those “common” interests.³⁷ In some cases, however, what is presented as serving the “common good” may privilege certain groups at the expense of others. For example, industrial development or economic growth is often justified as serving the “common good” because it can create jobs or fuels innovation and progress. But when these activities disproportionately harm communities facing structural disadvantages through pollution, poor and unsafe working conditions, gentrification, cultural loss, inadequate healthcare, and environmental destruction, the supposed benefits are not really shared.³⁸ In these cases, the idea of the “common good” is distorted to obscure various forms of injustice that occur when the needs and rights of certain communities are sacrificed for the sake of others. As a result, already marginalized communities become sites of “bare life,” where individuals endure conditions that reduce their existence to mere biological survival, devoid of meaningful possibilities.³⁹

Mbembe’s concept of “necropolitics” highlights discussions of environmental violence by underscoring how environmental degradation and toxic exposure are not merely passive outcomes of economic progress, but deliberate acts of violence perpetrated against specific populations. It identifies the power dynamics at play in which decisions about environmental policy and resource allocation are influenced by political and economic interests, often at the expense of marginalized groups. This framework underlines that environmental injustices extend beyond the unequal distribution of resources to include the targeted exploitation of vulnerable populations for the benefit of those in positions of power. “Necropolitics” provides insight into how structural violence operates, encompassing not only physical death, but also the erosion of basic human autonomy within societal structures.⁴⁰

Air as a Space of Violence

Despite air being an unequal space, though seemingly intangible, it serves as a vital element and a shared environment not only for breathing organisms but for all entities within its reach. For example, plants depend on air for photosynthesis, a process in which they absorb carbon dioxide from the air, using sunlight as energy, and release oxygen as a by-product of this process. Many aerobic animals, including mammals, require oxygen in the air for respiration; they inhale air to obtain this essential gas and exhale carbon dioxide. Aquatic bodies, such as lakes and rivers, engage in gas exchange with the air, absorbing oxygen that aquatic organisms, such as fish and invertebrates,

need to survive. Even nonliving objects such as buildings and infrastructure are exposed to air and can be affected by its properties, such as moisture and pollutants.⁴¹ Exposure to moisture can lead to structural degradation, such as rust in metal structures and mold growth in damp environments. Airborne pollutants can corrode materials and impact air quality indoors. This asserts the importance of air as a medium through which life as well as various environmental and chemical processes unfold. It blurs the boundaries between living and nonliving entities, between individual bodies and collective spaces, and emphasizes their interconnectedness within the broader ecosystem.⁴²

While it may be initially challenging to conceive of air as a space of violence, its role in sustaining life also exposes it to exploitation and harm. Toxicants dispersed in the air seep into bodies, penetrating tissues and organs, inflicting forms of slow and necropolitical violence upon those who inhale them. This inflicted violence can manifest as chronic illness, cardiovascular diseases, compromised immune systems, and degraded environmental conditions, gradually eroding the vitality and well-being of communities and ecosystems alike. Philosopher Peter Sloterdijk's concept of "air conditioning" extends this idea by examining how air is controlled and manipulated to exert power over populations. Sloterdijk argues that modern societies use the regulation of air as a means of biopolitical control, shaping the environments in which people live and breathe. This control over air quality and access can be seen as a form of environmental violence, where the manipulation of air enforces social hierarchies and maintains systems of domination.⁴³ In this context, the concept of eco-crime enriches the conversation by highlighting how environmental degradation frequently remains unaddressed within legal frameworks governing environmental offenses.⁴⁴ Laura Westra's concept of "eco-violence" extends this argument and provides a framework to analyze how acts of environmental degradation—often justified by states and corporations in pursuit of economic or political goals—are not always considered criminal. According to Westra, eco-crime involves acts of "unprovoked aggression" against the environment for the sake of profit.⁴⁵ While current legal definitions of environmental crime typically emphasize localized violations, such as littering or water pollution, they often overlook the serious and systemic pollution caused by corporations and government actors. As a result, the term eco-crime broadens the scope of legal definitions surrounding environmental crime, incorporating social and cultural dimensions into the discourses on accountability, public health, and environmental justice.⁴⁶

Beyond this, environmental violence includes not only the intentional harm, but also accidental infliction of (atmospheric) harm, such as pollution from industrial activities, vehicle emissions, and aerial spraying of chemicals, among others. These actions constitute eco-crimes in themselves. This form of violence not only affects human and more-than-human health, but also disrupts entire ecosystems. Therefore, while air may seem intangible and ethereal, its influence extends to all aspects of the environment, making it a shared space for diverse forms of life and matter.

Air, Breath, and Materiality

At the time of writing, geologists have dismissed the Anthropocene epoch, arguing that it is too recent and that it is necessary to evaluate the extent of anthropogenic activities' impact on the Earth before considering the beginning of a new geological epoch.⁴⁷ Nonetheless, scholars in various fields including environmental science, humanities, sociology, anthropology, and others, still widely utilize the term. This culturally influenced term refers to the modern period in Earth's history when human activity profoundly affected and still affects the planet's climate and ecosystems.⁴⁸ In this epoch, human actions have not only altered the physical landscape but also transformed the understanding of the material world. Traditionally, the materiality of the Earth's surface has been perceived as static and unchanging, providing the natural foundation for human activities. However, the reality is that humans have significantly altered this earthly substrate through extractive activities and resource exploitation, resulting in the production of materials that are central to modern human culture.⁴⁹ Historian and postcolonial scholar Dipesh Chakrabarty's work on the Anthropocene underscores the idea of humans as geological agents, fundamentally reshaping the planet in ways previously unimaginable.⁵⁰ Chakrabarty contends that human activities have moved beyond mere environmental impact to become a force capable of altering geological processes themselves.⁵¹ He illustrates this by comparing the impact of human activity—driven by population growth, consumption, and technological advances, among others—to that of the asteroid that caused the extinction of the dinosaurs.⁵² Activities such as deforestation, mining, and the widespread use of fossil fuels have left an indelible mark on the planet, creating a new cultural epoch characterized by human-induced changes and crises. These activities have led to the accumulation of materials such as plastics and concrete that are now ubiquitous in our daily lives and serve as a stark reminder of our role as architects of the Anthropocene.⁵³

While the materiality of the soil is readily acknowledged, the materiality of air remains largely overlooked.⁵⁴ Amidst this transformation, the materiality of air is often disregarded or reduced to an abstraction in scientific discourse.⁵⁵ However, the materiality of air becomes palpable and consequential when its composition is altered by for example emissions, combustion, and other chemical substances, with tangible implications for human and more-than-human health and well-being. The composition of air encompasses a diverse array of gases, comprising nitrogen, oxygen, emissions from combustion, and assorted additional components.⁵⁶ It serves as an essential, breathable life force for aerobic organisms, yet it also carries reverberations of significant historical events and human intervention in the environment.⁵⁷ This mixture of gases represents a hybrid combination of substances, carefully maintaining a delicate chemical balance that gives it sensitive and specific equilibrium properties.⁵⁸ Yet this seemingly invisible substance is deeply involved in biological processes, particularly respiration, which involves the exchange of oxygen and carbon

dioxide within living and breathing organisms and their environment. In the process of respiration, the body inhales oxygen, which is then transported to cells. Through inhalation, aerosols present in the air—tiny, imperceptible particles suspended in the atmosphere—can enter the body, impacting organismal and cell flourishing. The disregard of air's materiality fades it into invisibility, relegating it to insignificance focused on static representations. This neglect has created a void in knowledge and perceptions of air's role in sustaining life. Feminist and philosopher Luce Irigaray, however, challenges this neglect by emphasizing air's profound significance as a mediator of freedom and a key element of life.⁵⁹ In challenging Western cultures and capitalist societies for their exploitative practices, she stresses the detrimental effects of forgetting the importance of air, as neglecting air ultimately leads to suffocation.⁶⁰

Humanities scholar Irma Kinga Allen points out the glaring absence of the human body in discussions of air pollution. Failure to acknowledge the fundamental function of respiration overlooks the continuous and metabolic nature of breathing, where the material aspects of humanity and the broader ecological systems harmonize and continually influence one another.⁶¹ Turning our attention to air and breathing bodies, according to Allen, serves as a gateway to various frameworks for considering political ecologies and capitalist systems that also govern the distribution of pollutants.⁶² Reflecting on the act of breathing invites a profound engagement with the relationship between this essential human function and the pervasive threats in the air itself. This is consistent with the notion of breathing as a fundamental aspect of "bodily existence," emphasizing the inherent vulnerability of life itself.⁶³ Within this framework, the body serves as a "contact zone," interwoven with the diverse influences of the world, spanning social, political, material, and ecological dimensions.⁶⁴ Breathing transcends mere physiological necessity; it serves as an essential conduit through which aerobic organisms interact with their surroundings, inhaling life-sustaining oxygen while simultaneously exposing themselves to hazardous aerosols and suspended toxicants in a polluted aerial space. This juxtaposition stresses the interdependence between vital breath and environmental hazard, and highlights the paradoxical nature of respiration as both sustenance and risk.⁶⁵

Scholars such as feminist philosopher Magdalena Górska and transdisciplinary researcher Marijn Nieuwenhuis explore the profound social and political implications of breathing, emphasizing its capacity to carry memories, reflect vulnerability, and shape intersectional politics. Górska encourages a nuanced understanding of breath as an inspiration to rethink the relationships between physical bodies, individual perceptions, and natural surroundings, acknowledging through the act of breathing the intimate interconnectedness between humans and the broader natural realm.⁶⁶ Nieuwenhuis continues to emphasize how breath serves as a medium for the exchange of not only oxygen, but also "memories, chemicals, and other [remnants] of the past," showing the tangled ways in which our breath is intertwined with the fabric

of society, values, experiences, and worldviews.⁶⁷ In aesthetic discourses, breath plays a central role in shaping composition and meaning in linguistic and artistic realms.⁶⁸ Be it as a rhythmic beat, a pause in thought, or a marker of existential boundaries, literary scholar Arthur Rose shows in his introduction to the edited collection *Reading Breath in Literature* how breath deeply connects individuals to their present reality. Even when unnoticed, breath subtly influences the structure and flow of written language.⁶⁹

Humanities scholar Jane Macnaughton's exploration of the invisibility of breath provides a contemplation of its sensory depth. Emphasizing how breath encompasses not only physical sensations but also auditory, olfactory, gustatory, and visual experiences, Macnaughton accentuates its neglected potential to enrich social bonds and connections. Revealing breathing's intimate connections to physical embodiment and the broader world, Macnaughton emphasizes its importance in strengthening social bonds and relationships within the multifaceted dynamics of modern society.⁷⁰ Breathing in fear and anxiety, as well as the sensation of catching a breath, breathing to calm the nervous system, and breathing during sexual arousal or heightened excitement, all intertwine with the physical embodiment of breath, influencing our physiological responses and shaping social interactions.⁷¹ Environmental humanities scholar Jean-Thomas Tremblay extends this understanding by examining the ways in which breathing interacts with both literal and figurative realms. Tremblay emphasizes that breathing is not only a biological function, but also a significant cultural and aesthetic practice. He underlines how awareness of breath can draw attention to both literal and figurative forms of breathlessness, emphasizing the physical and symbolic dimensions of the respiratory experience. For example, Tremblay notes that "witnessing someone's labored breathing" can make one more aware of one's own breathing, creating a conscious connection that transcends mere physicality. Tremblay's work explores how different forms of art and media can manipulate the experience of breathing to produce different emotional and psychological effects. This manipulation highlights the intersection between the literal act of breathing and its figurative implications, illustrating how breathing can be both a personal and a collective experience.⁷² In this context, the act of breathing becomes a metaphorical battleground where social power dynamics are manifested and contested. It becomes a visceral reminder of the inequalities and injustices embedded in our social structures, where access to clean air and the ability to breathe freely are not equally distributed. These challenges manifest through a myriad of influences that include pollution, bio-/necropolitical dynamics, violent affronts and actions, and chemosocial factors.⁷³

Air—perceived immateriality—emerges as this force when its materiality becomes palpable in moments of physical and emotional crisis.⁷⁴ As breathing transitions from a mundane necessity to a critical barrier to health and well-being, the violence inflicted on our oxygenated lungs and respiratory systems becomes glaringly obvious.⁷⁵ For example, after strenuous physical activity, the need for air becomes pressing—not just for the air itself, but specifically

the oxygen it contains. Hence, the simple act of catching one's breath can feel urgent, making the absence of (fresh) air acutely felt. Similarly, when restricted from breathing freely or feeling suffocated—whether due to pollution, a bad workplace, or the weight of societal expectations and pressure—air transitions into a concrete impediment. In these moments, the struggle to breathe freely can reflect the broader violence inflicted on bodies and minds, whether from environmental degradation or invisible societal pressures. This is when the materiality of air becomes apparent, tangible.

Unequal access to clean air and breathable environments symbolically mirrors the rhythmic process of breathing, in which individuals not only take in life and the world, but also influence their surroundings through their actions. Scholar Ivana Milojević suggests that this rhythmic pattern of breathing serves as a framework for understanding the reciprocal relationships between antithetical constructs such as “violence and peace, self and other, individual and [collective] history, personal and political spheres, [lived experience and meaning-making, stability and change, security and threat,] and oppression and [liberation]” that shape one's perception of reality.⁷⁶ Breathing directly connects us to the materiality of air, drawing attention to its presence and significance. When we inhale, we engage with the physical substance of air, integrating it into our bodies and making its materiality undeniably real. This intimate connection manifests itself in situations where air quality is compromised, such as in polluted (urban) environments, during wildfires, or amidst tear gas exposure.⁷⁷ It is also evident in industrial areas with high emissions, regions suffering from deforestation, and places affected by agricultural pesticide spraying.⁷⁸ In addition, household pollutants such as cleaning products and indoor smoking, as well as natural events such as volcanic eruptions and dust storms, illustrate the vital importance of clean air and its impact on health and well-being.⁷⁹ These instances force us to confront the material properties of air, as it carries particles that invade our respiratory system, causing harm and discomfort. The act of breathing thus evolves into an acute awareness of air's material presence and its potential for violence. This nexus between breathing and air's materiality is crucial to understanding the broader implications of environmental and structural violence. For example, industrial pollution and environmental degradation are often located near low-income neighborhoods and communities of color, exacerbating health disparities and illustrating a form of structural violence.⁸⁰ The act of breathing in such contexts is not only a biological necessity, but also a constant reminder of the persistent nature of environmental injustices and violence.

Manipulation of air quality as a tool of control and oppression also reinforces the violent dimensions of air.⁸¹ For instance, tear gas, a chemical weapon used in protests and conflict, transforms air into a conduit of pain and suffering.⁸² Its use directly targets the act of breathing, weaponizing the very air on which we depend. This explicit violence inflicted through air emphasizes how something as essential and seemingly benign as air can be transformed

into an instrument of power and harm. What appears to be intangible air becomes a medium through which life and death, health and illness, are negotiated. In this way, the materiality of air becomes inextricably linked to the violence experienced by individuals and communities. Recognizing the materiality of air and its role in our lives is essential to understanding the broader dynamics of power, control, and resistance.

The Violent Qualities of Airborne Plastics

Exploring the dynamics of breathing and its intricate connection to the environment, we are confronted with the violent affronts posed by airborne plastics. The act of breathing, fundamental to life, serves as this reminder of our own vulnerability amidst the potential hazards of the air. Górska and Nieuwenhuis elucidate the social and political implications of breathing, underscoring its capacity to carry memories and shape intersectional and oppressive politics. However, this nuanced understanding of breath is juxtaposed with the invisible violence lurking in our atmosphere.

Plastics, ubiquitous in modern life, permeate cultural, social, and environmental spheres, leaving an indelible mark on the fossil record and revealing an undeniable ecological footprint.⁸³ Made from versatile synthetic polymers, the sheer volume of plastics surpassed 367 million metric tons between 2000 and 2019, a figure projected to triple by 2060 if proactive measures are not taken.⁸⁴ Ranging from macroplastics (>20 mm) to nanoplastics (1–1,000 nm), these materials come in a variety of sizes, each with its own environmental impact.⁸⁵ Among their many forms, airborne plastics emerge as a silent but potent threat, released into the atmosphere by various anthropogenic (extractive) activities.⁸⁶ These activities include abrasion from vehicle tires, city dust and the resuspension of deposited dirt from motor vehicles, consequences of waste incineration, accumulation in landfills, persistence of plastic waste, dispersal from common household items, and introduction of synthetic clothing with embedded substances and chemicals, among others.⁸⁷ Once introduced into the (natural) environment, these tiny particles undergo continuous processes and spread beyond their point of release. It is important to note that plastic particles do not simply remain in the atmosphere; they also undergo processes of evaporation and precipitation.⁸⁸ Not only do they pose health risks by entering the central airways and lungs through inhalation, but they also impact the environment by acting as vectors for microorganisms, potentially influencing disease transmission.⁸⁹

The complexity of synthetic proliferation in the atmosphere, particularly in the textile industry, unfolds as an interplay of chemical treatments that enhance material properties. Synthetic microfibers, prevalent in contemporary clothing, such as nylon, polyester, and acrylic, are released into the atmosphere during washing and drying cycles, contributing to the global dispersal of micro- and nanoplastics.⁹⁰ Astonishingly, a single garment can shed approximately 1,900 fibers in just one wash cycle.⁹¹ In Finland, for example, research

conducted in 2020 estimated the annual release of microfibers from polyester to be 154,000 kilograms.⁹² Within this sector, materials are often treated with an array of chemicals to enhance specific properties such as durability, fire resistance, and the incorporation of plasticizers and antimicrobial agents.⁹³ This process contributes significantly to the estimated millions of tons of plastic waste entering the oceans from rivers each year, highlighting atmospheric transport as a key mechanism in the global dispersal of plastics.⁹⁴ Consequently, workers in industries such as synthetic textiles or electronics are directly exposed to chemicals and airborne micro- and nanoplastics, with toxicological effects on the respiratory tract.⁹⁵

Beyond health concerns, these toxicants act as agents of violence, disrupting ecological balances and perpetuating cycles of exploitation. The presence of airborne micro- and nanoplastics in our environment underscores the dynamics underlying life as it navigates through the complexities of chemical interactions and environmental influences. As we confront the violent qualities of airborne plastics, we witness the collision of materiality and vulnerability. Plastics, once perceived as convenient, durable, and versatile materials, now emerge as active and “geological” agents in the air, wreaking havoc on the very systems that sustain life.⁹⁶ The infiltration of micro- and nanoplastics into our environment mirrors the nature of violence that lurks beneath the surface of everyday existence. In this narrative of violence, the dichotomy between breath and pollution becomes visible. While breath symbolizes life and vitality, pollution embodies destruction and decay. The violent qualities of airborne plastics serve as a sobering reminder of humanity’s capacity for both creation and destruction.

The infiltration of plastics into the air reshapes understandings of air’s materiality insofar as it uncovers the layered and often covert interactions between synthetic materials and natural processes. Plastics embody a complicated and arguably destructive relationship between human industrial activity and the environment, highlighting how human–material interactions and networks are crucial in shaping the materiality of air. Industrial activities, consumption patterns, and waste management practices are all interconnected, creating a web of interactions that influence the air that is breathed. The spread of airborne plastics illustrates how human actions can disrupt natural systems and introduce new materialities into the environment. These interactions underscore the entanglement of human life with the material world, where every breath is a reminder of the pervasive influence of human-made materials. Their presence in the air transforms perceptions of air from an innocuous, resuscitative element to a medium permeated with invisible dangers. This shift forces us to consider air not only as a carrier of life, but also as a vehicle of potential harm, redefining its materiality in a context where human activities have a (often) detrimental impact on the interconnected networks that preserve life. The materiality of air thus becomes a contested space where the benefits of modern advances are weighed against their insidious consequences.

Conclusion

Within the vast realm of environmental challenges facing global societies, this chapter focused on airborne plastics, attempting to explain their subtle yet profound presence in our atmosphere. Plastics persist and transform, their presence not only a matter of physical existence but one of sociopolitical significance, especially in the aerial realm. Their presence in the atmosphere challenges traditional notions of air as an invisible, immaterial expanse, revealing instead a dynamic and fragile ecosystem permeated by human-made pollutants. The materiality of air is redefined through the lens of micro- and nanoplastics. These minuscule particles, imperceptible to the naked eye, are intricately woven into the fabric of our environment, demonstrating how human activity transforms even the most ethereal elements of our world. Understanding air's materiality in the context of micro- and nanoplastic pollution requires acknowledging how these particles infiltrate the respiratory systems of living beings, disrupting biological processes and posing significant health risks. The act of breathing, fundamental to life, becomes a conduit for both nourishment and contamination. This duality highlights the paradoxical nature of air in the modern era, where the essential act of inhaling oxygen simultaneously exposes organisms to dangerous pollutants.

Beyond environmental impacts, this duality extends into broader social and economic spheres, disproportionately burdening marginalized communities and exacerbating existing inequalities in health and well-being. The discourse also spotlights the subtle yet potent threats posed by airborne micro- and nanoplastics, echoing the devious nature of other hidden dangers such as disease-causing pathogens like those responsible for COVID-19. Unlike overt diseases, plastics insidiously infiltrate our lives, and the full spectrum of their effects still remains incompletely understood. This complexity mirrors the multifaceted nature of violence, which often transcends immediate awareness. Looking into the future, the latent dangers of plastics and their additives loom ominously, urging a critical examination of our cultural engagement with these materials. A consideration of the materiality of air provides an important framework for addressing the interrelated challenges of pollution, health, and justice.

Notes

- 1 "Air Pollution," *World Health Organization*, accessed May 3, 2022, https://www.who.int/health-topics/air-pollution#tab=tab_1.
- 2 Philip J. Landrigan, "Air Pollution and Health," *The Lancet Public Health* 2, no. 1 (January 2017): e4–5. [https://doi.org/10.1016/S2468-2667\(16\)30023-8](https://doi.org/10.1016/S2468-2667(16)30023-8)
- 3 Landrigan, "Air Pollution and Health," e4–5; "Ambient (Outdoor) Air Pollution," *World Health Organization*, October 24, 2024, [https://www.who.int/news-room/factsheets/detail/ambient-\(outdoor\)-air-quality-and-health](https://www.who.int/news-room/factsheets/detail/ambient-(outdoor)-air-quality-and-health).

- 4 Reece Walters, "Air Pollution and Invisible Violence," in *Invisible Crimes and Social Harms*, ed. Pamela Davies, Peter Francis, and Tanya Wyatt (London: Palgrave Macmillan, 2014), 143. <https://doi.org/10.1057/9781137347824>
- 5 Luís Fernando Amato-Lourenço et al., "An Emerging Class of Air Pollutants: Potential Effects of Microplastics to Respiratory Human Health?" *Science of the Total Environment* 749 (December 2020): 2. <https://doi.org/10.1016/j.scitotenv.2020.141676>; Stephan Kubowicz and Andy M. Booth, "Biodegradability of Plastics: Challenges and Misconceptions," *Environmental Science & Technology* 51, no. 21 (November 2017): 12058–60. <https://doi.org/10.1021/acs.est.7b04051>
- 6 Pamela Davies, Peter Francis, and Tanya Wyatt, "Taking Invisible Crimes and Social Harms Seriously," in *Invisible Crimes and Social Harms*, ed. Pamela Davies, Peter Francis, and Tanya Wyatt (London: Palgrave Macmillan, 2014), 19. <https://doi.org/10.1057/9781137347824>
- 7 Derek R. Ford, "Air and the Politics of Resistance," *Aggregate* 3 (2015): 1–6. <https://doi.org/10.53965/ADYQ3032>
- 8 Ford, "Air and the Politics of Resistance," 2–3.
- 9 Neil L. Whitehead, "Violence & the Cultural Order," *Daedalus* 136, no. 1 (January 2007): 40–50. <https://doi.org/10.1162/daed.2007.136.1.40>; Klaus Wahl, "Streit der Fakultäten: Aggression und Gewalt im interdisziplinären Blick," in *Aggression und Gewalt: Ein biologischer, psychologischer und sozialwissenschaftlicher Überblick* (Heidelberg: Spektrum Akademischer Verlag, 2009), 5–16. https://doi.org/10.1007/978-3-8274-2389-4_2
- 10 Wahl, "Aggression und Gewalt," 11.
- 11 Whitehead, "Violence & the Cultural Order," 40.
- 12 Whitehead, "Violence & the Cultural Order," 41.
- 13 Robert Thornton, "The Peculiar Temporality of Violence: A Source of Perplexity about Social Power," *KronoScope* 2, no. 1 (January 2002): 41–69. <https://doi.org/10.1163/15685240260186790>
- 14 Thornton, "The Peculiar Temporality of Violence," 41–44.
- 15 Thornton, "The Peculiar Temporality of Violence," 41–44, 63–64.
- 16 Johan Galtung, "Violence, Peace, and Peace Research," *Journal of Peace Research* 6, no. 3 (1969): 167–91. <https://doi.org/10.1177/002234336900600301>
- 17 Galtung, "Violence, Peace, and Peace Research," 167–91.
- 18 Galtung, "Violence, Peace, and Peace Research," 167–91; Bandy X. Lee, "Causes and Cures VII: Structural Violence," *Aggression and Violent Behavior* 28 (May 2016): 109–14. <https://doi.org/10.1016/j.avb.2016.05.003>
- 19 Lee, "Causes and Cures VII: Structural Violence," 110–11.
- 20 Galtung, "Violence, Peace, and Peace Research," 167–91; Whitehead, "Violence & the Cultural Order," 40–50.
- 21 Paul Farmer, *Pathologies of Power: Health, Human Rights, and the New War on the Poor* (Berkeley: University of California Press, 2003), 29–30, 42–43. <https://doi.org/10.1525/nad.2003.6.1.1>; Paul Farmer, "On Suffering and Structural Violence: A View from Below," in *Social Suffering*, ed. Arthur Kleinman, Veena Das, and Margaret M. Lock (Berkeley: University of California Press, 1998), 261–84. <https://doi.org/10.1525/9780520353695-014>
- 22 Galtung, "Violence, Peace, and Peace Research," 167–91; Whitehead, "Violence & the Cultural Order," 40–50.

- 23 Achille Mbembe, "The Banality of Power and the Aesthetics of Vulgarly in the Postcolony," *Public Culture* 4, no. 2 (1992): 1–30. <https://doi.org/10.1215/08992363-4-2-1>
- 24 Rob Nixon, *Slow Violence and the Environmentalism of the Poor* (Cambridge, MA: Harvard University Press, 2011), 2. <https://doi.org/10.4159/harvard.9780674061194>
- 25 Johan Galtung, "Violence, Peace, and Peace Research," 167–91; Shannon O'Lear, "Climate Science and Slow Violence: A View from Political Geography and STS on Mobilizing Technoscientific Ontologies of Climate Change," *Political Geography* 52 (May 2016): 5–7. <https://doi.org/10.1016/j.polgeo.2015.01.004>
- 26 Nixon, *Slow Violence*, 2.
- 27 Lauren Berlant, *Cruel Optimism* (Durham: Duke University Press, 2011), 95–96. <https://doi.org/10.1515/9780822394716>
- 28 Berlant, *Cruel Optimism*, 95–96; Saida Hodžić, "The Ends of Cutting in Ghana: Blood Loss, Scarcity, and Slow Harm after NGOs," *American Ethnologist* 43, no. 4 (November 2016): 639. <https://doi.org/10.1111/amet.12380>
- 29 Thom Davies, "Toxic Space and Time: Slow Violence, Necropolitics, and Petrochemical Pollution," *Annals of the American Association of Geographers* 108, no. 6 (November 2018): 1538. <https://doi.org/10.1080/24694452.2018.1470924>
- 30 Achille Mbembe, "Necropolitics," *Public Culture* 15, no. 1 (January 2003): 11–40. <https://doi.org/10.1215/08992363-15-1-11>
- 31 Achille Mbembe, *Necropolitics* (Durham, NC: Duke University Press, 2019), 92. <https://doi.org/10.1215/9781478007227>; Mbembe, "Necropolitics," 13, 40.
- 32 Alicia Fentiman and Nenibarini Zabbey, "Environmental Degradation and Cultural Erosion in Ogoniland: A Case Study of the Oil Spills in Bodo," *The Extractive Industries and Society* 2, no. 4 (December 2015): 615–24. <https://doi.org/10.1016/j.exis.2015.05.008>; Joseph I. Uduji, Elda N. Okolo-Obasi, and Simplice Asongu, "Oil Extraction in Nigeria's Ogoniland: The Role of Corporate Social Responsibility in Averting a Resurgence of Violence," *AGDI Working Paper*, no. WP/20/088 (January 2020): 1–43. <https://doi.org/10.2139/ssrn.3736842>; Alice Le Roux and Oluwale Ojewale, "Endless Oil Spills Blacken Ogoniland's Prospects," *Institute for Security Studies (ISS)*, March 24, 2022, <https://issafrica.org/iss-today/endless-oil-spills-blacken-ogonilands-prospects>.
- 33 Fentiman and Zabbey, "Cultural Erosion in Ogoniland," 615–24; Uduji, Okolo-Obasi, and Asongu, "Oil Extraction in Nigeria's Ogoniland," 1–29; Le Roux and Ojewale, "Endless Oil Spills."
- 34 Le Roux and Ojewale, "Endless Oil Spills."
- 35 Fentiman and Zabbey, "Cultural Erosion in Ogoniland," 615–24; Uduji, Okolo-Obasi, and Asongu, "Oil Extraction in Nigeria's Ogoniland," 1–29; Le Roux and Ojewale, "Endless Oil Spills."
- 36 Waheed Hussain and Margaret Kohn, "The Common Good," in *The Stanford Encyclopedia of Philosophy*, ed. Edward N. Zalta and Uri Nodelman, August 14, 2024, <https://plato.stanford.edu/entries/common-good/>; Claus Offe, "Whose Good Is the Common Good?," *Philosophy & Social Criticism* 38, no. 7 (September 2012): 665–84. <https://doi.org/10.1177/0191453712447770>
- 37 Hussain and Kohn, "The Common Good."
- 38 One such example is environmental racism faced by BIPOC communities in the United States, among many others. For more, see Tatiana Konrad, ed., *Race and*

- Environmental Justice in the Era of Climate Change and COVID-19* (East Lansing: Michigan State University Press, 2025).
- 39 Giorgio Agamben, *Homo Sacer: Sovereign Power and Bare Life*, trans. Daniel Heller-Roazen (Stanford, CA: Stanford University Press, 1998), 1–15; Mbembe, *Necropolitics*, 67; Mbembe, “Necropolitics,” 12–13.
 - 40 Mbembe, *Necropolitics*, 46, 92; Mbembe, “Necropolitics,” 12–13, 40.
 - 41 Joshua Comaroff, “On the Materialities of Air,” *City* 21, no. 5 (September 2017): 607–13. <https://doi.org/10.1080/13604813.2017.1374776>
 - 42 Ford, “Air and the Politics of Resistance,” 4.
 - 43 Peter Sloterdijk, *Terror from the Air* (Cambridge, MA: Semiotext(e)/Foreign Agents, 2009), 17–20, 47–48.
 - 44 Reece Walters, “Eco Crime,” in *Crime: Local and Global*, ed. John Muncie, Deborah Talbot, and Reece Walters (London: Routledge, 2014), 173–208. <https://doi.org/10.4324/9781315880716>
 - 45 Walters, “Air Pollution and Invisible Violence,” 152; Laura Westra, *Eco Violence and the Law: Supranational Normative Foundations of Ecocrime* (Ardsey, NY: Transnational Publishers, 2004), 54.
 - 46 Walters, “Eco Crime,” 179–80.
 - 47 Paul J. Crutzen, “The ‘Anthropocene,’” *Journal de Physique IV* 12 (2002): Pr10–1–5. <https://doi.org/10.1051/jp4:20011025>; Paul J. Crutzen and Eugene F. Stoermer, “The ‘Anthropocene,’” *IGBO Newsletter* 41 (May 2000): 17–18; Erle C. Ellis, “The Anthropocene Is Not an Epoch—but the Age of Humans Is Most Definitely Underway,” *The Conversation*, March 5, 2024, <https://theconversation.com/the-anthropocene-is-not-an-epoch-but-the-age-of-humans-is-most-definitely-underway-224495>.
 - 48 Crutzen, “The ‘Anthropocene,’” Pr10–1–5; Crutzen and Stoermer, “The ‘Anthropocene,’” 17–18; Ellis, “The Anthropocene Is Not an Epoch.”
 - 49 Marijn Nieuwenhuis, “Breathing Materiality: Aerial Violence at a Time of Atmospheric Politics,” *Critical Studies on Terrorism* 9, no. 3 (September 2016): 500–1. <https://doi.org/10.1080/17539153.2016.1199420>
 - 50 Dipesh Chakrabarty, “The Climate of History: Four Theses,” *Critical Inquiry* 35, no. 2 (January 2009): 197–222. <https://doi.org/10.1086/596640>
 - 51 Chakrabarty, “The Climate of History,” 206–12.
 - 52 Chakrabarty, “The Climate of History,” 207; Aditya Rao, “Chakrabarty Discusses Historical Perspectives on Humans and the Environment,” *The Heights*, April 16, 2023, <https://www.bcheights.com/2023/04/16/chakrabarty-discusses-historical-perspectives-on-humans-and-the-environment/>.
 - 53 Colin N. Waters et al., “The Anthropocene Is Functionally and Stratigraphically Distinct from the Holocene,” *Science* 351, no. 6269 (January 2016): aad2622–1–10. <https://doi.org/10.1126/science.aad2622>
 - 54 Nieuwenhuis, “Breathing Materiality,” 500–1.
 - 55 Comaroff, “On the Materialities of Air,” 607–13.
 - 56 Rafael Beneytez-Duran, “Air: A Field of Intense Materiality,” *PLAT Journal* (2022): 2–13.
 - 57 Beneytez-Duran, “Air,” 2–4; Tatiana Konrad, Chantelle Mitchell, and Savannah Schaufler, “Introduction: Toward a Cultural Axiology of Air,” in *Imagining Air: Cultural Axiology and the Politics of Invisibility*, ed. Tatiana Konrad (Exeter: University of Exeter Press, 2023), 2. <https://doi.org/10.47788/GMTY9723>

- 58 Beneytez-Duran, "Air," 3; Konrad, Mitchell, and Schauffer, "Cultural Axiology of Air," 2.
- 59 Luce Irigaray, *The Forgetting of Air in Martin Heidegger* (London: The Athlone Press, 1999); Aleksander Kopka, "Air Democracy: On the Principles of Breathing Together," *Sophia* 61, no. 1 (March 2022): 135–49. <https://doi.org/10.1007/s11841-022-00902-7>
- 60 Irigaray, *The Forgetting of Air*, 8–11, 17–21; Kopka, "Air Democracy," 146–48; Katarzyna Szopa, "From Desire to Be Born to Desire for Being Together in the Philosophy of Luce Irigaray," in *Towards a New Human Being*, ed. Luce Irigaray, Mahon O'Brien, and Christos Hadjioannou (Cham: Springer International Publishing, 2019), 51–69; Beneytez-Duran, "Air," 3; Tobias Menely, "Anthropocene Air," *The Minnesota Review* 2014, no. 83 (November 2014): 93–101. <https://doi.org/10.1215/00265667-2782279>
- 61 Irma Kinga Allen, "Thinking with a Feminist Political Ecology of Air-and-Breathing-Bodies," *Body & Society* 26, no. 2 (June 2020): 79. <https://doi.org/10.1177/1357034X19900526>
- 62 Allen, "Feminist Political Ecology of Air-and-Breathing-Bodies," 82.
- 63 Sloterdijk, *Terror from the Air*, 93; Konrad, Mitchell, and Schauffer, "Cultural Axiology of Air," 2.
- 64 Stacy Alaimo, *Bodily Natures: Science, Environment and the Material Self* (Bloomington: Indiana University Press, 2010), 2; Peter Adey, "Air's Affinities: Geopolitics, Chemical Affect and the Force of the Elemental," *Dialogues in Human Geography* 5, no. 1 (March 2015): 54–75. <https://doi.org/10.1177/2043820614565871>; Konrad, Mitchell, and Schauffer, "Cultural Axiology of Air," 2–3.
- 65 Konrad, Mitchell, and Schauffer, "Cultural Axiology of Air," 2–3.
- 66 Magdalena Górska, "Why Breathing Is Political," *Lambda Nordica* 26, no. 1 (2021): 110. <https://doi.org/10.34041/ln.v26.723>
- 67 Marijn Nieuwenhuis, "Atemwende, or How to Breathe Differently," *Dialogues in Human Geography* 5, no. 1 (March 2015): 91. <https://doi.org/10.1177/2043820614565876>
- 68 Arthur Rose, "Introduction: Reading Breath in Literature," in *Reading Breath in Literature*, ed. Arthur Rose et al., Palgrave Studies in Literature, Science and Medicine (Cham: Springer International Publishing, 2019), 1–16. <https://doi.org/10.1007/978-3-319-99948-7>
- 69 Rose, "Introduction," 8.
- 70 Jane Macnaughton, "'Making Breath Visible': Reflections on Relations between Bodies, Breath and World in the Critical Medical Humanities," *Body & Society* 26, no. 2 (April 2020): 34–37. <https://doi.org/10.1177/1357034X20902526>
- 71 Górska, "Why Breathing Is Political," 110; Macnaughton, "Making Breath Visible," 34–37; Jean-Thomas Tremblay, *Breathing Aesthetics* (Durham, NC: Duke University Press, 2022), 1–32. <https://doi.org/10.1215/9781478023494>
- 72 Tremblay, *Breathing Aesthetics*, 24–25, 28–32.
- 73 Konrad, Mitchell, and Schauffer, "Cultural Axiology of Air," 2.
- 74 Steven Connor, *The Matter of Air: Science and Art of the Ethereal* (Chippenham: Reaktion Books, 2010), 31; Marijn Nieuwenhuis, "Breathing Materiality: Aerial Violence at a Time of Atmospheric Politics," *Critical Studies on Terrorism* 9, no. 3 (September 2016): 500–03. <https://doi.org/10.1080/17539153.2016.1199420>
- 75 Nieuwenhuis, "Breathing Materiality," 500.
- 76 Ivana Milojević, *Breathing: Violence In, Peace Out* (St. Lucia, Queensland: University of Queensland Press, 2013), 4.

- 77 Stephen Graham, "Life Support: The Political Ecology of Urban Air," *City* 19, nos. 2–3 (April 2015): 192–215. <https://doi.org/10.1080/13604813.2015.1014710>; Ruwan Thilakarathne et al., "Wildfires and the Changing Landscape of Air Pollution-Related Health Burden in California," *American Journal of Respiratory and Critical Care Medicine* 207, no. 7 (April 2023): 887–98. <https://doi.org/10.1164/rccm.202207-1324OC>; John Upton, "Tear Gas, Pollution, Wildfire Smoke: A Triple Threat to Your Lungs," *KQED*, June 10, 2020, <https://www.kqed.org/science/1965688/tear-gas-pollution-wildfire-smoke-a-triple-threat-to-your-lungs>.
- 78 Graham, "Life Support," 192–215; Alokya Kanungo, "The Silent Cry of the Forest: How Deforestation Impacts Indigenous Communities," *Earth.org*, August 8, 2023, <https://earth.org/the-silent-cry-of-the-forest-how-deforestation-impacts-indigenous-communities/>; European Environment Agency (EEA), "How Pesticides Impact Human Health and Ecosystems in Europe," *European Environment Agency (EEA)*, April 26, 2023, <https://www.eea.europa.eu/publications/how-pesticides-impact-human-health/>.
- 79 "Household Air Pollution," *World Health Organization*, October 16, 2024, <https://www.who.int/news-room/fact-sheets/detail/household-air-pollution-and-health>; Kim E. Andreassen, "Household Cleaning Can Be as Bad as Smoking for Lung Function," University of Bergen, February 16, 2018; Susanne E. Bauer et al., "Desert Dust, Industrialization and Agricultural Fires: Health Impacts of Outdoor Air Pollution," *Journal of Geophysical Research: Atmospheres* 124 (February 2019): 4104–20.
- 80 Camila H. Alvarez, "Structural Racism as an Environmental Justice Issue: A Multilevel Analysis of the State Racism Index and Environmental Health Risk from Air Toxics," *Journal of Racial and Ethnic Health Disparities* 10 (January 2022): 244–58. <https://doi.org/10.1007/s40615-021-01215-0>
- 81 Peter Sloterdijk, *Terror from the Air*, 23–25, 47–48; Leo Kim, "The Commodification of Air: Our Attempts to Insulate Ourselves from the Outside World Are Doomed to Failure," *The Long Now Foundation*, August 23, 2023, <https://longnow.org/ideas/commodification-of-air/>.
- 82 Caterina Albano, *Out of Breath: Vulnerability of Air in Contemporary Art* (Minneapolis: University of Minnesota Press, 2022), 72–80. <https://doi.org/10.5749/9781452968193>; Harmeet Kaur, "The Military Is Banned from Using Tear Gas on the Battlefield, but Police Can Use It on Crowds at Home. Here's Why," *CNN*, June 8, 2020, <https://edition.cnn.com/2020/06/08/us/military-tear-gas-protesters-trnd/index.html>; Justin Key Canfil, "Why Was Tear Gas Used to Quell American Protests?" *The Lawfare Institute*, June 19, 2020, <https://www.lawfaremedia.org/article/why-was-tear-gas-used-quell-american-protests>.
- 83 Tatiana Konrad, ed., *Plastics, Environment, Culture, and the Politics of Waste* (Edinburgh: Edinburgh University Press, 2023). <https://doi.org/10.3366/edinburgh/9781399511735.001.0001>; Imogen E. Napper and Richard C. Thompson, "Plastics and the Environment," *The Annual Review of Environment and Resources* 48 (November 2023): 55. <https://doi.org/10.1146/annurev-environ-112522072642>; Damian Carrington, "After Bronze and Iron, Welcome to the Plastic Age, Say Scientists," *The Guardian*, September 4, 2019, <https://www.theguardian.com/environment/2019/sep/04/plastic-pollution-fossil-record>.
- 84 OECD, *Global Plastics Outlook: Policy Scenarios to 2060* (Paris: OECD Publishing, 2022), 62. <https://doi.org/10.1787/aa1edf33-en>

- 85 Nanna B. Hartmann et al., "Are We Speaking the Same Language? Recommendations for a Definition and Categorization Framework for Plastic Debris," *Environmental Science & Technology* 53, no. 3 (February 2019): 1039–47. <https://doi.org/10.1021/acs.est.8b05297>
- 86 Xu Lin Xumiao et al., "Airborne Microplastics and Fibers in Indoor Residential Environments in Aveiro, Portugal," *Environmental Advances* 6 (December 2021): 1. <https://doi.org/10.1016/j.envadv.2021.100134>; Manish Kumar et al., "Current Research Trends on Micro- and Nano-Plastics as an Emerging Threat to Global Environment: A Review," *Journal of Hazardous Materials* 409 (May 2021): 1–15. <https://doi.org/10.1016/j.jhazmat.2020.124967>; Johnny Kee Hong Wong et al., "Microplastics in the Freshwater and Terrestrial Environments: Prevalence, Fates, Impacts and Sustainable Solutions," *Science of the Total Environment* 719 (June 2020): 1–15. <https://doi.org/10.1016/j.scitotenv.2020.137512>
- 87 Amato-Lourenço et al., "Emerging Class of Air Pollutants," 2; Xumiao et al., "Airborne Microplastics," 1; Kai Liu et al., "Source and Potential Risk Assessment of Suspended Atmospheric Microplastics in Shanghai," *Science of the Total Environment* 675 (July 2019): 463. <https://doi.org/10.1016/j.scitotenv.2019.04.110>; Rachid Dris, Johnny Gasperi, and Bruno Tassin, "Sources and Fate of Microplastics in Urban Areas: A Focus on Paris Megacity," in *Freshwater Microplastics: Emerging Environmental Contaminants?*, ed. Martin Wagner and Scott Lambert, *The Handbook of Environmental Chemistry* (Cham: Springer International Publishing, 2018), 71–72. <https://doi.org/10.1007/978-3-319-61615-5>; Guanglong Chen, Qingyuan Feng, and Jun Wang, "Mini-Review of Microplastics in the Atmosphere and Their Risks to Humans," *Science of the Total Environment* 703 (February 2020): 2–4. <https://doi.org/10.1016/j.scitotenv.2019.135504>; Srinidhi Sridharan et al., "Microplastics as an Emerging Source of Particulate Air Pollution: A Critical Review," *Journal of Hazardous Materials* 418 (September 2021): 5. <https://doi.org/10.1016/j.jhazmat.2021.126245>.
- 88 Mischa Aeschlimann et al., "Potential Impacts of Atmospheric Microplastics and Nanoplastics on Cloud Formation Processes," *Nature Geoscience* 15, no. 12 (December 2022): 967–68. <https://doi.org/10.1038/s41561-022-01051-9>
- 89 Sridharan et al., "Microplastics," 10; Christian Ebere Enyoh, Andrew Wirnkör Verla, and Evelyn Ngozi Verla, "Novel Coronavirus (SARS-CoV-2) and Airborne Microplastics," *Journal of Materials and Environmental Science* 11, no. 9 (March 2020): 1456–61; Dick Vethaak and Juliette Legler, "Microplastics and Human Health," *Science* 371, no. 6530 (February 2021): 672–74. <https://doi.org/10.1126/science.abe5041>
- 90 Amato-Lourenço et al., "Emerging Class of Air Pollutants," 2.
- 91 Mark Anthony Browne et al., "Accumulation of Microplastic on Shorelines Worldwide: Sources and Sinks," *Environmental Science & Technology* 45, no. 21 (November 2011): 9177. <https://doi.org/10.1021/es201811s>; Amato-Lourenço et al., "Emerging Class of Air Pollutants," 2.
- 92 Markus Sillanpää and Pirjo Sainio, "Release of Polyester and Cotton Fibers from Textiles in Machine Washings," *Environmental Science and Pollution Research* 24, no. 23 (August 2017): 19317. <https://doi.org/10.1007/s11356-017-9621-1>; Ana Šaravanja, Tanja Pušić, and Tihana Dekanić, "Microplastics in Wastewater by Washing Polyester Fabrics," *Materials* 15, no. 7 (April 2022): 8. <https://doi.org/10.3390/ma15072683>

- 93 Longyi Shao et al., “Airborne Microplastics: A Review of Current Perspectives and Environmental Implications,” *Journal of Cleaner Production* 347 (May 2022): 2. <https://doi.org/10.1016/j.jclepro.2022.131048>
- 94 Longyi Shao et al., “Airborne Microplastics,” 2; Laurent C.M. Lebreton et al., “River Plastic Emissions to the World’s Oceans,” *Nature Communications* 8, no. 1 (June 2017): 3. <https://doi.org/10.1038/ncomms15611>
- 95 Frank J. Kelly and Julia C. Fussell, “Toxicity of Airborne Particles—Established Evidence, Knowledge Gaps and Emerging Areas of Importance,” *Philosophical Transactions of the Royal Society A: Mathematical, Physical and Engineering Sciences* 378, no. 2183 (October 2020): 1–15. <https://doi.org/10.1098/rsta.2019.0322>; Fransien van Dijk et al., “Inhalable Textile Microplastic Fibers Impair Lung Repair,” *bioRxiv* (January 2021): 1–60. <https://doi.org/10.1101/2021.01.25.428144>; Sridharan et al., “Microplastics,” 9.
- 96 Chakrabarty, “The Climate of History,” 206–12; Rao, “Chakrabarty Discusses Historical Perspectives.”

Firewood: Carbon-Neutral Fuel, or Threat to Human Health?

Gordon M. Sayre

Earth's warming climate is causing forest wildfires to burn hotter, during longer fire seasons, and to spread more quickly, compared to twentieth-century baselines. As a recent study of fires in western North America described it: "With ongoing fire suppression, lengthening wildfire seasons, and the increased likelihood of extreme fire weather, fire effects are broadly becoming more severe than those experienced in the last two centuries."¹ People in regions accustomed to annual wildfire seasons, such as the western and southwestern United States, are aware of the increased threat, but in the last ten years smoke has also come to affect the more humid, rainy eastern half of the continent, where wildfires have been rare. The spring and summer of 2023 saw an unprecedented number and scale of wildfires burning in Quebec and the maritime provinces, as well as the rest of Canada. In June 2023 the forest fires in northern Ontario and Quebec generated huge clouds of smoke, and winds carried some of it a thousand kilometers or more to the south. For a few days New York City, the financial and media hub of the United States, was for the first time in memory choked with wildfire smoke. The air quality index (AQI, measured as parts per million of particles smaller than 2.5 microns, the size which poses the greatest health risks to the respiratory system) rose above 400, an extreme level commonly found only in the immediate vicinity of large wildfires. Air quality alerts were also issued for Toronto, Chicago, Minneapolis and other cities in the northeast and Great Lakes regions. The 2023 fires may be an inflection point for air quality and greenhouse gas policy, because they brought the reality of a warming climate and its wildfires to millions of people who previously had the luxury of ignoring these risks.

North Americans who have become accustomed to clean air are mostly ignorant of the fact that before the fossil fuel era, woodsmoke was ubiquitous in temperate and cold climates, because wood was used for home heating

and cooking, as well as for many industries. CO₂ and methane levels in the atmosphere were much lower, however, because the mining of coal and extraction of natural gas and petroleum had not yet begun to release fossil carbon into the atmosphere. Recent trends in air pollution policy—the recognition of greenhouse gases as air pollutants, alongside the long-term trend of improving air quality in post-industrial North America and Europe—have led to conflicting environmental and political imperatives around energy and air quality. Some local governments have acted to limit natural gas combustion because it contributes to greenhouse gas emissions, and at the same time some governments have imposed limits on woodstoves for home heating because they degrade air quality (even if wood heating reduces consumption of fossil fuels including natural gas). I argue that air quality will inevitably worsen due to increased wildfires, and that using firewood for heating and fuel can be consistent with efforts to limit catastrophic wildfires, such as occurred across North America in 2023. I draw upon my experience as a citizen of Eugene, Oregon, one locality that has suffered severe wildfire smoke, and has responded with furtive efforts both to improve air quality and to limit greenhouse gas emissions. My methodology follows the progressive maxim “think globally, act locally.” As a scholar and teacher of environmental humanities I have researched and taught classes about the history of the Cascade mountains, where fires have rapidly changed the forest ecosystems in the twenty-first century. The fieldwork for this chapter has benefitted from friends and colleagues experienced with the timber industry, and with wildland firefighting. I visited several forest sites and spoke with local people about their fuels and timber management techniques.

If air pollution caused by forest fires were a recent phenomenon, its link to anthropogenic climate change might seem self-evident. But wildfire smoke is not a recent phenomenon. The impact on northeastern North America may be a new threat, but smoke from forest wildfires has always been a concern during the summer and fall fire seasons in the western United States and Canada. Some rural towns in California, Oregon, Washington, Idaho, Montana and British Columbia suffer for weeks on end during bad fire seasons, and have suffered for decades.

While 2023 was the worst year for fires in Canada, 2015, 2017, and 2020 were the most severe in the western United States, and 2020 was also the first summer I experienced intense wildfire smoke in my hometown of Eugene, Oregon, where I have lived since 1993.² On September 8, 2020, an extreme low pressure system brought cold and snow to the interior Rocky Mountains of Idaho, Utah, and Colorado, and also caused easterly winds of 100 km/h to blow from the Rockies over the Cascade mountains and into the Willamette Valley of Oregon. The winds caused existing fires to flare up, as well as toppling power lines, which sparked new blazes along the western slope of the Cascades, from Portland south to Eugene.³ A broken electric power line was probably the cause of the Holiday Farm Fire, named for an RV park near the town of McKenzie Bridge, Oregon, which grew to more than 100,000 acres (42,000

hectares) within twenty-four hours. More than 700 homes and other buildings were destroyed in this fire, and its smoke funneled down the McKenzie River valley to the Eugene/Springfield metropolitan area. The efforts of hundreds of firefighters, working mostly on private timberland owned by Weyerhaeuser and other firms, contained the fire before it reached the city, and then were able to extinguish it when rain fell ten days later.

Wildfires are catastrophic for humans and their infrastructure, but routine for many forests. Forests are not destroyed and in many ways are renewed by fires. On a long-term time scale, fires are a normal part of forest ecology in western North America. Scientists estimate that in California prior to European colonization, the average annual wildfire extent was 2.1–5.3 million hectares, whereas the 1972–2002 average was just 100,000 hectares.⁴

The greater expanse of forest and grasslands in what is now California during the earlier period, and the lower intensity of fire in ecological systems where fires have not been suppressed both contribute to the enormous contrast in those figures. But the lesson remains that intensified fire regimes in a warmer future will still not match the long-term baseline fire cycles in which most of these ecosystems evolved. Forests are overdue for major fires, and the warming climate will make it harder for humans to control or prevent catastrophic wildfires, even though we have done just that for more than a hundred years. In the imagination of some fire ecologists, a “new normal” can resemble the ancient normal; beneficial fire cycles are still possible in the modern landscape of western North America, and western Oregon in particular. For this to occur, however, human infrastructure will need to become “fire permeable” by retrofitting buildings and horticulture to make them less flammable, and by managing wildland forests and rangelands to reduce the severity of wildfires.⁵ This is a very ambitious goal given the scope of changes required.

During the nineteenth and early twentieth centuries, forest wildfires in western North America could be minor for many years running, then become severe in exceptionally hot or dry years, and in response to strong winds. Because the infrastructure (roads, reservoirs) and resources (trucks, pumps, planes, laborers and expertise) to fight wildfires was scarce at that time, fires burned larger areas, and usually ended only when they ran out of fuel, or when wet, cool weather extinguished the flames. The famous naturalist John Muir reported from Portland, Oregon in the 1880s that the riverfront city’s iconic view of Mount Hood, less than 100 kilometers to the east, “through a great part of the summer is invisible on account of smoke poured into the sky from burning woods, logging camps, mills, etc.”⁶ Because far fewer people lived in western forests then, the perceived damage from fires was less. People lived with wildfires and saw no alternatives, and smoke was part of their material environment.

Due in part to John Muir’s lobbying of US presidents and other politicians, national parks and forest reserves were established in the western United States beginning in the 1880s, and the reserves were promoted as a storehouse of future timber to help build the entire nation, including infrastructure for

mines and railroads in the region. In the aftermath of some deadly early wildfires, such as the 1910 “Big Burn” in Idaho and Montana, which killed eighty-seven people, politicians traded blame for wildfire deaths, and promised that such fires could be stopped, and lives and homes saved. Gifford Pinchot, the first chief of the United States Forest Service (1905–10), began to organize teams of firefighters to protect towns, farms, and mines from the threat of forest fires.⁷

Attitudes toward forest fires further evolved during and after World War II. The war sent many of the men who were trained as firefighters overseas, leaving their home regions unprotected. In 1944 and early 1945 the Japanese military launched more than 9,000 incendiary balloons, called Fu-Go balloons, from Japan into the trans-Pacific jet stream, with the intent that a few would be carried to the western USA and ignite forest fires. In addition, Japanese pilots were sent to drop firebombs on the coast of Oregon. In September 1942 Nobuo Fujita launched his plane from an I-25 submarine offshore, and on two separate flights dropped two bombs into forests on the Southern Oregon Coast. Only one exploded, and the fire was soon extinguished by firefighters. These were the only bombings by Axis forces in World War II inside the United States (which at that time did not include Alaska or Hawaii). These attacks are not widely remembered today, but they reinforced existing government messages that wildfire might be a tool of war, and that the forest was a front to be defended: “[T]he logics of forest protection [we]re entirely aligned with a distant war effort, which became so all-encompassing that wildfire prevention propaganda began to combine messages about labor and economic production with overtly racist depictions of foreign soldiers.”⁸ Inspired by a bear cub orphaned by a fire in New Mexico and adopted by its rangers, the US Forest Service created Smokey Bear as an icon for “the longest-running and most expensive government propaganda campaign in U.S. history.”⁹ Since 1947 the campaign has repeated the tagline “Only You Can Prevent Forest Fires,” an ominous motto that echoes wartime public relations campaigns to root out spies and draft dodgers, and public service announcements against wasting resources needed for war preparedness and munitions. Smokey Bear remains a popular icon in spite of changes in the understanding of forest fires and ecology.

Myths about Fire in Western American Landscapes, and Their Policy Consequences

John Muir was and is a key figure for the environmental protection movement in the USA, and his words quoted above demonstrate how, 150 years ago, wildfire smoke was assimilated to industrial sources of smoke such as the mills and camps of the lumber and timber industries that led economic growth in Oregon and the Pacific Northwest. The use of coal for power generation and home heating was still rare in the northwest, which had few coal mines. Through the early 1900s most people in this and other parts of North America

heated their homes with firewood, and so they tolerated woodsmoke much more than we do today. Before the wide adoption of coal for fuel (and in many areas long after), trees provided material for shelters, vehicles, and tools, as well as food and medicine, for nearly every human, and as a by-product they offered firewood for heating and cooking. Whereas today we think of “forest products” as an industrial sector, in the past it was a source of subsistence, of a relationship with woodlands that provided other resources including berries, mushrooms, herbs, greens, medicinal products, game, fish and fowl, as well as wood for building, crafts, and heating and cooking. With an eye toward these past practices of forest subsistence, I propose thinking about firewood and woodfires as part of a carbon/cellulose cycle, whereby fires in nearby forests revived those ecosystems, and fires in one’s home kept families warm and cooked their food. When people used firewood in this manner, and considered it abundantly renewable, obtained not as a trade commodity but by barter and gathering, firewood could more easily be understood as part of a cycle, one that has become obscured in modernity. In the iconography of frontier America from the eighteenth and nineteenth centuries, log cabins and the wisps of smoke coming from their crude chimneys signified pioneer domesticity, and the axe was as important as the rifle in the apparatus of the stereotyped pioneer man. In many nineteenth-century landscape paintings by artists of the Hudson River School, wisps of smoke rising from a log cabin, or a railroad, or even a church, diversify a pastoral scene and connote warmth and domestic comfort.¹⁰ “Firewood” is the title of this chapter, but the term “Woodfire” would be equally apt, for it defines or describes a style of human life and industry that relied on wood (or cellulose if bamboo, peat, grass, and other fuels are included). Woodfire also describes the links between forestry management and home heating.

Woodsmoke today, by contrast, is more often perceived as a sign of danger and as a threat to respiratory health. When woodsmoke also came from fires in one’s home, it was a fact of life, not an alien threat, and was not perceived as a health concern because nearly everyone experienced it. In my home state of Oregon, home heating with wood is now rare, but the logging and wood products industries continue to be major employers, and so nearly everyone can still see firewood as abundant. Trees and logs are everywhere. Even late in the twentieth century many households, both rural and urban, relied on woodstoves for heating, and this reliance supported the timber industry, connecting forest workers’ jobs with their homes.

On an ecological scale, the historical memory of settler colonial peoples and their descendants in the western United States is shallow. As noted above, smoke was severe in some spring and summer fire seasons across wide areas of North America for thousands of years since the Ice Ages, but modern settler colonial North Americans, by working to suppress fires over the past two centuries, have imposed (and enjoyed) a period of clearer air, as well as extracting wealth from the land in the form of fertile soils for agriculture, large trees for lumber, coal, oil and gas for fuels and chemicals, and abundant

fish and game for protein. Historian Stephen Pyne has argued that the doctrine of fire suppression was brought from Europe to North America, and then enforced with ever greater zeal in the early twentieth century when US forest reserves were established. The ecological history of forests (and of their management by Native people) was suppressed or ignored, and a detailed knowledge of fire regimes and patterns before the 1840s was held only by specialists in the paleoecology of fire. Research by these scientists has gradually changed popular perceptions since the late twentieth century, however. Environmentalists now perceive low-intensity, regular fires as beneficial for local forests and wildlife, and as a means of preventing more severe blazes by reducing the amount of fuel (dry vegetation and small trees) in the understory of the forests.¹¹

Recent research and bestselling books by Suzanne Simard and Peter Wohlleben imagine an anthropomorphic utopia of trees and their symbionts, particularly underground mycorrhizae, but few of the fans of these authors and their theories have hands-on knowledge of the trees in their regions. Policies and ideals have made trees and forests our friends, but woodsmoke an enemy, whereas in the past the two coexisted ecologically. A sanitized, idealized concept of forest trees puts conservationists in a dilemma; fire is a protective tool, but fire smoke is a severe threat to health. Trees are our friends, because they sequester carbon and help clean the air and the water. Air pollution is an enemy, even as forest wildfires are inevitable and even useful. Amidst these contradictory impulses, we should all agree that wildfire smoke is now inevitable, and we ought to use woodfires for our benefit, since we will have to tolerate woodsmoke regardless.

Melinda Adams, in the abstract for her lecture in the series “Materiality of Air: Representation, Crisis, Health,” quoted Yurok Cultural Fire Practitioner Margo Robbins posing an evocative question: “What kind of smoke do you want to breathe?”¹² The degree to which smoke from a prescribed burn differs from the smoke of a lightning- or arson-sparked fire is uncertain, but I endorse Robbins’ sentiment because it emphasizes the inevitable trade-off between smoke from periodic controlled burns, and smoke from intense, catastrophic fires. The first type can limit the second, and the role of tribal governments in forest management is vitally important, because the tribes and First Nations understand the role that regular fires play in forest ecology, and tribal lands encompass large tracts of forest in the Western USA and Canada, usually adjoining national forests and Crown lands. What’s more, many Indigenous people work as wildland firefighters, for it is one of the few well-paying jobs available to young people in the vicinity of Native reserves or reservations. Woodsmoke is familiar in the lives of Indigenous people, who for millennia relied on fire for cooking and warmth in their dwellings, as well as to maintain ecosystems that facilitated a hunting, foraging, and agricultural subsistence. An inevitable consequence was that many suffered respiratory and vision problems. Early settlers in log cabins with open fireplaces shared the same ailments.

Intentional or prescribed burns always carry risks. Whereas Adams, Robbins, and others stress how Indigenous peoples set seasonal fires to maintain optimal conditions for growing, gathering, and hunting their preferred foods, Indigenous people also sometimes misjudged the fires, or saw them get out of control and damage habitats they treasured. Modern prescribed fires can escape control, as occurred in northern New Mexico in April–May 2022, when prescribed burns on national forest land spread to create the Hermits Peak and Calf Canyon fires, among the costliest of a devastating year in the United States. This event scarred the reputation of Forest Service specialists who plan prescribed burns, and there have been cases where local law enforcement officers have arrested and charged federal Forest Service personnel who conducted controlled burns which spread to adjoining private lands, even when the fires caused no damage to life or property.¹³

I propose that the popular image of pristine premodern forests, with clean air and skies, is a myth. Most people today have not experienced routine woodstove fires in their homes, nor large wildfires in surrounding wildlands, whether human-caused or not. This ignorance or disdain for the firewood/cellulose cycle results, I argue, from three intertwined myths:

1. An imperial myth, generated in the early twentieth century, that wildfires (and the smoke they generate) can and should be extinguished or controlled. This goal has become more difficult due to climate change and the history of fire suppression.
2. A pastoral myth, built upon the ecological truth that periodic fires were a key factor shaping the ecosystems in forests and grasslands in North America—lands that, ironically, were often regarded as uninhabited wilderness by the settlers. The perceived benefits of prescribed fires today are bound up with this myth, inasmuch as some see fire as a means to restore a primeval ideal.
3. A modernist myth, linked to fossil fuel dependence, that the pervasive combustion powering modern industry and consumerism—the motors in cars, trucks, trains, and planes, as well as electricity generation in power plants—all can operate without creating excessive smoke and smog. Post-industrial affluence includes an expectation of clean air.

The three myths taken together have created contradictory expectations for land and fire management, clustered around three related trade-offs:

- a. The CO₂ and methane (and other GHG) emissions from natural gas and other fossil fuels, weighed against particulate emissions from firewood and/or from fossil fuels used for heating and cooking.
- b. The dangers to life and property of forest wildfires started by lightning, careless human workers, recreationalists, or arsonists, weighed against the risks and costs of forest management methods for mitigating fire risk, using prescribed burns and mechanical logging and clearing regimes.

- c. The first two combine into a third trade-off: the threat woodfires pose to air quality, both nearby and distant from the fires, weighed against the air quality consequences of prescribed burns which are necessary to reduce the risk of larger, more dangerous wildfires on that land.

In all three myths and trade-offs, the implications for greenhouse gas emissions (both carbon dioxide and aerosols or particulates in smoke from burning trees and soils) intersect with the implications for human health from smoke pollution, and with the long-term threats to human health and subsistence posed by climate change caused by humans burning fossil fuels. Consumers and policy makers need to examine and debate the risks of poor air quality caused by woodfires (three types of fire: wildfires, prescribed burns, and domestic or industrial wood burning) as a dilemma between short-term health risks from smoke particulate pollution, and long-term climate (and health) risks from CO₂ and methane emissions from crude oil and natural gas. Greenhouse gas emissions from natural-gas-fired power plants, and from cars and trucks, all contribute to rising temperatures, and yet thanks to emission regulations and devices such as catalytic converters, they are often considered clean with respect to particulate pollution, while a woodstove, which is nearly carbon neutral, is seen as a threat to human lungs and health. Methane is more dangerous than CO₂ as a greenhouse gas, and the methane emissions associated with natural gas drilling and distribution have often not been factored into the estimates of the climate change impact of natural gas. Natural gas has been heavily promoted by fossil fuel producers as clean, and policy makers have also promoted natural gas as environmentally virtuous compared to coal, but this advantage is exaggerated.¹⁴

Even if natural gas is not so clean with regard to greenhouse gases as many believe it to be, the shift during the twentieth century from burning wood and coal to burning oil and natural gas has helped to create an expectation of clean air among residents of post-industrial economies. In the twenty-first century, China, the nation that contributes the largest share of worldwide CO₂ emissions, has joined this group, by implementing stricter emissions regulations on cars and trucks, by increasing the share of electric vehicles in this fleet, and by reducing the share of coal burned in its industries and electric power plants.

Air is material because its composition responds to wildfires and other sources of woodsmoke, and to the fossil fuels combusted to generate heat and electricity. But air quality is an intangible good, and memories of air quality decades in the past are now faint. The three myths above also obscure the fact that air quality in the past was not so healthy as many assume. To use an example from the Pacific Northwest, air quality in the Seattle area, as measured by the AQI index cited above, has steadily improved since 1989, when comprehensive monitoring equipment was installed. University of Washington meteorology professor Cliff Mass, who writes a popular blog about weather and climate in the Pacific Northwest, reported on September

2, 2023, following a brief period of thick wildfire smoke in Seattle, that summer air quality in the city is on average slightly worse than twenty years earlier, but winter air quality is better:

[I]n 2000–2002, there were extensive and persistent periods of degradation during the winter. It would have been even worse in the 1980s during the winter. The trend towards more summer smoke has to do with the wildfires, which have become more active for a number of reasons. The winter improvement has mainly occurred from a substantial drop in the use of wood stoves. ... Fortunately, burning wood has declined precipitously, with many switching to natural gas, which burns cleanly.¹⁵

Mass, like most Seattleites, supports the regulation of woodstoves, and believes natural gas to be a cleaner alternative. The damage of methane to our air is invisible and intangible, because its emissions are from distant well fields, feedlots, or peat bogs, and its contribution to global warming is diffuse and delayed. The trade-off Cliff Mass articulates is item a) above; the use of fossil fuels for winter heating (among other uses) contributes to the climate change that has made wildfires and smoke more common in the summer.

My city, Eugene, like Seattle and a few others in the region, has also regulated home woodstoves, and has made significant progress toward improving winter air quality since the 1990s when I moved here. But I have no memory or perception of these improvements. The surge in wildfire smoke since 2015 is more spectacular and more salient. Recently there have been proposals to completely ban the installation of new woodstoves and fireplaces, and at the same time Eugene has considered a ban on natural gas connections in new home construction. The natural gas measure in Eugene was first proposed by the City Council in July 2022, and enacted in February 2023. In April 2023, however, a similar ban on natural gas connections for new buildings, enacted by the Berkeley, California city council in 2017, was overturned in a ruling by the Ninth Circuit of the US Court of Appeals. The court ruled that the US federal Energy Policy and Conservation Act preempted local bans. That ruling came as the local gas utility in Eugene, NW Natural, was financing a campaign to overturn the ban through a referendum, to be put to voters on the November 2023 election ballot. Supporters of the ban claimed the court ruling concerning the Berkeley ordinance would not preempt Eugene's ordinance. The Eugene City Council, however, sensing a likelihood that the referendum would succeed, repealed the ordinance in early July.¹⁶

Eugene is a liberal city that prides itself on clean air and water, outdoor recreation, and environmental conservation. Its leaders are also stuck in dilemma a), between GHG emissions and woodsmoke emissions as two factors in air quality and two types of emissions for which its citizens are all responsible, even as some wish to protect themselves from the emissions' effects.

A similar circumstance pertains to European cities. A 2023 article from Politico about woodstove restrictions in European cities mentions Austria, Germany, Britain, and Norway.¹⁷ A woodstove owner in London or Vienna must make significant effort or expense to use firewood from a rural area. But because the costs of electricity and natural gas are so much higher in those markets, perhaps it is an appealing option for households with woodstoves. Or perhaps these cities have been able to ban woodstoves only because scarcely any households still have or use them, and so a ban faces weak opposition.

Looking to the future, inhabitants of the Pacific Northwest should expect more wildfires and deteriorating air quality, driven by rising levels of GHG pollution, the resulting rising average temperatures, and drier forests and grasslands. Can these risks be reduced through improved forest management, notably prescribed burns and thinning to reduce fuel loads in the forests surrounding cities like Seattle, Washington, and Eugene and Portland, Oregon? What actions will be necessary on the part of those who live not in the major cities but in or near the forests? These are the people who face the greatest risks from forest wildfires, and who often have the most immediate control over these risks, through how they manage their own forest properties.

In the Private Timberlands of Western Oregon

For answers to these questions, I turned to my friend Malcolm. During the last thirty years he has acquired hundreds of acres of timberland near Eugene, and he now manages four separate parcels himself, planting trees, weeding, pruning, thinning, and planning for timber harvests. He often works alone, and he enjoys practicing an old-fashioned style of timber work. I accompanied Malcolm in January and February 2024 on visits to two of his holdings. First, we planted trees in a clear-cut on very steep slopes in the Coast Range (see Fig. 2.1). About ten hectares of land had been logged three years earlier, and following that harvest, Malcolm had hired a crew to replant it, as is required by Oregon forest regulations. We scrambled back over the same terrain, looking for the seedlings recently planted, and adding new ones in spots the crew had missed, or where a seedling had been grazed by elk, or lost to erosion. We used hoedads, a lightweight hoe with a long thin blade, to quickly dig holes in the wet loose dirt for the new seedlings. Few landowners are willing or able to do the kind of work Malcolm and I did that day. It was some of the muddiest, slipperiest, most exhausting labor I have ever undertaken.

Industrial logging has become much less labor-intensive since its boom days in the twentieth century. Fewer workers are employed to cut down trees and drive equipment, because machines have become much larger, more complex, and multifaceted. A modern feller-buncher enables a single operator to log many hectares of land in one day. With these machines, which cost more than a million US dollars, trees can be cut down, segmented into a

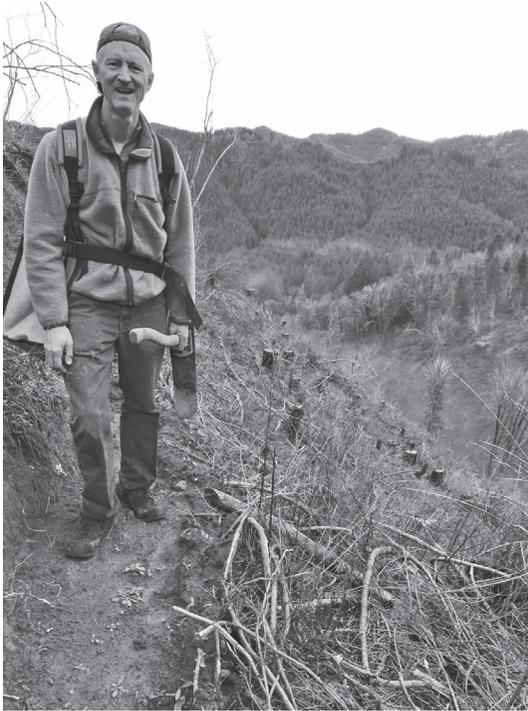


Fig. 2.1. The author, holding a hoedad, planting trees in the Oregon Coast Range, January 2024. (photo by author)

desired length, stripped of branches, sorted by diameter, stacked up, and finally loaded onto a waiting log truck for transport to a sawmill. Nonetheless, a few essential tasks in forestry have proved hard to mechanize. After a parcel of timberland is clear-cut by these machines, the next crop of the desired tree species, which in western Oregon is Douglas fir, Western redcedar, or Sitka spruce, usually cannot be planted except by hand, a job now done mostly by Central American immigrants, often undocumented laborers. A year or so later herbicide must be applied to prevent faster-growing tree species, such as maple and alder, from shading out the desired crop of fir, cedar, or spruce. Ten years or more after that, if the new timber crop has formed a canopy to crowd out the other tree species, the new stand needs to be thinned. Thinning can sometimes be done by machines, but not always. Malcolm often does it alone with his chain saw, and recently acquired a battery electric chain saw, to reduce the noise and emissions of the two-stroke engine.

Forestry researchers have proved that thinning and/or seasonal burning of forests is important for mitigating fire danger. Fire risk depends on many factors, of which temperature, humidity, and wind are the most important for the ignition and spread of a wildfire. Thinning and/or controlled burns completed in the winter or spring affect how much dry fuel is available during summer fire season. In the historical forest ecosystems of 150 years ago or

longer, regular fires often burned across the ground, fueled by dry leaves, shrubs, and grasses, without igniting the leaves and branches of the larger trees. This may seem surprising to people unfamiliar with these forests, but it was due to the height of major tree species like Ponderosa pine and Douglas fir, with their lowest branches as far as twenty to thirty meters above the ground, and thick bark protecting their cambium wood. This is how most of the enormous trees in western forests (Douglas firs and Sitka spruce, as well as coast redwoods, occasionally grow to more than 100 meters in height) got to be so large, because across three or more centuries of growth, fires almost certainly burned around these forest giants at least once or twice.

The large, intense forest fires of our own era, such as on the western slopes of the Oregon Cascades in September 2020, are caused by strong winds and “surface, ladder, and canopy fuel contagion,” a phrase foresters use to describe how flames that ignite on the ground, for example from the hot exhaust pipe of a car driving on a back road, can move into the upper branches of trees, where they spread more quickly due to embers carried aloft by winds and by the heat of the fire itself.¹⁸ The regular clear-cutting and replanting of industrial forests in western Oregon likely increases fire danger, because it brings heavy equipment into forests, and because of the motive inherent in the timber industry to plant and grow as many trees of the same size as close together as possible. These dense stands of trees competing with one another create ladders for fuel contagion, because the lower branches of each tree become desiccated, and lose their leaves or needles. Thinning is vital to allow sunlight to reach the lower branches of remaining trees, and to grow a healthy forest floor groundcover that maintains soil quality and supports wildlife. For this reason, thinning of industrial forests is also necessary to create valuable harvests of lumber. Western Oregon is one of the best sites in the world for industrial timber. But if trees are not thinned and grow too close together, a plantation will in twenty or thirty years become a dense, dark thicket of stunted trees all the same size. The density shades out all the understory plants, and prevents the sun from reaching the lower branches of trees, inhibiting their growth as well.

On a second outing with Malcolm, I visited his land near Noti, Oregon, in a valley with cattle farms as well as homes on rural acreages that include timberland. Malcolm explained as we looked around his neighborhood that these owners of small private parcels, and the planters whom they hire, not only plant seedlings too close together, but also neglect to thin the forest when needed. Tree planters and/or landowners often plant too many seedlings, due to a mistaken assumption that more trees will bring a richer harvest. Thinning is a task easy to postpone, because even with heavy equipment, it is labor-intensive and costly for landowners who will see little or no revenue from their timber until decades later. But thinning is essential for managing western Oregon forests; necessary to maximize timber yields, to provide wildlife habitat and plant diversity, and to reduce wildfire risks. The ecosystem services are diffuse and intangible to many landowners, and to the timber

industry, which reaps only low-value products from thinning: chips used to make particleboard, pulp used to make cardboard. Forest thinning is unglamorous, unprofitable, and unappealing both to those who do the work and to passersby who see the results. It is an exercise in delayed gratification. Conscientious timberland owners like Malcolm will enjoy only firewood, and perhaps fenceposts made from logs twenty to thirty centimeters in diameter. On both aesthetic and air/material levels, thinning is linked to the trade-offs b) and c) above, because it creates by-products that can be used as firewood, or burned off as slash piles. In this regard thinning indirectly generates small amounts of smoke, but can prevent huge thick clouds of choking smoke from intense wildfires raging in densely overgrown industrial forestlands.

Malcolm showed me a grove of ten- to fifteen-meter-high trees he has been thinning on his property. The stand was planted about forty years ago (measured from rings on the trees he has cut down), long before he acquired the property, and was not adequately thinned, so the trees have grown poorly. Malcolm set himself the task of thinning it by hand, cutting down at least half the trees, and segmenting the trunks into sixteen-foot sections which he slowly rolled or dragged downhill. A neighboring forest parcel, likely planted at the same time or later, remained un-thinned, and its trees were so small and crowded that the landowner had decided to cut them all down (see Fig. 2.2). These trees



Fig. 2.2. A feller-buncher clear-cutting un-thinned timber on private land near Noti, Oregon. (photo by author)

had leaves (needles) only at the very top. A healthy coniferous tree should have limbs with leaves on a quarter or third of its total height. Malcolm explained how one can estimate the rate of growth on a Douglas fir by observing the sets of three or four branches that appear radially around its trunk as it grows taller. A tree produces one such ring of new branches each year. If the rings are three feet apart, the tree is growing quickly, but by this measure some of his trees showed less than a foot of vertical growth per year.

After a forest is thinned and any usable firewood or other product is hauled away, or after the forest is clear-cut for larger-diameter timber, what is left behind are slash piles: short pieces of small tree trunks, along with bark, branches, needles, and leaves, stacked up in a large pile, several meters in diameter and nearly as tall. When thinning is done in the fall, winter, or spring, the goal is to keep the wood inside the slash piles moist or green enough that the pile is unlikely to burn unintentionally during the following summer, even if embers from a distant fire land on top of it. One often sees slash piles partly covered with a small tarp, sitting until weather conditions are suitable, and crews are ready to burn it. The tarp will prevent the winter rains from soaking that portion of the slash pile, ensuring that the entire pile can be set afire during the subsequent spring. These fires will consume most of the slash, eliminating the fuel as a potential wildfire hazard, and depositing some nutrients onto the soil (see Fig. 2.3). However, this task, like the thinning, is often postponed many years, because the burning is costly and risky.



Fig. 2.3. Remains of burned slash pile near Veneta, Oregon, January 2024.
(photo by author)

Malcolm had no slash piles because he was slowly processing and moving each tree he felled, one at a time, adding the logs to his firewood supply or fencepost stock, and leaving the branches on the forest floor. But his artisanal woodcraft is extremely rare; it won't scale up to a widespread practice or policy. As a group of prominent forest scientists declared: "Thinning alone can sometimes mitigate fire severity, but through residual logging slash ... thinning can contribute to high-intensity surface fires and abundant mortality."¹⁹ As a forest regrows, the timber trees are surrounded by a plethora of shrubs and grasses, often invasive plants that are highly flammable during the hot dry summers, when there is no shade from larger trees, shade that was created in the mature mixed forests centuries ago. Malcolm told me his smallest timber trees, Douglas firs and lodgepole pines less than five meters in height, surrounded by brush such as Scots broom and manzanita, constitute the most flammable type of vegetation on his property.

For a synthesis of research about wildfire risks and forest management, I turned to a suite of three papers published in August 2021 in the journal *Ecological Applications*, composed by more than three dozen authors from universities, conservation organizations, and government labs in the USA and Canada.²⁰ Academic forestry researchers such as these co-authors attempt to describe the ecology of western North American forests, but most of their field research is on public land, and their audience is mostly the other scientists, conservationists, and policymakers who manage these federal and state-owned forests. Their scholarship has more limited influence on private forest management. On lands owned by Weyerhaeuser, Rosboro, Boise Cascade, and other large forest products companies, timber is managed through systematic thinning on a set schedule, waiting until trees reach an optimal size for lumber before logging them. The corporate owners have their own researchers, who focus on how to maximize harvests of the most valuable types and grades of timber. They know thinning is important, and are equipped to do it well, but they are less concerned with maintaining good wildlife habitat and water quality, or even with preventing fires. The interests of large timberland owners diverge somewhat from the smaller landowners, but in both cases, as Prichard and co-authors wrote, it is "significantly more difficult, expensive, and risky to implement" prescribed burn policies on private lands, "while air quality regulations and associated risks create disincentives to treating near homes."²¹ This matches trade-off b), and like many environmental issues in western forests, prescribed preventative burning of forest and grasslands can be highly controversial, as well as risky for the foresters and firefighters who conduct them.

The increasing danger of wildfire is a consequence not only of climate change but also of growing human populations and infrastructure in high-risk forest and grassland locations, referred to as the wildland–urban interface or WUI by firefighters, scientists, insurance managers, and public policy specialists. Industrial logging itself does not prevent severe forest fires, and as we have seen, wildfires are not at all a new threat. The neighborhood of Malcolm's

property near Noti is not urban but it qualifies as part of the WUI, because his and neighboring properties were built on land previously used for logging, grazing, or recreation. Areas that in the past burned periodically without causing loss of life or home now contain many residential buildings, most made of flammable wood and surrounded by flammable landscaping plants. Residential sprawl often brings an end to land use practices that had mitigated fire risks, such as livestock grazing, prescribed burns, and logging. WUI forest residents often value recreation and wildlife more than logging, and are reluctant to carry out thinning and logging themselves, as my friend Malcolm does. Newcomers from an urban or a more humid rural environment sometimes fail to recognize the danger fire poses to their homes. To obtain a building permit and homeowner's insurance for a new dwelling, the builder and owner must clear a wide buffer around the house of all trees and brush, use fire-retardant siding and roofing materials, and have a water source ample enough to put out small fires. But as years pass, most homeowners allow trees and brush to grow larger and closer to their home and outbuildings.

Large timber companies such as Boise Cascade have branched out from their core business into real estate development, because among the huge tracts of land they own, some are near fast-growing cities or resort areas, and the value of that land for housing becomes much higher than its potential for timber production. When this land is subdivided and sold for home building, fire risk suddenly rises. Logging advocates often use catastrophic fires as an argument for increasing clear-cuts in publicly owned forests. But logging doesn't prevent fires. The industrial timber companies use fire, such as when they burn slash piles, and they benefit from catastrophic fires, on their own land or sometimes on publicly owned land, because fires enable what they call salvage logging. After the huge fires of 2020 burned through large trees on the western slope of the Oregon Cascades, some investors and consumers assumed that lumber prices would rise, because more of it would be needed to rebuild lost homes and businesses. They wrongly believed that forest fires destroy timber. In truth, the leaves and branches of large trees may burn, but the trunks remain undamaged, with valuable lumber hidden behind superficially charred bark, and loggers often find it easier to work in a forest that has recently burned. Weyerhaeuser and other timber companies raced to collect the charred logs and market the fresh wood in the boles, and the local Willamette Valley lumber mills were deluged with so many logs in the fall and winter of 2020–21 that they could not keep up with supply.

The political conflicts over forest policy and wildfire mitigation in western Oregon, and western North America in general, often pit environmentalists and recreational interests against the timber industry and agricultural landowners who resist regulations limiting clear-cutting, herbicide spraying, and roadbuilding. Caught up in these debates are the wildland firefighters—the party with the most to lose. Firefighters breathe more smoke than anybody, and their lives are on the line as forest fires become larger, hotter, and more frequent. Firefighters United for Safety, Ethics, and Ecology, or FUSEE, is

a small non-profit group led by another friend of mine in Eugene, Tim Ingalsbee. The group's website includes a series of short policy papers. Some advocate for allowing fires to burn when they do not threaten structures or major infrastructure, and for strong regulations in the wildland-urban interface. Houses and properties in the WUI should strive to be "fire permeable," to recover quickly from low-intensity blazes. FUSEE insists on the value of prescribed burns, notwithstanding the smoke they emit, because they can prevent more intense wildfires, and, as Margo Robbins asked: "What kind of smoke do you want to breathe?"²² The FUSEE researchers take a strong position on trade-off c)—they assert that "air quality concerns will welcome more strategic burning, but fanatically focus on industrial and transportation polluters."²³ We can act to reduce pollution of particulates and GHG from fossil fuel combustion by industry and transport, and live with some increases in smoke from wildfire.

Woodfire Is Part of Forestry, as Is Firewood for Home Heating

I began by describing the growing risk of large forest wildfires in North America in the past twenty years as a consequence of climate change, specifically warmer temperatures and reduced rainfall, in the Pacific Northwest where the summers are very dry. These changes have reversed a century of mostly successful efforts to limit or extinguish forest wildfires, efforts that have altered the composition of western forests, making them gradually more susceptible to intense fires. Forest ecologists who are aware of the changes in forest composition, and the heightened fire risks, advocate the use of prescribed burns (i.e. intentional forest fires) to reduce the risk of large, catastrophic wildfires. But such prescribed burns create smoke that irritates neighbors who are also increasingly bothered by the smoke from forest fires. Based on research in my region of western Oregon, I have argued that using firewood for home heating should be encouraged, because it reduces consumption of fossil fuels, and of electricity more urgently needed for other purposes such as electric vehicles and building cooling. Firewood is especially attractive if it comes from nearby forests, where it would have been burned anyway in slash piles, or in industrial co-generation plants. Yet the woodstove has a bad image. How can the reputation of firewood and woodstoves be improved?

From Malcolm I also learned of his years of experience heating his two homes with wood, by cutting up logs from trees he has thinned on his land, and then drying, splitting, storing, and seasoning the wood. Using some of the many posts made from his Douglas fir trees, he built a covered firewood storage structure on his country property. Wood should sit here for one full dry season, he told me, before going into the woodstove. The new stove installed in his house is designed to reburn the gases emitted from the logs, greatly reducing the particulates and oxides of nitrogen found in wildfire smoke. This stove design is modern, but the principle was applied as early as the Pennsylvania Fireplace designed and marketed by Benjamin Franklin in

Philadelphia in 1742. Franklin boasted that his iron inserts for fireplaces enabled a household to use one-fourth the firewood each winter that they had consumed previously. Firewood was already in short supply in fast-growing Pennsylvania (which was named for its dense forests and for the founder and proprietor of the commonwealth, William Penn), due to its iron and steel industry.²⁴ Franklin continued to innovate on his designs for nearly twenty years, culminating in enclosed free-standing stoves similar to those found in old hunting cabins and ski lodges today. On the cool afternoon when I was there, no visible smoke was coming out of the woodstove's chimney. By this criterion, Malcolm's stove and wood satisfy the stipulations of the Lane County Air Protection Authority, our local air pollution regulator.²⁵ But emissions from woodstoves vary greatly with the quality of the firewood they burn, and many stove users are not able to take all these measures to procure or prepare high-quality firewood.²⁶ To heat one's home with wood is to become responsible for one's own supply chain of fuel, a prospect not everyone is prepared to take on. Considerable effort is needed to acquire and store sufficient firewood for a winter season, a year in advance. Starting a fire and waiting for the hearth to warm takes time, and this makes winter morning routines much more difficult than many people can accept. However, these efforts should be encouraged not only as a means of reducing GHG emissions from natural gas, but also as a means of reconnecting people to the forest ecologies and economies around them. Oregon suffers from a vast political and social divide between urban and rural residents, and the process of collecting or even purchasing firewood may bring these two populations together, in a setting where they can share experiences and understanding of the forests and the WUI.

Particulates in the Atmosphere: Danger to Lungs, Benefit for Climate?

Tim Ingalsbee, in his research published at FUSEE.org, makes another argument in favor of controlled burns as a forest management and fire mitigation tool: "Prescribed fire can help diminish smoked-sotted [*sic*] summers. Additionally, wildfire smoke reflects sunlight, increases humidity, and reduces temperatures and thus can locally mitigate effects of Climate Change."²⁷ This is a little-known and counterintuitive factor in debates over wildfires and woodsmoke; woodfires, as well as the burning of agricultural waste, as is still common in South Asia, are major contributors to atmospheric aerosols, particulates that remain in the lower atmosphere near where they are emitted. These aerosols reduce warming by blocking some of the sun's radiation before it reaches the ground, and by seeding the formation of clouds, which also block solar radiation. Woodfire is just one source of aerosols, but it can have a powerful effect. The large fires around my home in recent summers were caused in part by temperatures in the upper 30s Celsius, or near 100 degrees Fahrenheit. When dense smoke occluded the sun, however, temperatures that were forecasted to reach that range instead stayed much cooler.

The aerosol effect is no remedy for climate change; it masks rather than prevents warming, and it has a significant impact only in the vicinity where the aerosols are emitted (or occasionally further afield, depending on prevailing winds). The regions with the greatest masking of solar radiation by aerosols have been urbanized and industrialized places such as in India, China, and Northern Europe. Climate science research indicates this effect was considerable during the second half of the twentieth century, which, in western North America, was also a period of wetter climate and therefore of fewer wildfires. Climate journalist David Wallace-Wells explains: “While overall, the world has warmed about 1.2 degrees Celsius above the preindustrial average, the Intergovernmental Panel on Climate Change estimates that aerosols are simultaneously cooling the planet by about half a degree. The high end of the estimated range is almost a full degree.”²⁸ It would have been warmer had those aerosol emissions not been created, 30 to 50 percent warmer, according to a commentary in the science journal *Nature* by three climate scientists.²⁹ Wallace-Wells goes on say: “For the most part, carbon emissions and aerosol pollution are produced by the same processes: the burning of fossil fuels,” and neglects a major exception to that statement, that burning wood generates lots of aerosols, while the CO₂ it releases is not fossil carbon, and thus contributes much less to warming.³⁰ The wood we burn will grow back in new trees, sequestering carbon as they grow.

When aerosols are considered, trade-off a) above becomes even more significant, because firewood not only replaces the combustion of fossil fuels and thereby reduces GHGs, but can also mask the effects of the higher GHG concentrations created by burning fossil fuels in the industrial era. What’s more, a transition to cleaner electricity generation and to electric motors for transportation will further reduce aerosol pollution from the high levels prevalent in industrial areas during the 1940s through the early 2000s. As climate scientist and physicist Kate Marvel explained in an interview with Wallace-Wells: “[I]f we got rid of all fossil fuel infrastructure tomorrow, in the short term, we would see a spike in temperature because of that air pollution, which is killing us, but also blocking the sun.” Marvel then outlines the pattern of post-industrial pollution control: “[I]t is an unalloyed good thing that air pollution is projected to fall in the future. But in terms of the climate impact, we’re going to see ... less stuff in the atmosphere that’s reflecting the sun. And so that is a really, really important problem in the future.”³¹

Marvel describes the trade-offs I outlined above, with a significant twist: the decarbonization of industry, transportation, and electricity generation, which is key to reducing GHG emissions, will not necessarily limit the global rise in temperatures, because it will also reduce the masking effect of aerosols or particulate pollution. Marvel should have carved out a special role for woodfire, which produces aerosols without emitting fossil carbon. However, there is political risk in this strategy. Will some people be enraged by the smoke from woodstoves, if other people embrace this old-fashioned energy source as a low-GHG option?

The air we breathe is closely linked to the earth, fires, and waters around us, and the cycle of carbon through wood or cellulose is one of the most fundamentally domestic, humane aspects of the materiality of air. Wood is the oldest fuel humans have used for heating and cooking, and it has an important role to play in human efforts to adapt to a changing climate while limiting fossil fuel combustion. Many of us will see more smoke in our futures, and we should learn to make the best of it, while protecting the lungs of the most vulnerable. When nearby forests and grasslands burn, put on that N95 mask, protect your home, and stock up your woodpile for the coming winter.

Notes

- 1 Paul F. Hessburg et al., “Wildfire and Climate Change Adaptation of Western North American Forests: A Case for Intentional Management,” *Ecological Applications* 31, no. 8 (2021): 2. <https://doi.org/10.1002/eap.2432>.
- 2 National Interagency Fire Center, Boise, Idaho, “Total Wildland Fires and Acres, 1983–2022,” accessed May 19, 2024, <https://www.nifc.gov/fire-information/statistics/wildfires>.
- 3 Cliff Mass, “Another Deceptive Front-Page Climate Story in the *Seattle Times*,” *Cliff Mass Weather Blog*, March 3, 2024, <https://cliffmass.blogspot.com/2024/03/another-deceptive-front-page-climate>.
- 4 Neil Sugihara et al., *Fires in California's Ecosystems* (Berkeley: University of California Press, 2006), 417, 521.
- 5 The term “fire permeable” is used, for example, in the papers posted on the website of *Firefighters United for Safety, Ethics, and Ecology*, fusee.org. See also note 23.
- 6 John Muir, *Steep Trails* (San Francisco: Sierra Club Books, 1994), 209.
- 7 See Timothy Egan, *The Big Burn: Teddy Roosevelt and the Fire that Saved America* (Boston: Houghton Mifflin, 2009).
- 8 Jessie Minor and Geoffrey A. Boyce, “Smokey Bear and the Pyropolitics of United States Forest Governance,” *Political Geography* 62 (2018): 83.
- 9 Minor and Boyce, “Smokey Bear,” 84.
- 10 See, for example, the analysis of George Inness’s “The Lackawanna Valley” in Leo Marx, *The Machine in the Garden: Technology and the Pastoral Ideal in America* (Oxford: Oxford University Press, 1964), 220–22.
- 11 Stephen J. Pyne is among the writers and researchers most important to the shift in understanding the importance of fire for North American ecosystems, beginning with his book *Fire in America: A Cultural History of Wildland and Rural Fire* (Seattle: University of Washington Press, 1982).
- 12 “Materiality of Air: Representation, Crisis, Health,” lecture series program, March 11–June 10, 2024, https://airproject.univie.ac.at/wp-content/uploads/2024/05/Program_Materiality-of-Air.pdf.
- 13 See, for example, Conrad Wilson, “Criminal Case Dismissed against Federal Burn Manager in Rural Oregon,” *Oregon Public Broadcasting*, June 6, 2024, <https://www.opb.org/article/2024/06/06/criminal-charge-dismissed-grant-county-oregon-forest-service-prescribed-burn-manager/>.

- 14 Research by Robert W. Howarth of Cornell University has questioned claims that natural gas is cleaner or causes less GHG emissions than coal and crude oil. Howarth measured the methane released in the production of natural gas, particularly the fracking of shale oil deposits in Pennsylvania. See “A Bridge to Nowhere: Methane Emissions and the Greenhouse Gas Footprint of Natural Gas,” *Energy Science & Engineering* 2, no. 2 (June 2014): 47–60. <https://doi.org/10.1002/ese3.35>
- 15 Cliff Mass, “On Average, Is Western Washington Air Quality Getting Better or Worse?” *Cliff Mass Weather Blog*, September 2, 2023, <https://cliffmass.blogspot.com/2023/09/on-average-is-western-washington-air.html>.
- 16 Nathan Wilk, “In State First, Eugene Bans Natural Gas in New Low-Rise Residential Buildings,” February 7, 2023; Karen Richards, “Opponents of Eugene’s Proposed Natural Gas Ban Launch Next Phase of Campaign,” June 27, 2023; Nathan Wilk, “Eugene Natural Gas Ban Removed from Upcoming Ballot,” July 10, 2023. See www.KLCC.org/politics-government.
- 17 Ashleigh Furlong, “Cities Grapple with Run on Wood Burning Stoves,” *Politico Europe*, February 15, 2023, <https://www.politico.eu/article/cities-wood-burning-stove-energy-air-pollution/>.
- 18 Susan J. Prichard et al., “Adapting Western North American Forests to Climate Change and Wildfires: 10 Common Questions,” *Ecological Applications* 31, no. 8 (2021): 2. <http://doi.org/10.1002/eap.2433>
- 19 Prichard et al., “Adapting Western North American Forests,” Table 1, question 2, page 9.
- 20 One is Prichard et al., “Adapting Western North American Forests.” The two other papers are: R.K. Hagemann et al., “Evidence for Widespread Changes in the Structure, Composition, and Fire Regimes of Western North American Forests,” *Ecological Applications* 31, no. 8 (2021): 1–34. <https://doi.org/10.1002/eap.2431>; Hessburg et al., “Wildfire.” I learned of these from Kylie Mohr, “Why Fire Experts Are Hopeful,” *High Country News* 58, no. 11 (November 2021): 13.
- 21 Prichard et al., “Adapting Western North American Forests,” 14.
- 22 “Materiality of Air,” lecture series program.
- 23 See “The Fire Permeable WUI #1: Introduction,” *Firefighters United for Safety, Ethics & Ecology*, accessed May 19, 2024, <https://fusee.org/fusee/a-fire-permeable-wui-wildland-urban-interface-1-introduction>.
- 24 Joyce Chaplin, “The Franklin Stove: Modern Materiality, Made in Pennsylvania,” *William and Mary Quarterly*, 3rd series, 81, no. 2 (April 2024): 219–54.
- 25 See the smoke opacity illustrations at <https://www.lrapa.org/air-quality-protection/burning-overview/wood-heating/>, which apply to woodstove emissions in Eugene, and in the nearby mountain town of Oakridge, located in a narrow valley that traps cold air during fall and winter.
- 26 Some home heating stoves are specially designed to burn pellets produced from sawdust and bark by lumber mills. Buying and storing pellets is easier for many people than chopping, curing, and carrying firewood. But the pellets, like charcoal briquets, which are also made from lumber mill by-products, contain small amounts of petroleum residue.
- 27 “The Fire Permeable WUI #1.” Tim Ingalsbee expands on the principles in “Incendiary Rhetoric: Climate Change, Wildfire, and Ecological Fire Management,” *Firefighters United for Safety, Ethics, and Ecology*, May 2020, <https://static1.squarespace.com/>

- static/5e2c7d5a807d5d13389c0db6/t/5ecbfda2e8296a24e17436f5/1601670278230/Incendiary+Rhetoric_2020-6.pdf.
- 28 David Wallace-Wells, “The Faustian Bargain of Reducing Air Pollution,” *New York Times*, August 30, 2023; “IPCC, 2021: Summary for Policymakers,” *Climate Change 2021: The Physical Science Basis. Contribution of Working Group I to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change* (Cambridge and New York: Cambridge University Press, 2023), 2–32, Figure SPM.2. <https://doi.org/10.1017/9781009157896.001>
 - 29 Geeta G. Persad, Bjorn H. Samset, and Laura J. Wilcox, “Aerosols Must Be Included in Climate Risk Assessments,” *Nature* 611 (2022): 662–64. <https://doi.org/10.1038/d41586-022-03763-9>
 - 30 Wallace-Wells, “The Faustian Bargain.”
 - 31 “Transcript: David Wallace-Wells Interviews Kate Marvel,” *New York Times*, The Ezra Klein Show, September 5, 2023, <https://www.nytimes.com/2023/09/05/podcasts/transcript-david-wallace-wells-interviews-kate-marvel.html>.

Survival of the Most Collaborative: Climate Justice as a Logics for Flows of Air

Sheena Wilson

Air quality, like climate change, is an issue experienced locally, but its flows do not adhere to borders. This chapter will outline, from a situated feminist and decolonial perspective, the inherent contradiction of expecting national governments around the world to enforce international agreements on climate when the *raison d'être* of states has always been to manage lands and resources, as well as the bodies, included and excluded from their territorial borders. I will situate my own personal-professional perspective within a broader history of the logics and politics that have created climate change to illustrate how the flows of air, the climate crisis, and the polycrisis of the twenty-first century demand more agile and nimbler sociopolitical infrastructures than currently exist. Survival of the fittest is a popularly misunderstood concept. It never was about the one who could kill before being killed. When they defined the concept, Charles Darwin and Herbert Spencer were referring to those among the species who were most adaptive to changing conditions; as we attempt to mitigate and adapt to climate change, it is important to remember that being agile, nimble, and flexible is critical for individual and collective survival and wellbeing. To be adaptive is to be collaborative—to be able to work well with others and coordinate our actions within the timeframes and at the scale needed to have global impact. Thinking with air as a material entity that contains the oxygen necessary to most life on this planet, as well as the medium that suspends the very greenhouse gases that are causing planetary heating, reminds us that through air we are all connected. The air I breathe, you also breathe. David Suzuki illustrates this by drawing attention to the research of Harlow Shapley, who traced the flows of argon. Shapley calculated

that every breath of air contains 3×10^{18} argon atoms, so if you take a breath now, and you take a breath a year from now, there will be

15 argon atoms from that one original breath you took a year before. So Shapley calculates . . . every breath we take has argon atoms that were in the bodies of dinosaurs 65 million years ago. That every breath you take will suffuse life as far as we can see into the future. . . . We are air. Whatever we do to air we do to ourselves.¹

Air is something we all share—at a local and global scale. It cannot be contained by geopolitical borders. Nations maintain control of land and resources within their borders. The flows of air defy the bounded state of nations. As political infrastructures, are nations sufficiently agile to govern the flows of air that disperse toxins released into the atmosphere within one bounded territory to locations around the globe? The pollutants suspended in flows of air contribute not only to global heating and climate change, but also to the erosion of human and more-than-human health and well-being. If governance is just another word for relationship, what relations need to be unbuilt and remade as part of this epochal transition in order to achieve planetary health, which is core to survival and flourishing?

Climate justice is one way to name the ongoing struggle(s) to achieve and maintain planetary health; a term that refers to the interconnection of individual, community, and multi-scalar ecosystem resilience, wellness, and thriving. My research is centered around bodies. I am also invested in political bodies. I will frame these issues around the concept of modern nations (with their origins as nation-states) as political bodies, in the context of climate change. The nation is a body that is first imagined,² a body constructed on the establishment of norms and that demands normativity. The nation is a body that renders killable certain forms of life: bodies declared Other—whoever that might be at different historical moments (including but not limited to the noncompliant woman's or witch's body, queer bodies, bodies of color, bodies that are politically dissident, and more).

This chapter is a transdisciplinary theoretical and personal essay that brings together my scholarly research in the energy humanities with personal experiences and reflections on current events, as well as my experiences working in policy areas, at the nexus of energy transition and planetary health, to imagine the next steps in the struggle for climate justice. This chapter is a reflection on the knowledge acquired and lessons we are learning about climate change, as we breathe air contaminated by forest fires, the burning of fossil fuels, and toxic petromodernity.³ It is an attempt to model what I am calling for, which is attunement to our bodies and our ecosystems, as we live through these troubled times. There are lessons to be learned from listening to the places and lands where we live, to our more-than-human kin, to one another—and sharing these lessons opens up new potentialities.

Like you, I am a human living through the climate crisis and *not all* of what I know comes from my scholarly investments. For better or for worse, much of it comes from the embodied experience of *living through these troubled times*. I do most of my work on Turtle Island, in the territories now colonially referred to as Canada. As the descendant of settlers who moved away from Europe to North America at different intervals over the last 200 years and settled in Treaty 8 in Northern Alberta, I was born on neighboring Treaty 6 lands and into a complex web of settler–Indigenous relations, marked by historical and ongoing colonialism. I am not just a white settler, but I am also a cisgender woman, a mother, a person with my own claims to being an AI assisted body, and more. I was raised in Alberta, and after later living parts of my adult life around the world, my home base is once again in amiskwaciy-wâskahikan, Cree for Beaver Hills House. Also known as Edmonton, my city is situated on lands long ago stolen from Papaschase and Métis peoples, displacing them through means and methods that led to the loss of culture and lives as part of our nation’s genocidal practices.⁴ This fact informs all of my thinking, working, and being—particularly as it relates to my research on intersectional and decolonial climate justice and energy transition. Indeed, energy and natural resources play a starring role in this history—extracting value from the land at the cost of the wellness of ecosystems and species, displacing Indigenous nations through ongoing colonialism, and leaving all of us with the ruins of petromodernity as we transition to new energy sources, new economies, new power relations, and new ways of living.⁵ This material and epistemological intersection has become the focus of my research.

Petro-Mama

In 2014, I wrote a creative non-fiction story, “Petro-Mama: Mothering in a Crude World,” about my distress as I rushed my preschooler, who was having trouble breathing, to the doctor in congested traffic against the backdrop of oil refineries, with tankers and smoke stacks defining the horizon.⁶ Two years later, in 2016, I released a film of the same name that took its inspiration from the short story and again explored the ways in which healthcare providers and loved ones subtly but repeatedly expressed their internalized belief that the health and well-being of my family was not only my responsibility, but within my control, and that my child’s asthma might somehow be traced back to something I had or had not done.⁷ In the story and the film, I reject this narrative. As I look around at the material impacts of air quality, I know that this is just one outcome of what it means to raise children in the *industrial heartland*, another moniker for these lands I call home. While the oil and industrial products extracted and processed in our region are exported around the world as part of global petroculture, we live with the toxic impacts locally. Seven years and two weeks after the events in that story took place, I would hover on the precipice between life and death. These embodied experiences of living and dying on this planet inform my research.

Climate Change Is a Symptom

Over the last several years, I have worked to explain climate change to general and specialist audiences using a number of taglines. This is one of them: *Climate change is a symptom*. When I say that climate change is a symptom, I mean that it is not the root problem we need to solve. How we define problems determines our ability to solve them. If we think the problem is climate, or more specifically, parts per million of carbon in the air leading to global heating—which is where a lot of policy and activism is focused—and all we solve for is *decarbonization*, we will have addressed merely one aspect of the current crisis. A very important one, no doubt—one that I am also devoted to—but not the root cause of the problem. Our ability to solve a problem will be limited by the narrowness of our definition, and thus the narrowness of our actions. The root causes are instead epistemic, ontological, and axiological—related to how we understand the world, how we are and act in the world, and what we value. Addressing these root causes of climate change, therefore, means that the logic driving decision-making must be remade; it means rebuilding the broken relationships caused by the alienations and violences accepted as part of business-as-usual practices and common-sense understandings of the world.⁸

For the past two decades, I have devoted myself to energy, specifically to energy transition. I care deeply about energy, and, more importantly, I have learned many lessons from my energy transition research, policy advising, and community organizing—lessons that are applicable to other areas of the climate crisis, beyond energy transition. Why the focus on energy?

1. Energy transition is an agreed upon necessary, immediate action on climate.⁹
2. Very importantly, societies are shaped by the energy systems that power them.¹⁰ *Energy is social*, and therefore *energy is a matter of social justice*. *Energy is power*. This is not only a play on words but an etymological truth: our relationships to energy mark our relationships to power, understood as social relationships.
3. Energy transition is a *material* problem, and we can address it in steps and imagine it incrementally. In other words, it is a problem we can tackle from different perspectives, one step at a time, which helps us to get around the problem of the hyperobjectivity of climate change as an issue so large and so unwieldy that we cannot even imagine where to start.¹¹

Air too is a material issue, one very different from oil and fossil fuels, but a material issue that forces a reckoning with the interconnectedness of climate issues, one that refuses compartmentalization into managerial silos. Thinking with air and its flows, which carry not only atoms like argon but pollutants, reveals the interconnection and interdependency between humans and planetary health. The materiality of air highlights the way we have

placed excessive value on fossil fuels over the last 150 years, to the degree that we did not account for the deleterious impacts on planetary health produced by allowing for the release of toxins into the atmosphere. The over-focus on carbon-intensive fossil fuels has led to a focus on decarbonization. This oversimplification of the causes and solutions has created regulatory prohibitions on one type of greenhouse gas, CO₂, while failing to sufficiently monitor other gases that can increase the greenhouse effect—loopholes that are being exploited for profit. New rules as opposed to new logics—following the letter of the law rather than the spirit of the law—is going to compound the crises of this century. For example, hydrogen is being promoted as a green alternative fuel to replace natural gas and other fossil fuels, despite warnings from scientists about the impacts of methane (and other gas) leakage that occur during hydrogen production that uses methane as an input (blue hydrogen), or through the leakage of hydrogen itself, during the distribution phase (indeed, nearly all hydrogen is still produced with the help of fossil fuels, not green electricity). As the Andlinger Center for Energy + Environment at Princeton University reports, “hydrogen gas easily reacts in the atmosphere with the same molecule primarily responsible for breaking down methane, a potent greenhouse gas” and because there is a limited amount of the hydroxyl radical (OH) in the atmosphere and OH is needed to break down both hydrogen and methane, an increased amount of hydrogen in the atmosphere could lead to increased levels of methane. “If you emit some hydrogen into the atmosphere now, it will lead to a progressive build-up of methane in the following years,” says (then) postdoctoral researcher Matteo Berttagini. “Managing leakage rates of hydrogen and methane will be critical . . . If you have just a small amount of methane leakage and a bit of hydrogen leakage, then the blue hydrogen that you produce really might not be much better than using fossil fuels, at least for the next 20 to 30 years.”¹² The UN environment program warns that “Methane Emissions are Driving Climate Change,” and methane is “80 times more potent at warming than carbon dioxide” over a twenty-year period.¹³ The problem is not carbon. Fossil fuels are being fetishized as the cause of global heating, but the root cause is epistemic failure. The proposed solutions to climate change cannot succumb to the same failures of European Enlightenment rationale that caused them. Solutions must be able to nimbly integrate best practices and knowledge from multiple wisdom systems.

Over four decades ago, eco-feminist philosopher Carolyn Merchant argued in her germinal book *Death of Nature: Women, Ecology and the Scientific Revolution* that “the domination of nature,”¹⁴ and the “devaluation of women,”¹⁵ their knowledge, as well as the knowledge of racialized peoples, are in large part what has led to the current ecological crisis. Western (patriarchal) rationalism excludes not only women’s experiential knowledge and expertise, but vast bodies of knowledge, including Indigenous and non-Western ways of knowing. Her and my (and many others’) argument is that, instead of attempting to solve a problem caused by patriarchal, colonial capitalism using

the same amputated Enlightenment rationale that eliminated feminist knowledge and the knowledge of people of color from decision-making, thereby excising the consideration of most of humanity as relevant to either the problem or the solution, what is needed is an intersectionally feminist decolonial rethinking of who we are in relationship to one another and the world. And here, where I live and work, on these lands we now call Canada, in these territories, that *relies* on Indigenous, settler, immigrant and refugee knowledge sharing. From this contextual relational understanding, it is my wager that while climate change exponentially gains momentum, the real work of reworlding and transition—at least where I am located and situated, for me, for us, with communities and between communities—can only happen at what Lana Whiskeyjack talks about as the conditional “pace of trust.”¹⁶ Trust that begins in understanding and respect across difference.

Our current hierarchies of knowledge have long refused the knowledges of female-identified people, queer folks, differently abled people, Indigenous peoples and people of color who make up the vast majority of the global population. This refusal then justifies other forms of exclusion, not allowing members of these groups to share power or even benefit from the full rights of citizenship. This leaves many of us, and the institutions that educate us, with a very narrow definition of reason, and an equally narrow dataset. What is reasonable and who defines it? We cannot solve the very problems caused by this epistemic failure using only the knowledges that produced it.

As Silvia Federici argued in her book *Caliban and the Witch* (2004), European women’s lives were colonized through the witch hunts of the sixteenth and seventeenth centuries in Europe, which involved the torture and killing of thousands of people.¹⁷ Federici argues that this overlooked event was a critical turning point in the transition to a capitalist society, because women who engaged in practices that had traditionally been gendered as women’s work—midwifery, medicine, food foraging, and cultivation on public shared lands known as the commons—were dispossessed of their access to these lands and as a result were alienated from the intergenerational expertise (knowledges) that were. Much of this knowledge was lost. What aspects remain have been rationalized into patriarchal capitalist logics and integrated into a capitalist marketplace. The majority of the world’s population is now forced to participate in these normalized systems as mere waged laborers—with women-identified people, 2SLGBTQQIAA+, people of color, people from lower classes and castes, people with disabilities, and anyone identified as Other often being paid less. These practices have had impacts on people’s ability to earn a living for themselves and their families, not to mention the loss of valuable knowledges and relationships to land and ecosystems. The enclosure of the commons in Europe, which led to the persecution of peoples reliant on land-based subsistence economies, was happening simultaneously with the beginning of the slave trade and the colonial take-over of territories in Canada.

A tool to justify these disposessions and violences was the Doctrine of Discovery, which established the moral and legal superiority of Christians as a matter of religion and law and was based on a series of Papal Bulls dating back to the fifteenth century. The Doctrine of Discovery not only allowed European colonizers to enclose the lands we now call Canada, but it justified the dispossession of land from the rightful Indigenous stewards and guardians of these territories and led to the land grants of the nineteenth and twentieth centuries that distributed plots of land to settlers for the purpose of agricultural production and industrial development. In short, based on religious moral superiority, these lands were taken from communities that had thousands of years of intergenerational knowledge about how to live on them and maintain their health and were parceled out for practices that ensured the destruction of existing ecologies. These logics, and the agricultural and industrial practices that were demanded as a way to demonstrate that the land was being put to productive use (e.g., transforming forests into farmland, logging, or mining sites), are part of what has led to the radical shift in global temperatures (climate change), ecosystem toxicity (pollution) at local and global levels, and the unanticipated impacts that these imbalances are creating for the health and well-being of air, waters and lands, flora and fauna, and humans. The way that the Doctrine of Discovery was mobilized and the way the witch hunts were carried out are *just two* of many examples that demonstrate how the control of land, bodies, and ideas (i.e., knowledge systems) is made possible by ideological and political perspectives that believe the world is there for the pillage and profit of a meritorious or privileged few, and that their freedoms can be ethically built on the oppression and enclosures of other people and places. These oppressions and violences against ecosystems and whole swaths of society were necessary conditions for the emergence and maintenance of a capitalist economic system; moreover, their maintenance is spurring on planetary heating.¹⁸ As scholars from many disciplines have articulated, the “ongoing challenge that existing international and national air pollution regimes face is that environmental concerns are grafted into a regulatory model that continually prioritizes trade and economic prosperity.”¹⁹ The problem is clear; the solutions, less so.

New logics are needed to collectively shift those of us living under these ways of thinking, doing, and being away from the existing logics that suggest any living being—human or more-than-human—is superior to another, or entitled to more than any other, based on sex, gender, skin color, religion, class, ability, and so on. We need to move away from notions of white supremacy and patriarchal privilege, to name just two outcomes of centuries of thinking and acting according to these logics of entitlement. This, at the very least, is what needs to change to even begin to address the climate crisis and the polycrisis of this century. This is why climate change is a matter of social justice and why social justice is needed to create more health and well-being, not just for the planet but for people as well. Climate change is one

of the greatest teachers of this century. Climate change will humble us (if it has not already).

In this context, what is required to address the climate crisis and the many interlocking crises are *new logics* that confront, resist, and unbuild what visual culture theorist Nicholas Mirzoeff calls “White Sight,” working to come to terms with the systemic violences of prevailing modern logics that have been sanitized of non-patriarchal modes of thinking and being and acting.²⁰ Or, to paraphrase what Canada Research Chair in Indigenous Peoples, Technoscience, and Society Kim TallBear says of whiteness: whiteness needs to be understood not as a skin color or phenotype, but an ideology.²¹ Much of our inheritance as modern humans is the product of Western Enlightenment modes of relating to the world. Cartesian dualism (a concept first articulated by René Descartes in 1641 in *Meditations on First Philosophy*²²) nurtured a worldview that separated mind from body, and human beings from nature and from one another, which resulted in racial and gender subjugation, conquest, and colonialism. Much of this justified the scientific (and pseudoscientific) notions of survival of the fittest that fed and continue to feed ideologies of economic competition between individuals, classes, and nations.

In fact, as anthropologist David Graeber and archaeologist David Wengrow lay out, this evolutionary framework for history was a fear response. European explorers, missionaries, traders, and settlers in the New World encountered Indigenous critiques of European society. Indigenous critiques of European cultures were raising important questions “about money, faith, hereditary power, women’s rights, and personal freedoms,” which “was having an enormous influence on leading figures of the French Enlightenment.” The result was “a backlash among European thinkers which produced an evolutionary framework for human history,” where the white European male sits at the apex of human civilization, “that remains broadly intact today.” Put into a contemporary context, the rise of white supremacy, finding virulent footing during and after the global COVID-19 pandemic, is likewise a fear response by those least able to respond nimbly to the threats posed by a changing climate, those least able to adapt their ways of doing and being. And those least nimble are those for whom our current systems are built to fit—those who are not necessarily white as a phenotype, but white in terms of their worldview. They are most threatened because they risk loss of power. Their privilege leaves them with less flexibility than those of us who, over a lifetime, have been maneuvering and adapting to systems not made for our ease or thriving—in fact, built to exclude most of us.

The backlash against this fear of doing otherwise, and the fear of change, also contributed to the promotion of the concept of “survival of the fittest”—a misunderstood notion. First, it is usually attributed to Charles Darwin. But, in fact, he took the term from Herbert Spencer, who, in his 1864 book *The Principles of Biology*, spoke with much greater nuance about the concept than

what has survived as popular understanding of the term. Given the variability within species, Spencer observes:

[A]mong all the individuals, some will be less liable than others to have their equilibria overthrown by a particular incident force, previously unexperienced. Unless the change in environment is of so violent a kind as to be universally fatal to the species, it must affect more or less differently the slightly different moving equilibria which the members of the species present. It cannot but happen that some will be more stable than others when exposed to this new or altered factor. That is to say it cannot but happen that those individuals whose functions are most out of equilibrium with the modified aggregate of external forces, will be those to die; and that those will survive whose functions happen to be most nearly in equilibrium with the modified aggregate of external forces.²⁴

In other words, it is not necessarily the strongest who will survive. The most violent. The one who can kill before it is killed—as is the popularly applied use of this term. Instead, as Spencer points out, it is the one who can best adapt, in context, to new circumstances. The most flexible. The nimblest. That is what Darwin and Spencer were referring to as natural selection and survival of the fittest. The way to move forward is to recast Spencer and Darwin's concept as survival of the most adaptive. For me, adapting means moving away from the ways *survival of the fittest* has been taken up by conventional wisdom, where survival is linked to antagonistic individualism. I propose, instead, that what it means to be adaptive at this moment in time is to learn to be collaborative—*survival of the most adaptive, survival of the most collaborative*—and to work together on a scale and within a time frame never before achieved in human history, to do our utmost to address the climate crisis and the multiple converging crises that stem from the same root causes.

People keep waiting for governments to take action on climate. However, the conundrum is whether the state, as an institution and as a social infrastructure, is sufficiently agile to respond to the demands of the climate crisis. Air, its flows, and what it suspends and moves through the planetary ecosystem cannot be contained and siloed using the same governance and economic mechanisms that transport coal, crude, refined petroleum, petrochemical, and other consumer products through pipelines, on trains, on ships—bounded and contained, much like the nations that control their flows. Starting with Westphalia in 1648, *modern* humans have reproduced the nation structure: each nation equal to other nations, and thereby autonomous insofar as no state is beholden to another power (i.e., the church) unless they choose to be, and no nation is allowed to interfere in the domestic-political affairs of another (which has given rise to diplomacy). The first philosopher to attempt to define the concept of a state was Rudolf von Ihering.²⁵ In *Der Zweck im Recht* (1871), von Ihering argued at length that the “second lever of social

order is Coercion [*sic*]. The social organization of reward becomes trade; coercion organized makes the State and Law.”²⁶ Post-Westphalian logics were (and continue to be) organized around control of labor forces, nature, and resources. Also called “the Peace of Westphalia,” the nation-state was here seen as a means to live in peace and freedom, and John Stuart Mill saw it as a necessary infrastructure for democracy. However, the nation-state was also born of the Thirty Years’ War. It was the *outcome* of conflict and, as is clear when we glance at our smartphone devices, despite seventeenth-century dreams, it has not ended conflict in the slightest.

Here in Canada, the nation falls into the tradition, much like other imperialist nations around the world over the last couple of hundred years, of Jean-Jacques Rousseau’s *The Social Contract* (1762), in which the ideal of a republic is intended to allow citizens freedoms and liberty.²⁷ At the same time, the notion of multiple republics implies the need for nation-to-nation governance. Canada purports to be a democratic nation and children in Canadian schools are raised on a diet of Canadian multiculturalism, believing gender discrimination and racism are historical, unless of course they face it daily or even intermittently; and that human rights abuses—like the internment of Japanese-Canadians during the Second World War, or the systemic erasure of Indigenous peoples using the Residential Schools system that lasted over 100 years and ended only in 1996—are *historical* anomalies. They are not taught that the entire legal premise of the nation is based on land theft and genocide and that Canadian law, like the Doctrine of Discovery, works in the interest of protecting the monopoly on privilege and violence held by those benefitting most from the status quo. Mohawk political anthropologist Audra Simpson highlights this when she argues that the mere existence of Indigenous women is an affront to the colonial project, since they are the historical guardians of the resource- and oil-rich lands now occupied by settler Canadians.²⁸

The point is that climate change is not simply the result of the carbon-intensive energy systems and emissions we have produced, so decarbonization alone will not solve the problem. Climate change results not just from an attempt to dominate the environment and other species, but is part of a larger project of domination where some people believe in their God-given superiority over those different from themselves in some way—whether that is gender, sexuality, skin color, income, class, caste, religion, disability—and exploit *those* people to secure and sustain their own profit and privilege. Here in Canada, the government parties that subsidize oil and slow down action on climate simultaneously undermine the quality of and equitable access to social services, including public education and public healthcare. Since the Second World War, people in Canada, and particularly in the province where I live, have enjoyed a relatively high standard of living, marked by access to publicly funded universal education and healthcare, old age pensions, unemployment insurance, and other social benefits often attributed to oil and natural resource wealth. However, in recent years, there has been a radical erosion of the social

democratic character of Canada (and of many countries around the world). Citizens who express surprise when oil profits do not result in increased social well-being fail to understand their relationship to and positionality within power hierarchies that determine who the system exists to serve and who exists to serve the system. Whether profits are being generated through the development of natural resources, a euphemism for the destruction of ecosystem health (directly connected to human health) on the one hand, or via medical institutions profiting from illness rather than health on the other—these logics are part of the same project. This is why there will be no action on climate that does not determine future relationships of power on this planet. Climate justice can only be achieved through the reordering of power relations as we transition to new energy systems and their corresponding social, economic, and political systems. The stakes of energy transition are so much higher than choosing the right energy technologies.

There is no linear progression from one form of social organization to the next: this is one of the false metanarratives of history that sells the idea that our way of life, now in the age of oil, is the apex of civilization. On the contrary, the failings of our society are evident everywhere, most obviously in the living conditions of the most vulnerable among us. A society is only as resilient as its most vulnerable. Using this metric, petromodern cultures are precariously positioned, given rising inequities. In North America, corporate “CEO pay has skyrocketed 1,460% since 1978: CEOs were paid 399 times as much as a typical worker in 2021” while the costs of food, clothing, transportation, and shelter are rising much faster than wages. As a result of increasing inequality, the working classes (middle and lower) are struggling, and the number of unemployed and unhoused is growing.²⁹

Citizen vulnerability in Canada, where income inequality is at its highest point since the turn of the millennium, is not merely theoretical, but part of everyday life.³⁰ The tent cities that I drive past every morning when I drop my sons at their downtown high school are expanding, and look more and more permanent despite police efforts to force them to move on. But move on to where? There are very few commons. Public spaces, in the true sense of the word, are rare in North America today. Spaces to congregate are corporately owned—malls, movie theatres, even schoolyards are owned by school districts and increasingly enclosed—and as long as property is private, the owners determine who is and is not allowed access. Even national parks, which Canadians tend to think of as shared spaces, were created through the enclosure of common lands as part of settler colonial projects and land grabs, and these lands continue to be closely monitored and policed.³¹ Where is anyone able to live outside capitalist society and still thrive? What might be possible outside the restrictions of capitalist life?

To argue that Canada, or any nation is fair and equitable is to argue a contradiction. Statehood itself is the imposition of a legal order to maintain power and control over a territory through force and violence. As Graeber and Wengrow articulate, “a government is a ‘state’ if it lays claim to a certain

stretch of land and insists that, within its borders, it is the only institution whose agents can kill people, beat them up, cut off parts of their body or lock them in cages; or, as von Ihering emphasized, that can decide who else has the right to do so on its behalf.³² So the question I pose is not whether the nation is an institution and social infrastructure sufficiently agile to respond to the demands of the climate crisis, but rather: Is it *reasonable* or *legitimate* for nation-states to be the governing body that determines our responses to the climate crisis, if what we want is climate *justice*?

The nation as a governance system, in its current form at least—particularly given the ways that multinational corporations factor into the mix—is *not* adequate to twenty-first-century challenges. This is in part because state logics were never formulated to function cohesively on a planetary scale. They were created to control natural resources. And the control of natural resources, both oil and energy, as well as the laboring bodies doing this industrial work and the work linked to petrocultures around the world, has been organized by Enlightenment logics, by an extractivist worldview. This worldview and these logics consider humans above nature, and nature there for the taking and for the profit of those whose interests are guaranteed by the state.

The air pollution we need to manage does not respect national boundaries. Air flows carry smoke from forest fires, from industrial pollution, and even from nuclear meltdowns around the world in unpredictable ways. Local actions have global impacts. The slow violence of emitting pollution that then raises the parts per million of carbon in the air and produces extreme weather and climate events is one temporal scale by which to understand local-global relations.³³ Another is the way local pollution has immediate and direct impacts in faraway places. This was harder to conceptualize before it became relatively commonplace to experience the suffocating sensation of breathing in the toxic fumes of fires burning hundreds or thousands of kilometers away, in what is increasingly being referred to in common parlance and the mainstream media as fire season. In no uncertain terms: new logics are needed to address climate change and energy transition, new logics adequate to the experiential knowledge of living through these troubled times.

At the start of this chapter, I referenced *Petro-Mama*, which was a research-creation project that brought together my work on the institution of motherhood, in particular my critique of patriarchal motherhood and womanhood, and what I have termed petrofeminism: a cisheteropatriarchal petroculturalist definition of women's roles that aligns with and reproduces petrocultural norms.

In *Petro-Mama*, my then toddler asks, "Is this the breathing store Mama?" To which I reply, "It's the pharmacy. There isn't any such thing as a breathing store, Love." In his tiny child's raspy voice, he replies, "Too bad they don't have a breathing store Mama."³⁴ Of course, now, we do have breathing stores in the form of oxygen bars.³⁵

In 2014, when this story was written, threats to local air quality were largely understood to be caused by petrochemical exhaust from cars and

petroleum-refining processes emanating particulates into the air. In 2025, the more imminent and eerie worries that drift into our lives and settle all around us come from wildfires burning across the provinces of the Canadian nation. These fires that are so intense that they burn down whole cities like Fort McMurray (2016) and towns like Jasper (2024). They are so hot and fast-moving that they are able to skip across major lakes and waterways,³⁶ and deliver quick death to people and ecosystems in their path, not to mention those who quietly asphyxiate, often asthmatics or people with other pre-existing conditions, whose deaths go unreported in media or statistics on climate death. Then there are the slow(er) deaths often resulting from respiratory illness, cardiac disease, and the carcinogens contaminating our bodies through the air we breathe and the water and food we consume. Drawing a clear line between these deaths and climate change is difficult. We do, however, know much in our bodies before the science exists to back it up.

In May of 2023, wildfires were raging throughout the province of Alberta Canada, creating low visibility, with air quality index ratings at 10+ on a scale of 10, warning people to stay inside with the windows shut—assuming this is even an option, which it is not for many vulnerable populations and certainly not for the more-than-human. On one of those days, after smoke had drifted into the city overnight, that same child who asked about the breathing store a decade earlier came to tell me that he had heard on social media that if you played outside all day, it was equivalent to smoking eleven cigarettes. Where we are, in Alberta, we take these warnings seriously. On some days in May of 2023, “Alberta had the worst air quality in the entire world.”³⁷ The impacts are everywhere. While in 2014, family and friends were baffled by why my son would have asthma, two years later the causes were obvious. In hindsight, the shift from poor air being an invisible to a visible problem had been just around the corner. Climate change impacts that we had imagined were two or three decades away were instead only two years away. After the 2016 wildfires burned much of the city of Fort McMurray in Northern Alberta to the ground, one of my other sons developed asthma—a different type of asthma from his brother. Not being a respiratory specialist, I had no idea there is more than one kind of asthma. When I commented to my family doctor that my non-smoking father had, almost simultaneously with my son’s diagnosis, developed a respiratory condition that usually only appears in lifelong smokers, he said, in a knowing way, that many of his patients were suffering from respiratory conditions after the Fort McMurray fires. This was before there was science to prove it (which now exists). He already knew. We already knew.

In the late summer and early fall of 2023, “299 fires burned over four million hectares across the NWT ... These fires resulted in 12 community evacuations.”³⁸ Thousands of climate refugees from the fires in the Northwest Territories filled hotel rooms and campsites and spare bedrooms across my city and the province; they could escape the fires, but none of us could escape the smoke that followed. One night, at 2 am, my then sixteen-year-old, who had developed asthma after the Fort McMurray Fires, stood over me and my

husband as we slept. He was panicking, unsure whether to wake us or not. His lungs were seizing up as he struggled to breathe. He had been awakened by the sensation of suffocation. Now, it is no longer the oil-industrial complex that is the most imminent threat to air quality and health; instead, it is the climate change consequences that *not just* this industry but *this way* of relating to the world have exponentially unleashed. This, then, is juxtaposed with news about provincial cutbacks in healthcare, serious ones that privatize what have been public health services, and a government that is reversing action on climate. These announcements, however, are not a contradiction or irony, as some people see it. They are intended outcomes. Bodies for profit. Our bodies. Now, the Canadian medical system (more in line with an American model) will increasingly exist not to promote the health of citizens, but to profit off our illnesses—all while eroding the social fabric and the environment by extracting as much profit as possible out of the land for as long as possible.

What Other Governance Logics Are Possible?

Thinking with the materiality and flows of air illustrates how when we demand government action on climate, we are not simply asking for a set of new policies, but for new logics organized around the flourishing of environments and people. These new logics and associated politics must necessarily propose a value system and associated metrics that stand in contrast with those of current economic *development*, where the destruction of nature is accounted for as net positive when calculating the gross domestic product (GDP). When we ask for action on climate, we are asking for new logics that value and produce mutual aid, (bio)diversity, and other markers of healthy ecologies and communities. This is why I argue that “*if we achieve climate justice, we will have addressed climate change. The reverse is not true.*”³⁹

It can feel impossible to enact new climate logics, but the alternative is to acquiesce to the direst scientific climate-model forecasts. I refuse the abdication of political agency, and instead am investing time and energy into organizing action around the concept of *survival of the most collaborative*. I work to question the role of the state while refusing to become cynical about collaborating with the infrastructures and institutions available to us. To succumb to cynicism is to believe humans are beyond the hope of changing, to relinquish any role or responsibility in and for the crises we are living through. We are all always already implicated petrosubjects. There is no existence outside this system, no one who can claim objectivity. Change from within is the only option. Nations and their institutions are the infrastructures we have to unbuild—how far is yet to be seen, maybe all the way—but there are learnings in that process of unbuilding and rebuilding.

We must each bring our skills and knowledge to bear on the present moment. This will be different for everyone. Personally, I use inside-outside strategies of mobilizing, working inside organizations (universities, local governments, etc.) and coordinating with those running outside strategies

(community organizing), doing what I can to support people to recognize their roles in what I call “activist ecologies.”⁴⁰ As a two-term (2018–26) advisor to mayor, council, and city administration in Edmonton as part of the Energy Transition Climate Resilience Committee, I’ve familiarized myself with the work of many of the people and roles within our local ecologies. For example, elected officials often feel pressure from constituents with opposing views on climate action. Municipal employees working on the climate files behind the scenes, in the shadow of elected officials, often feel misunderstood and attacked by community organizers pushing them to do more, faster, as they work within a large bureaucracy at the mercy of shifting political winds that can interrupt, delay, or reverse their work. Even when the will is there, the process can be frustrating. In this ecology, community organizers push as hard as they do because they feel left out of decision-making processes. Business leaders and lobbyists use their financial leverage to interrupt changes that threaten their profits. However, change is coming whether we work to plan for it intentionally in the interest of mitigating devastation and creating the conditions for flourishing and community well-being, or whether it is imposed on us through natural disasters or economic crises caused by our own maladaptations. I work to foster solidarities between these groups and more, across differences in generation, culture, languages, and areas of expertise, with individuals and groups that often see themselves at odds with one another. Each agent within our shared *activist ecologies* must understand their possible roles and responsibilities. The goal is to achieve climate justice. The path from here to there is not clear. However, whatever the cause – a carbon budget or a solar project or a waste management system – what is more important is the co-creation of new logics that can contribute to community acceptance and implementation of co-determined climate action. This will ultimately contribute to improved local and planetary health.⁴¹

Responding to climate change can either be proactive or reactive. Policy is one of the instruments we have at this time. Neither blind idealism nor a full-scale withdrawal from existing systems are agile responses. The healthy criticism of systems is a durational practice done in community. Policymaking, whatever role one plays in that process—whether as an elected official, a bureaucrat, an activist, an engaged citizen, or a technical consultant—is an avenue for organizing collective action. Scale is also important. It is easier to make change in community, adapted to local contexts. While capitalist modes of time and production want scalable, transferable solutions that grow the economy, many valuable adaptations for local communities are too culturally or ecologically specific to apply across contexts. These are the types of solutions I invest in: solutions that rebuild relationships between community members and their ecologies. I spend time and energy un/building intra- and intercommunity relationships, working in multidirectional university–community collaborations, to support members of my local ecologies to act with the understanding that *every decision is a climate decision*.⁴² It will take all of us, slowing down, collaborating, sharing our knowledges, expertise and talents,

while simultaneously listening to and learning from others as we attune to what actions make health and well-being possible.

Conclusion

Thinking with the materiality of air builds awareness of our interconnectedness. It can also help us think about more agile governance modes with policies organized around ecological boundary limits rather than national boundaries. Thinking with flows of air provides a model for how to coordinate climate action. In recent years, the smoke that has been carried around the world, from fires in the territories where I live to people living around the globe, has raised awareness of the fact that we all breathe the same air. While some people are much more directly impacted by the toxicity of our shared petro-cultural way of life, none of us are immune. The rich might be able to frequent breathing stores, as my toddler invokes in *Petro-Mama*, but none of us wants to live in a world where not only water but air becomes a marketable commodity. If we do not want the invisible hand of the market driving extractive national policies and logics, we need to create new ways to relate to one another. Air flows and air quality indexes make evident how interconnected we are. We need to stop chasing the money and the oil, and start following the flows of air to understand that when I exhale and you inhale, we are interconnected. Air suspends and carries both the elements we need to sustain breathing and living on this planet, as well as many toxic particulates that threaten individual health, species survival, and planetary health. This is why we must all take action on climate, and that means showing up, listening to one another, and co-designing adaptation and mitigation responses that serve us all. Everyone has a right to breathe clean air as a matter of climate justice. The materiality of air teaches us that climate justice is for everyone.

Climate change is the greatest teacher of this century. What climate change teaches me is that when someone says stress kills, or they say they are working themselves to death, this is not a metaphor. When carcinogenic smoke rolls into my bedroom via an open window on a hot summer evening, or when the refineries are flaring off gases on cloudy nights because the satellites cannot easily detect it, or when I sit in traffic and exhaust comes in through the vents, I know in my body that this is not the best way to live, that the trade-offs for the creature comforts, the consumer products that sell the belief that this is the best possible life, are wrong. Climate change is teaching us all these harsh lessons, in no uncertain terms.

Responding to climate change is about healing from our social dis-eases: learning to live again, very differently from the ways that have brought about this century's polycrisis. Mother Earth, too, is having a health event. Her systems are failing. We will increasingly need not only to adjust to new climate limitations, but to face extreme weather events and climate emergencies. Knowing this, not just intellectually, but in our bodies, as humans living through crisis, starts with mourning.⁴³ First, we might need to put up solar

panels and put out fires. Technofixes are emergency measures.⁴⁴ Interventions of that ilk are part of the urgent care we need to give our ecologies. Once the fires are out, mourning and healing can begin. We are mourning the ways of life that we are losing while healing from the unhealthy habits they engendered, not to mention the impacts of the cascading and compounding crises that have been unleashed. Mourning and healing are best done in community. They will take place over a very long period of time. Healing and its counterparts of health and well-being are ongoing processes, not end goals.

Finding a new normal even after a rupture, first for oneself and then with others at the community level, and then finding ways to rhizomatically connect these learnings at a planetary scale, is what climate crisis is demanding of us. It is demanding that we acknowledge our interconnectedness. The fact that your air is my air. That the argon I breathe out goes to you and comes back to me. So do the toxins. We are healing both from the material realities of atmospheric and air pollution, and from what Robin Wall Kimmerer, in *Braiding Sweetgrass*, talks about as the Windigo mindset. The Windigo is the monster who takes too much.⁴⁵ Rolando Vázquez says it well when he articulates the purpose of his 2020 book, *Vistas of Modernity: Decolonial Aesthetics and the End of the Contemporary*, as “an urgent call to engage with the question of healing, that is a healing beyond the confines of medical institutions, a healing that needs a transformation of our understanding and experience of the world.”⁴⁶ Healing ourselves and our ecologies will happen much like climate change itself: at times incrementally, and in other moments leaping forward. It does not mean the wholesale overthrow of all fossil fuels and their derivatives. It cannot be achieved merely with technofixes that replace our fossil fuels with solar or wind. It requires that we shift our worldview and our relationships to one another and the planet. If all we do is decarbonize, it will be a failed transition. Instead, we must build new logics around climate justice. Logics that will support healing, and nurture our relationships to one another, other species, and the planet. These new logics must be invested in mutual flourishing—one decision at a time, because *every decision is a climate decision*. New logics create the possibility for agile decision-making that allows everyone to bring their knowledge(s) to bear on the issues at stake, as opposed to merely demanding regulatory compliance and enforcement. The struggle is not a trajectory from here to there, nor one of evolutionary progress to a magical paradise at a specific endpoint. It is a process—a struggle. Paulo Freire says, “Without a minimum of hope, we cannot so much as start the struggle. But without the struggle, hope, as an ontological need, dissipates, loses its bearings, and turns into hopelessness. And hopelessness can become tragic despair.”⁴⁷ The struggle is where we live.

Imagine what could be possible if the invisible hand, the imagined nation as body-politic, were a loving body, an inclusive body, able, willing, agile, and aware of the strength and resilience of the whole that comes with difference. What, then, would our governance systems look like? After all, governance is really just another word for our relationships with one another, the

more-than-human, and this planet we call home. This is why, in this climate, at this time, in this place, to breathe in and express the air we share, is revolutionary.

Notes

- 1 David Suzuki, "Everything under the Sun by David Suzuki '58—A Conversation with David Suzuki '58 and Prof. Joseph Moore," *Amherst Reads*, January 2013, <https://www.amherst.edu/alumni/learn/amherstreads/pastfeatures/2013-features/january2013/interview/transcript#>.
- 2 Giorgio Agamben, *Homo Sacer: Sovereign Power and Bare Life*, trans. Daniel Heller-Roazen (Stanford: Stanford University Press, 1998); Benedict Anderson, *Imagined Communities: Reflections on the Origin and Spread of Nationalism*, revised ed. (London: Verso, 2016).
- 3 As my co-authors and I argue at greater length in "On Petrocultures, or Why We Need to Understand Oil to Understand Everything," oil and fossil fuels have played "a crucial role in enabling the monumental growth of human populations and of the technological innovation that we now associate with the development of modernity," hence my use of the term petromodernity. For more information see Sheena Wilson, Imre Szeman, and Adam Carlson, "On Petrocultures, or Why We Need to Understand Oil to Understand Everything," in *Petrocultures: Oil, Politics, Culture*, ed. Sheena Wilson, Adam Carlson, and Imre Szeman (Montreal: McGill-Queen's University Press, 2017), 3–20.
- 4 The Papaschase Band are Cree people who signed an adhesion to Treaty 6 and were granted reserve land within what is now the city of Edmonton. Over time, the Papaschase were pressured to disperse by European settlers who were uncomfortable with the proximity of the reserve and wanted their land for the growing city. Although the Canadian government sold all Papaschase lands to settlers between 1890 and 1930, descendants of the Papaschase continue to reside within Edmonton and advocate for its return. The Métis are a distinct, legally recognized Indigenous Nation made up of the descendants of unions between Indigenous women and European fur traders in northwest North America in the eighteenth century; the term Métis refers specifically to people who have a connection to a historic Métis community rather than to anyone of mixed Indigenous and European heritage.
- 5 Wilson, Szeman, and Carlson, "On Petrocultures," 3–20.
- 6 Sheena Wilson, "Petro-Mama: Mothering in a Crude World," in *Telling Truths: Storying Motherhood*, ed. Sheena Wilson and Diana Davidson (Bradford, ON: Demeter Press, 2014), 307–14.
- 7 Sheena Wilson, *Petro-Mama: Mothering in a Crude World*, film written and directed by Sheena Wilson, 2016, <http://sheenawilson.ca/projects/petro-mama/>.
- 8 Sheena Wilson, "Hacking the Techno-Transition: The Possibilities of Deep Energy Literacy," *Sociální studia / Social Studies* 1 (2022): 29–53.
- 9 Kyoto Protocol to the United Nations Framework Convention on Climate Change, Dec. 10, 1997, 2303 U.N.T.S. 162; Paris Agreement to the United Nations Framework Convention on Climate Change, Dec. 12, 2015, T.I.A.S. No. 16–1104; Sheena Wilson, "Just Powers: Climate Change and Social Justice," lecture, *Intergovernmental Panel on*

- Climate Change (IPCC): Change for Climate Community Series*, Edmonton, Alberta, March 6, 2018.
- 10 Wilson, Szeman and Carlson, "On Petrocultures," 3–20.
 - 11 Timothy Morton, *Hyperobjects: Philosophy and Ecology after the End of the World* (Minneapolis: University of Minnesota Press, 2013).
 - 12 Colton Poore, "Switching to Hydrogen Fuel Could Prolong the Methane Problem," *Andlinger Center News*, March 13, 2023, <https://acee.princeton.edu/acee-news/switching-to-hydrogen-fuel-could-prolong-the-methane-problem/>.
 - 13 UN Environment Programme, "Methane Emissions Are Driving Climate Change. Here's How to Reduce Them," August 20, 2021, <https://www.unep.org/news-and-stories/story/methane-emissions-are-driving-climate-change-heres-how-reduce-them>.
 - 14 Carolyn Merchant, *The Death of Nature: Women, Ecology, and the Scientific Revolution* (New York: HarperOne, 1990).
 - 15 Carolyn Merchant, "The Scientific Revolution and the Death of Nature," *Isis* 97 (2006): 513–33.
 - 16 Lana Whiskeyjack, Saddle Lake First Nation, Treaty Six. Lives in Edmonton. Oral teachings at land-based learning and ceremonial events. Topic: Relational research praxis and the pace of trust, 2019.
 - 17 Silvia Federici, *Caliban and the Witch* (New York: Autonomedia, 2004). Federici claims hundreds of thousands died in the witch hunts, but the statistics around witch hunt deaths are contested. It would seem that while all numbers are approximations given the poor recordkeeping at the time, more widely accepted death tolls range from 50,000 to 200,000 in Europe over the 200-year span of the sixteenth to seventeenth centuries. The European population at that time was still recovering from the plague that took place in the fourteenth century and is estimated to have been around 70 million. Federici's historical and art historical methods and uses of the image have also been questioned. Despite these critiques of her methodologies, Federici's work in this book made a vital intervention that then made way for very powerful work from subsequent generations of scholars; her work opened the door to Marxist feminist, psychoanalytic, and gender-nuanced understandings of the causes and impacts of capitalism, particularly through the colonization and privatization of common lands.
 - 18 For more detail on how the climate crisis links to these historical events—the witch hunts and the enclosure of the commons, as well as the Doctrine of Discovery—see Sheena Wilson, "Trafficking in Petronormativities: At the Intersections of Petrofeminism, Petrocolonialism, and Petrocapitalism," in *Transportation and the Culture of Climate Change: Accelerating Ride to Global Crisis*, ed. Tatiana Prorokova-Konrad (Morgantown: West Virginia University Press, 2020), 227–58.
 - 19 R. Walters, "Air Pollution and Invisible Violence," in *Invisible Crimes and Social Harms*, ed. Pamela Davies, Peter Francis, and Tanya Wyatt (London: Palgrave Macmillan, 2014), 142.
 - 20 Nicholas Mirzoeff, *White Sight: Visual Politics and Practices of Whiteness* (Cambridge, MA: The MIT Press, 2023).
 - 21 Kim TallBear, *Kim TallBear on Whiteness*, film, Just Powers, November 5, 2018, <https://vimeo.com/299067314>.
 - 22 René Descartes, *Meditations on First Philosophy*, trans. John Cottingham (Cambridge: Cambridge University Press, 2013).

- 23 David Graeber and David Wengrow, *The Dawn of Everything: A New History of Humanity* (London: Allen Lane, 2021), 442.
- 24 Herbert Spencer, *The Principles of Biology: A System of Synthetic Philosophy* (London: Williams and Norgate, 1864), 444.
- 25 Graeber and Wengrow note that the definition of a state as an institution with a monopoly on violence is commonly attributed to Max Weber, despite its earlier origins in the work of von Ihering. (Von Ihering is the other variation on the spelling of his name). This is worthy of note, given that much of the scholarship in *The Dawn of Everything* is organized around tracing epistemic genealogies and identifying the outcome of cross-cultural contact, whether that led to the acceptance and proliferation of ideas, or their rejection and erasure. Graeber and Wengrow, *Dawn of Everything*, 359.
- 26 Rudolf von Ihering, *Law as a Means to an End*, trans. Isaac Husik (Boston: The Boston Book Company, 1914).
- 27 Jean-Jacques Rousseau, *The Social Contract and the First and Second Discourses*, trans. Susan Dunn (New Haven, CT: Yale University Press, 2002).
- 28 Audra Simpson, "The Chief's Two Bodies: Theresa Spence and the Gender of Settler Sovereignty," keynote presentation, *Unsettling Conversations, Unmaking Racisms and Colonialisms: RACE Network's 14th Annual Critical Race and Anticolonial Studies Conference*, University of Alberta, Edmonton, 2014, <https://vimeo.com/110948627>.
- 29 Josh Bivens and Jori Kandra, "CEO Pay Has Skyrocketed 1,460% since 1978," *Economic Policy Institute*, October 4, 2022, accessed June 28, 2024, <https://www.epi.org/publication/ceo-pay-in-2021/>.
- 30 In October 2024, the Canadian Broadcasting Corporation reported that according to Canada's statistics agency, "income inequality in Canada has hit the highest level ever recorded as wealth becomes increasingly concentrated in fewer hands." Darren Majors, "Income Inequality in Canada Rises to the Highest Level ever Recorded: Statistics Canada," *CBC News*, October 10, 2024, <https://www.cbc.ca/news/politics/canada-highest-level-income-inequality-recorded-1.7349077>.
- 31 For more information, see the UAlberta Libraries archive titled "Indigenous Peoples and Canada's National Parks," accessed November 23, 2024, <https://guides.library.ualberta.ca/indigenous-peoples-and-canadas-national-parks>.
- 32 Graeber and Wengrow, *Dawn of Everything*, 359.
- 33 Rob Nixon, *Slow Violence and the Environmentalism of the Poor* (Cambridge, MA: Harvard University Press, 2011).
- 34 Wilson, *Petro-Mama*, film.
- 35 Thank you to Tuesday Young, a student in my Interdisciplinary 225 course (2025), who pointed out that breathing stores exist in the form of oxygen bars, which has also made me more aware of so many wellness and yoga studies using oxygen in their branding, even if they are not actually pumping oxygen into their workout spaces.
- 36 Canadian Broadcasting Corporation, Update: "Kelowna Declares State of Emergency after Wildfire Jumps Okanagan Lake, Prompting More Evacuations," *CBC News*, August 16, 2023, <https://www.cbc.ca/news/canada/british-columbia/what-you-need-to-know-about-bc-wildfires-aug-17-2023-1.6938796>.
- 37 Robson Fletcher, "Alberta Has Endured Some of the Worst Air Quality in the World This Week due to Wildfire Smoke: Higher Levels of Airborne Fine Particulate Matter than Some of the Most Polluted Places on Earth," *Canadian Broadcasting Corporation*,

- May 19, 2023, <https://www.cbc.ca/news/canada/calgary/alberta-air-quality-among-worst-in-the-world-wildfire-smoke-1.6848195>.
- 38 NWT is the acronym for Northwest Territories commonly used throughout Canada; Shane Thompson, “Historic 2023 Wildfire Season,” Government of Northwest Territories, minister’s speech, September 28, 2023, <https://www.gov.nt.ca/en/newsroom/shane-thompson-historic-2023-wildfire-season>.
- 39 Wilson, “Hacking the Techno-Transition,” 32.
- 40 Sheena Wilson, “New Logics for the Climate Crisis,” panel on “Research-Creation: Producing Needed Knowledges for the Climate Emergency,” *Petrocultures 2024 LA Conference*, Los Angeles, May 18, 2024.
- 41 “A carbon budget is the cumulative amount of carbon dioxide (CO₂) emissions permitted over a period of time to keep within a certain temperature threshold.” A carbon budget provides another value metric by which to make decisions. The City of Oslo and the City of Edmonton have both implemented carbon budgets, but both of these municipalities quickly realized upon implementation that a more comprehensive climate budget is needed, because climate decisions demand more than an accounting of parts per million of carbon in the air. For more information, see the Carbon Tracker’s “Carbon Budgets Explained” blog, accessed November 23, 2024, <https://carbontracker.org/carbon-budgets-explained/>.
- 42 The slogan “every decision is a climate decision” is used by City of Edmonton’s municipal government for largely internal communications, as they shift to using a carbon and climate budget. Originally part of Sheena Wilson’s research, the motto “every decision is a climate decision” was adopted starting in 2023 as part of a City-University collaboration and research initiative called *Action on Just Transition: City of Edmonton Change(s) for Climate (2024–2026)* aimed at shifting workplace culture at the City of Edmonton, so that all 12000 municipal employees are able to integrate climate thinking into their daily workplace decision-making and long-term project planning.
- 43 Stephanie LeMenager, “Petro-Melancholia: The BP Blowout and the Arts of Grief,” *Qui Parle* 19, no. 2 (Spring/Summer 2011): 25–55.
- 44 Technofixes include everything from radical, even fantastical, geoengineering solutions such as planetary-sized sun umbrellas, stratospheric aerosol injections, and carbon capture and storage, to much closer to home technosolutions such as wind- and solar-generated electricity.
- 45 Robin Wall Kimmerer, *Braiding Sweetgrass: Indigenous Wisdom, Scientific Knowledge and the Teachings of Plants*, 1st ed. (Minneapolis: Milkweed Editions, 2013).
- 46 Rolando Vázquez, *Vistas of Modernity: Decolonial Aesthetics and the End of the Contemporary* (Prinzenbeek, NL: Jap Sam Books, 2020), xvi.
- 47 Paolo Freire, *Pedagogy of Hope: Reliving Pedagogy of the Oppressed* (London: Bloomsbury Academic, 2021), 17.

PART II

AIR AND SCIENCE FICTION:
TOXICITY, SENSORIALITY,
TRANSMISSION

A Microbiological Menace: Killer Spores and Toxic Pollen in Contemporary Young Adult Fiction

Natalie Dederichs

We live in suffocating times. Surrounded by greenhouse gases and toxic particles of all kinds, we are gasping for air on a planet whose upper atmosphere is thinning as we speak. In part, the climate crisis that we are facing today arises from the questionable pleasure of industrialized nations to see air being burned: first, in the fires set to convert forests into tree plantations or to create cattle ranches; and second, in the burning of fossil fuels and the waste produced by throwaway societies. Seen from this point of view, air becomes another commodity—but as with the overexploitation of all natural resources, extracting and polluting air to fuel global capitalism comes at a great cost: the planet-wide creation of sheer uninhabitable ecosystems. By transforming the air that we breathe into air that we choke on, human activity has introduced a new form of what Sullivan calls “dirty traffic” into biogeochemical and metabolic cycles,¹ leading to an increase in the amount of human-made toxins in the air, environments, and living things.

With every breath we take, with everything we touch, with everything we digest, we are intermingling with a polluted world that is as much outside as inside us. Born into these “dirty” meshworks of relations, our bodies are made of and affected by living and non-living, organic and inorganic matter, which calls into question the very “we”—you and me—that I am addressing right now, for humanity is part of the multispecies project of Planet Earth. Existing in what I have elsewhere called the “Global Garb-Age” is to embody the material and atmospheric effects of anthropogenic-induced environmental

changes,² and so nature and culture, according to Yaeger, become one and the same thing:

the result of weird and commodity-based intermingling. We are born in a detritus-strewn world, and the nature that buffets us is never culture's opposite. Instead, it is made by a wind machine—or compacted with refuse, ozone, and mercury: the molecular crush of already mingled matter.³

Besides pollutants, today's air carries with it a number of other invisible menaces that, too, have been profoundly impacted by the human fingerprint on planetary ecosystems. Biological aerosols such as viruses, bacteria, spores, and pollen may pose a serious threat to individual health and human survival. And even though they circulate outside of our limited human perspective, they bring home the dreadful reality of how we are inseparably connected to the vegetal world through flows of tainted matter in our biosphere and atmosphere. After all, it is in airy relations that the vegetal and the human are interconnected. It is only that these airy relations appear eerie in a time in which breathing is as much life-sustaining as it is lethal, because the exchange of oxygen and carbon dioxide comes with a sharing of pathogens and pollutants. If we may be said to be haunted by any monsters at all, then it is the atmospheric ones provoked by ourselves, slowly smothering us with the foul breath of a planet at its last gasp.

As this planet seems to turn against us in a time of climate crisis, it is little wonder that stories about contagious encounters with microbiological pathogens transmitted through the air have become more prevalent in young adult (YA) fiction in recent years. The invisible dangers emanating from microscopic forms of life lack the shocking visuals associated with other monsters of invasion and outbreak narratives, such as the zombie figure. This may well be one of the reasons why microbiological plant horror has become increasingly popular with younger readers. With readings of Dale Carlson's *The Plant People* (1977), Polly Ho-Yen's *Boy in the Tower* (2014), and Kenneth Oppel's *Bloom* (2020), this chapter analyzes to what extent imaginations of a parasitic and infectious botanical world link teenage life with the life of plants through the airborne transmission of pathogens. It is through bodily, social, and political disruptions caused by the uncontrollable dispersal of microscopic cellular matter that microbiological plant horror written for an adolescent readership works through teenage fears and anxieties around growing up in an eerily contaminated present. Air as a space that contains harmful particles from the nonhuman world plays a central role in this context, as it mediates the conflicting relationship between culture and nature in the Anthropocene. It becomes the "literal contact zone" between the human body and the nonhuman world, signifying a material intermingling between the two through which the mutual interdependence between human well-being and vegetal well-being becomes apparent.⁴ Amid the current climate crisis,

it is increasingly clear that this “atmospheric re(lation)ality” poses an omnipresent and yet invisible threat to individual and planetary health.⁵ This chapter demonstrates how the plant pathogens that are shown to infiltrate human bodies in literary works of microbiological plant horror become a metaphor for anthropogenic pollution, symbolizing the toxic chemicals used to penetrate and exploit the environment. In that air carries a monstrous vegetal force capable of destroying humanity in the plots of the three works of fiction selected for this chapter, it will also be argued that air represents a site of both destruction and transformation, which allows readers to negotiate the deadly and indeed intangible consequences of human behavior. The focus of this chapter on the “material ‘traffic’” between the human body and hazardous vegetal matter in the biosphere and atmosphere will help us understand air as a materialization of the ubiquitous imbalances that human exploitation of the vegetal environment has caused for global well-being.⁶

Embedded into the context of coming-of-age stories, YA microbiological plant horror moreover serves the purpose of negotiating the physical and emotional stress that teenagers are infected with during puberty today: the horrors of growing out of family ties, into normative and oppressive systems, into a body that suddenly feels foreign, and towards an increasingly uncertain planetary future. Just like the revenge-seeking environment, the teenagers portrayed in *The Plant People*, *Boy in the Tower*, and *Bloom* are denied a sense of agency in a world polluted by adults. This chapter will examine different facets of how teenage protagonists in YA microbiological plant horror become mirrors of what pollution, genetic engineering, neglect, disregard, and abuse could possibly do to future generations of human and vegetal life alike—and will discuss how teens also become warriors in their fight for finding strategies to make their suppressed voices heard. Since the coming-of-age plots of these novels indeed revolve around neglected teenagers who struggle for their right to be heard—and seen—by adult society, another argument will be that microbiological plant horror can initiate discussions on how existing power structures are perpetually legitimized through the suppression of “voices” deemed to be of lesser value, including those of children, young adults, and the vegetal environment. The figure of the sick and vulnerable teenager is of particular interest in this respect, as it demonstrates vividly how the monstrous agency of a polluted ecosystem is omnipresent, even within the bodies of the most vital members of society in the form of the contaminated air that they breathe. In the novels discussed in this chapter, both the bodily transformation of the teenagers and the botanical environment as made possible through the spreading of dangerous particles through the air make explicit the “slow violence” of detrimental environment-related processes.⁷ Since the vegetal threats experienced by the teenage protagonists comes at first in the non-figural, imperceptible form of microbiological matter floating in the air, the novels also point at the ubiquity of the toxic condition of the world, manifesting in an air polluted with “immortal microbes, resilient viruses, and undisposable pesticides and herbicides.”⁸

I will start this analysis with a definition of YA microbiological plant horror, before going into detail on how the three novels are emblematic for this subgenre in that they all seem to draw on the outbreak narrative and depictions of contagious plant life and airborne diseases to convey a sense of environmental urgency in a time of climate crisis. As will be demonstrated in the comparative literary analysis following thereafter, they also use age-appropriate versions of the alien or botanical invasion narrative and the body horror coming with it to negotiate teenage fears regarding sex, death, and power struggles during puberty. Picking up on such fears, I will argue from an ecocritical perspective, moreover serves the function of critically commenting on the environmental consequences of nuclear waste, pesticides, pollution, and genetic engineering. Finally, I will show how microbiological plant horror stresses the dangers as well as the liberating power of collective agency, as exemplified both in the swarm agency of the plants and of the people united by the teenage protagonists in their battles against a monstrous flora.

Microbiological Plant Horror and Young Adult Fiction

Plants are critical for the fate of planetary life. If all of them were to disappear completely overnight, it would not take us long to die of CO₂ poisoning. And even if we were to somehow survive this carbon hell and the drastic increase in global temperature coming with it, we would soon have to face a deadly food crisis because of chronic droughts and the extinction of herbivores. Yet the Earth's vegetation seems to grow unnoticed in our daily environments and come to our awareness only if it bothers us—and, as a consequence, needs to be pruned, weeded, or cut down. Plant horror, the most recent installment in a series of twentieth- and twenty-first-century works of literary and filmic ecological horror or “ecohorror,” tends to these phobic fears towards the botanical world. As famously defined by Keetley, “plant horror marks humans’ dread of the ‘wildness’ of vegetal nature—its untameability, its pointless excess, its uncontrollable growth.”⁹ Similar to nature-strikes-back narratives of the ecohorror franchise, plant horror too imagines the nonhuman world to be a powerful force capable of taking revenge on humanity for its mistreatment of the planet—only nature’s menacing threat does not come in the form of extreme weather events or bloodthirsty animals, but is staged using flesh-eating plants, dangerous spores, pollen, and other botanical and microbiological monstrosities carried by the haunting “winds of the Anthropocene.”¹⁰

Turning Western conceptions of the inanimate, passive, and non-harmful nature of the natural world on its head, plant horror plays on cultural fears of not being able to keep control over a surrounding environment that is becoming increasingly unhinged because of anthropogenic climate change. For Estok, representations of a vengeful planet are an expression of a negative “response to the perceived inscrutability of the natural world”—that is, an irrational fear of nature which he has called “ecophobia.”¹¹ However, what plant horror also does is to provide a critical commentary on capitalist

consumer culture. This can be seen in the horrific ways in which the Western lifestyle is either abruptly laid to rest by the sudden presence of vegetal monsters, as in Wyndham's groundbreaking novel *The Day of the Triffids* (1951), or slowly infiltrated with microbiological and respiratory threats, as for instance in the movie *The Happening* (2008). Both of these failed fantasies of humanity's domination of nature have found their way into contemporary YA fiction, embedding teenage conflicts and concerns typical of coming-of-age plotlines into the context of a dying as well as deadly vegetation. There is, however, more than just a Gothic hue added to the already turbulent period of adolescence by YA plant horror. In that the adolescent protagonists challenge the status quo of the unjust social and political systems that they are forced to live in, such stories position teenagers' and plants' struggle for authority and autonomy alongside each other. This is why plant horror functions as a promising tool for discussing how existing power relations are always legitimized by a violent silencing of "voices" considered to be of lesser worth, including those of children, young adults, and plants.

In what I will be discussing under the name of microbiological plant horror, we find one form of literary horror that is particularly effective in uncovering the literal blindness to the agency of plants and young adults in Western thinking. The "outbreak narrative," with its focus on airborne infections, demonstrates that we are "living [in] relations even if we did not assume the same role with respect to it" and "participate in a universal exchange from which [Western] tradition cut [us] off."¹² Whereas this narrative form usually revolves around the exchange of viral diseases, it has also spawned fictional stories about how alien or mutated pollen and spores circulate in the air of a globalized world. Enjoyed by adult readers and younger audiences alike, microbiological plant horror has been taking the stage as a trope in mainstream fiction and film ever since the huge success of the movie *Invasion of the Body Snatchers* (1956).¹³ The video game *The Last of Us* (2013), M.R. Carey's novel *The Girl with All the Gifts* (2014), and Jeff VanderMeer's *The Ambergris Trilogy* (2022) have followed in its footsteps and are only a few of the most recent examples of this ever-growing subgenre. Featuring less gore but certainly not less drama, microbiological plant horror has also appeared in a handful of novels targeted at a younger readership, following trends in adult fiction after the emergence of environmental concerns and fears in the second half of the twentieth century. As is reflected in microbiological plant horror, these fears currently revolve around notions of a new hazardous materiality of air, evidenced in scientific insights about environment-related risks such as worries about air quality or rising pollen counts in urban environments.¹⁴

In Dale Carlson's *The Plant People* (1977), Polly Ho-Yen's *Boy in the Tower* (2014), and Kenneth Oppel's *Bloom* (2020), plant-based germs, killer spores, and toxic pollen penetrate, infect, and disempower human bodies, forcing the adolescent protagonists and readers to acknowledge the agency of microscopic cellular matter in the air that they breathe. *The Plant People* draws on science

fiction's popular alien or space invasion trope to work through a US-specific paranoia about the environmental consequences of nuclear waste, pesticides, and pollution.¹⁵ This illustrated novella imagines how a small and isolated village in the American southwest is haunted by a mysterious fog that gradually turns all but a few inhabitants into cacti and, finally, spreads its infectious disease across the globe. The teenage main protagonist Mike is the first to notice the microscopic cellular life that constitutes the fog. Infiltrating the bodies and minds of almost all of Mike's family, friends, and neighbors, the fog leads to a change in behavior in the working-class citizens: they wander around aimlessly and emotionlessly, lay down work, and if they talk at all, then only to the plants growing in and around the village. Soon thereafter, they take roots and morph into cacti. As Mike notices, the fog seems to have infected only those people with an unsustainable lifestyle or an indifferent or even spiteful attitude towards the natural world. Since nobody believes him and a cure is nowhere to be found, the fog can continue its global mission to take revenge on industrial nations' mistreatment of the vegetal world by slowly turning people into plants themselves.

Bloom similarly imagines how the population of a small American gulf island is suddenly infected by a harmful species of vegetal life. It presents the story of three teenage main protagonists, who uncover the deathly nature of strange black shoots rapidly overgrowing the island and mutating into flesh-eating monsters. Just as in *The Plant People*, the kids' theories about this new vegetation are ignored in *Bloom* until it is almost too late. While everyone around them develops severe allergies because of the toxic pollen emitted by the plants, Anaya, Seth, and Petra are the only ones staying healthy during this epidemic. In fact, they are even becoming stronger and healthier because of it. As it turns out, they are immune to the allergens in the pollen because they are genetically related to this new—and alien—vegetation. Oppel's adolescent protagonists embody both human and nonhuman life and use their newfound agency within this "trans-corporeal" state of being to fight against the impending global plant apocalypse just as much as against adult interests.¹⁶ In their struggle against the dangerous vegetation, the teenagers are put into conflict not only with their own bodily nature, but also with corrupt political and military systems that legitimize bioengineering, spread conspiracy theories, and provoke environmental health issues.

Set in a (post-)apocalyptic London and narrated through the eyes of the teenage boy Ade, *Boy in the Tower* is yet another young adult novel that explores the collapse of systems—both social and ecological—in the face of a dangerous and inexplicable plant invasion. A menacing species of plants called the Bluchers plagues the story's lower-income neighborhood, tearing down whole tower blocks and killing residents with airborne spores that turn out to be lethal when inhaled. Within this toxic environment, Ade is in danger of suffocating under both the contaminated air and his mother's mental health issues. His fight for survival thus becomes also a fight for attention and parental love in his crumbling world. Adding to environment-related themes

such as air pollution, environmental health hazards, environment-related phobias, and natural-cultural entanglements in the “Anthropocenic” cityscape, the novel negotiates the importance of friendships and building community resilience to “thrive in an environment characterized by change, uncertainty, unpredictability and surprise.”¹⁷

What connects these three works of YA fiction is the way they shatter conceptions of the vegetal world as a passive and inanimate background through imaginaries of plants “con-spiring” (Latin *spirare*: breathing, living) against humanity, thus demonstrating the “respiratory stress” that living things are exposed to in an era of air thickening and atmospheric thinning.¹⁸ More than acting as a response to environment-related fears and anxieties, I suggest that microbiological plant horror reminds us of the fact that we truly are what we breathe. In forcing readers to see humans as breathers that partake in a transpersonal sharing of contaminated air, microbiological plant horror asks for a critical re-evaluation of the hierarchal position of humanity in a larger biosphere. This also includes coming to terms with the unsustainability of sheer endless growth, both population and economy wise, which in microbiological plant horror is problematized through horrific imaginations of uncontrollable cellular reproduction, invasion, and airborne transmission. By showing how monstrous plants force teenagers to find ways of flourishing in dark vegetal futures, the works of YA fiction selected for the following analysis prompt readers to look at the cracks in the fragile foundations upon which Western civilization is built.

Go Green or Go to Hell: Contagious Plant Life and Vegetal States of Being

Nightmarish visions of the catastrophic consequences of human impact on the environment have been looming in the imagination of novelists at least since the biologist Rachel Carson voiced her concerns about toxic pesticides in her *Silent Spring* in 1962. Her seminal work on the lethal consequences of crop sprays like DDT on local flora and fauna diversity sparked a new environmental awareness around how air has become a contested and indeed infested matter in an era that we call the Anthropocene. *The Plant People*, *Bloom*, and *Boy in the Tower* are clearly written into a fairly recent literary tradition of narrating how toxicity, pollution, contamination, and sickness are virulent in the air of our globalized world and have been altering our human experience of and relationship with the vegetal environment. With two of the stories set in places tellingly called “Carson City” and “Salt Spring,” these YA novels testify that Carson’s worries about the dangers emanating from invisible toxic substances into the air are still topical today.¹⁹

Indeed, these three works of fiction reflect what Cynthia Deitering has called the “toxic consciousness” of a world population that is increasingly faced with different versions of ecological collapse, on local scales as much as on a global one.²⁰ They mirror intergenerational concerns over the pollution

of natural environments and negotiate them alongside teenage-specific fears of having to grow up in a crisis-ridden present and into increasingly uncertain and undesirable vegetal futures. Similar to the all-American town pictured in the preface to Carson's *Silent Spring*, the communities in *The Plant People*, *Bloom*, and *Boy in the Tower* are haunted by lethal airborne particles, only the "evil spell" in each of these works is not cast by human-made insecticides, but plant-based pathogens.²¹ In *The Plant People*, Mike and his friends are faced with tiny organisms inside a mysterious fog that turns people into cacti, whereas Anaya, Seth and Petra in *Bloom* as well as Ade in *The Boy in the Tower* are experiencing the creeping horrors of toxic pollen and "killer spores" released into the air by new invasive species of plants.²² People start developing severe "lung infections, or life-threatening asthma attacks," lose "control of their bodies" and minds, and drop dead on the streets just by "breathing in a lungful of the outside air."²³ Even though these physical symptoms are described in vivid detail, the source of fear and horror experienced by the sick populations in all of the three novels remains unclear at first. This is of course due to the relative invisibility of the microscopic pathogens causing the "Cactus disease" in *The Plant People*, the "Blucher Disaster" in *Boy in the Tower*, and the allergic reactions to the globally spreading "black grass" in *Bloom*.²⁴ As a consequence, the airborne vegetal threat is described only vaguely as "dust or *something*" and "something in the air, something menacing out there that said, *No one is safe*."²⁵

This use of indefinite pronouns demonstrates the human inability to "see" and understand both global environmental threats and local vegetal life. Indeed, and as Marder has pointed out, "plants are wholly other and foreign to us."²⁶ To date, science has not yet agreed upon whether or not plants possess a form of consciousness which would enable them to experience pain, communicate with each other or show anticipatory behavior. In some respects, plant life remains a mystery. This understanding of the vegetal kingdom as *the* great unknown brings to mind a sense of plant horror that Keetley describes as plants' "unique ability to strike us blind." By this, Keetley does not necessarily mean that plants can make us physically blind, although the Wyndhamian plant monsters appearing in the course of the stories of *Bloom* and *Boy in the Tower* are certainly capable of doing so. Rather, Keetley alludes to the fact that plants truly exist outside of Western visibility as they teeter in the background, being to most people merely part of the landscapes, infrastructures, and architectures in which they go about their daily business. In other words, plants and their agency "lurk in our blindspot" precisely because they do not interfere with our daily lives.²⁷ The inability of the teenage first-person narrator of *Boy in the Tower* to neatly describe not only the omnipresent lethal spores surrounding him but also the very visible plants that release them is another testimony to the fact that plants exist in between the "categories of visible and invisible, present and absent" in Western culture.²⁸ When Ade encounters the "Bluchers" which are overgrowing the buildings in his neighborhood for the first time, his description is confusing and

incomplete, leaving not only one but many images of these dangerous plants in the mind of the reader:

I must be surrounded by the spores that are floating and swirling all around me but I can't see them at all. It just looks like empty air to me. Then I come to the Bluchers. . . . Close up, they look beautiful. And weird as well. As if they are filled with some kind of liquid that is always moving. . . . You can see the inside of them because they have a sort of clear skin which reminds me of when you see a little puddle of petrol on the road and it has swirls of colours in it. . . . Pink and green and yellow. Except it doesn't look like any of those things, not really. It's like nothing else I've seen before. Not like a plant, not like a tree.²⁹

The Bluchers truly rob Ade of his words and voice—and that is exactly what the adults do to the young people in these novels, too. As soon as Mike and Anaya share their worrying observations regarding the intentionality of the fog in *The Plant People* and the “intelligence” of the black grass in *Bloom*,³⁰ they are not taken seriously by the people in charge of their communities. In *The Plant People*, the town's mayor, sheriff, doctor, and Mike's father “act like nothing happened” and even the local police dismiss Mike's cry for help as a form of “hysteria,” thus putting him in his place in the social hierarchy ruled by white male adults.³¹ By contrast, Ade's discovery of the dangerous Bluchers in *Boy in the Tower* is quickly confirmed by the TV news. However, he also has to experience his limited teenage agency when he is forced to follow orders by the overprotective neighbors who take him into custody after the first buildings start to collapse as a consequence of the Blucher Disaster. Ade feels “left out” of their decisions and even “crossed” when he discovers that “they had a radio all along,” which is the only connection left to the outside world in this Blucher-overgrown reality.³²

In this way, the teenagers' agency is considered of lower worth compared to that of adults, and so they become positioned alongside a variety of silenced Others, including plants, in the hierarchy of life created and legitimized by Western philosophy.³³ As Flanagan notes,

adolescent subjects as liminal in relation to adults and adult culture functions as an apt analogy for the way in which animals, machines, and the natural world have similarly been positioned as inferior to adult, human subjects within humanist ideological paradigms.³⁴

Just like plants, the teenage protagonists are considered voiceless. And just like the monstrous flora featured in these novels, they have to fight for their right to be heard—and seen—again by adult society. As a consequence, they conspire with other teenagers as well as adults they consider trustworthy. What is interesting to note here is that the teenagers' need for action is not only driven by selfishness, but even more so by their care for the environments

and communities they are placed in, as well as by their worries for the vegetal futures that lie ahead.

The closeness of the teenagers to the vegetal world is expressed in the names given to characters like “Gaia,” meaning “earth,” and is also reflected in their values and behavior. Mike, who desperately wants to become an ethnologist and has “spent his life studying plants and animals,”³⁵ and Anaya, whose father is a botanist, share a certain attentiveness to the natural environment, as does Gaia, who is very passionate about cultivating houseplants. In *The Plant People*, Mike’s love for nature is even rewarded: together with a handful of other environmentally aware and sustainably living inhabitants of his town, he is spared from being turned into a cactus because he is one of the few people whom he calls “preservers” of the earth.³⁶

By equating vegetal life either with a vegetative state of passiveness and lifelessness or with an invasive species as monstrous beings that need to be destroyed, *The Plant People*, *Bloom*, and *Boy in the Tower* of course undermine their environmental message. Nevertheless, the contaminated and contagious plant life depicted in these works of fiction functions as a metaphor for human infiltration and pollution of the earthly flora. Thus, they provide a critical cultural commentary on how the unsustainability of the Western lifestyle puts at risk the creation of livable futures for our youth, as well as future generations of human and more-than-human beings to come.

Botanical Invasion and Teenage Body Horror

This unsustainability of the Western lifestyle shows itself in the many ways that ecosystems are ruptured and damaged for economic growth and welfare: deforestation, pollution, intensive farming, and overconsumption, to mention but a few. In *The Plant People*, the rural desert idyll, too, is being degraded by unsustainable human choices. Mike’s mother regularly enjoys “speeding across the desert in her car,” his brother Jimmy takes pleasure in abusing animals with a “slingshot,” and the only growth his father, a banker, is interested in is that of capital and economic welfare.³⁷ As soon as the fog has settled over the town, this way of life is punished. The town’s polluters are invaded and infested with the strange botanical matter that constitutes the fog and start to “go green” quite literally: “The Sheriff was talking to his tomatoes” and all of a sudden people “stopped at the sight of growing things,” Mike recalls, shortly before most of the people around him develop “veined” skin “like the leaf of [a] lettuce” and take roots in the desert ground.³⁸ It becomes clear that the fog is on an ecological mission to protect the Earth by wiping out people with an unsustainable way of treating the physical world, thus subverting neoliberal settler colonial power and capitalism. Far more than a cloudy materialization of lifeless particles, the fog possesses a powerful nonhuman agency that eludes human control over the air, leading to an awareness of a “new atmospheric vulnerability” that has defined cultural engagements with the air since the twentieth century.³⁹

In *Bloom*, we are presented with a small island town that is described as already being “*earthy*,” but which is invaded by monstrous plants anyway.⁴⁰ While all the other islanders suddenly get sick or die, Anaya, Petra, and Seth realize that they seem to be immune to the poisonous spores of the black grass growing everywhere. What is more, the exposure to the contagious vegetation improves their health drastically and even heals their chronic allergies to environmental triggers of all sorts, including pollen and water. As it turns out later in the story, the three teenagers are immune to the “cryptogenic plants” because they are of an alien origin themselves. “[H]umans and plants share a lot of the same DNA,” the local doctor explains to them.⁴¹ On the one hand, and since the novel keeps it relatively ambiguous how exactly the alien plant DNA got implanted in the teenagers’ primordial genetic makeup, the hybrid teenage bodies visualize the dystopian consequences of human manipulation and modification of nature. On the other hand, their “trans-corporeal” bodily materiality debunks the belief that humans can be clearly separated from nature as a myth of Western philosophy.⁴² The “material dissolutions of the body–environment boundary through sickness” caused by plant-based pathogens and allergens, as portrayed in all of the three novels, emphasizes what I have elsewhere called our “embodied permeability” as relational beings that affect as much as they are affected by atmospheric matters.⁴³

The adolescent identity epitomizes this conceptional and bodily fluidity perhaps most strikingly. No longer a child and not yet an adult, the teenager is placed in a liminal space, thus experiencing dissolutions of social, emotional, and bodily boundaries. According to Punter, adolescence is an uncanny state of existence “where what is inside finds itself outside (acne, menstrual blood, rage) and what we think should be visibly outside (heroic dreams, attractiveness, sexual organs) remains absolutely inside and hidden.”⁴⁴ Coming-of-age narratives typically mirror young protagonists’ moral, individual, and bodily growth. *The Plant People* and *Bloom* are no exception to this rule, since both stories revolve around identity formation and the loss of innocence in a time of vegetal havoc. Using botanical metaphors, Anaya, who is bothered by her “sturdier body type” and “acne,” desperately wishes that “one day, she’d *bloom*. She imagined a dull flower suddenly opening its petals, and they were dazzling.”⁴⁵ This sexual awakening also plays a role in *The Plant People*, when Mike discovers his romantic feelings for his friend Jenny, pondering in the middle of the town’s botanical invasion whether she has “always been a girl? Or did I just notice.”⁴⁶

Whereas the plant invasion narrative in these three novels signals the return of the oppressed “Other” of Western culture by imagining how nature reclaims colonial, urbanized, and ruptured spaces, it also gives rise to the return of our suppressed knowledge of our own nonhuman nature. After all, the teenage protagonists discover their “untamed” side by either transforming into nonhuman beings, discovering their sexual desires, or following their instincts in battles for survival against the monstrous vegetation. Nature’s revenge in these novels, even if it is indeed an alien one, thus has two

functions: firstly, it can be seen as a punishment for people's disrespect for the world around them; and secondly, as a lesson to never forget that human beings are the "nature" that they so desperately try to keep at bay.

In that the novels foreground human beings' embeddedness in a respiratory cycle, they refocus the elemental union of "[a]ir ... with the body through breath,"⁴⁷ thus decentering human uniqueness and superiority in the anthropocentric hierarchy of planetary life. The "biblical imperative to control everything that lives" and, in doing so, artificially positing human beings as "better" and "other" than nature is an expression of what Estok defines as an ecophobic "hatred of the natural world."⁴⁸ This aggression towards the vegetal environment becomes expressed in these novels, too, in the many action-driven fight scenes against the invading killer plants, pollen, and spores.

What the teenage protagonists experience in their horrific encounters with the contagious plant life is the horror of estrangement, not only from themselves and their bodies, but also from peers, family members, and the changing environment. Home is no longer where the teenagers can feel safe and sheltered, but, in a Freudian twist, becomes a place of exposure to "physical or psychological dissolution, explicitly shattering the assumed norms (including the repressions) of everyday life with wildly shocking, and even revolting, consequences."⁴⁹ Transforming into a cactus or being killed by spores, pollen, or carnivorous plants within the domestic setting is the preferable way to go, since the realities of the teenagers are haunted by an even greater threat: the collective annihilation of humanity through (biological) warfare and the deathly consequences of anthropogenic climate change, including epidemics, pandemics, and temperatures too hot to handle for the human organism. All of these rather abstract dangers materialize in anxieties about the loss of "innocence" or safety of air,⁵⁰ for even something as mundane and repetitive as breathing turns out to be lethal in a contaminated present. The novels respond to these anxieties, as we are presented with glimpses of a planet in peril: scientists desperately searching for solutions and cures, overcrowded hospitals, a shrinking world economy, crop failure and food shortage, closed schools, and unusual weather patterns and rising temperatures.

Seen from this point of view, the teenage protagonists' "domestic scene is predicated on loss"—that is, loss of security, childish innocence, and future perspectives.⁵¹ The microbiological menaces that they have to face, indeed, become a source of body horror as well as of psychological terror.

Pollen, Pollution, and Parental Abandonment

The plant invasions that, in the novels, rewild developed areas with their violent overgrowth of buildings and streets lead to emotional stress in the teenage protagonists. The familiar domestic spaces become the hunting *and* haunting grounds for predatory plants and airborne microorganisms, rendering the once-familiar world as strange, perplexing, and dangerous. As a consequence, the teenagers feel disconnected from their support environment—i.e.,

their family home and their hometown. There is no solace to be found in Carlson's rural valley or Oppel's island idyll after the alien vegetation has started to transform and destruct the environment, and even the solid fortresses of Ho-Yen's urban tower blocks do not provide a sense of safety any more. The teenagers are highly aware of this and notice, as Ade does, how far "[b]ricks and walls and doors didn't protect you any longer."⁵² The place-based distress that becomes expressed here can be read in terms of "solastalgia," a feeling of pain that according to Albrecht is experienced "when there is recognition that the place where one resides and that one loves is under immediate assault (physical desolation). ... In short, solastalgia is a form of homesickness one gets when one is still at 'home.'"⁵³ As a consequence, the teenagers develop a profound sense of loneliness that is amplified by the unusual silence that has overcome their hometowns. As the plants and their microbiological pathogens have brought modern life to a standstill, both Ade and Mike identify that "[e]verything was still" and "[q]uieter than it should have been."⁵⁴

More than assaulting their psychic identity and well-being, however, the microbiological disasters lead to an erosion of the teenagers' sense of belonging to a community. Mike feels like an alien himself as soon as most of his town's inhabitants start behaving against their human nature by aimlessly shuffling along the deserted streets with "their eyes ... wide and open—and staring."⁵⁵ He cannot identify with the "sleepwalkers" surrounding him any longer and, not unlike Anaya, Petra, and Seth of Oppel's *Bloom*, feels estranged and excluded from his family and peers because of his sudden deviance.⁵⁶ In *Boy in the Tower*, Ade similarly has to get used to his existence as an outcast in an apocalyptic present. Living together with a traumatized mother who suffers from agoraphobia and thus cannot leave the house, he experiences isolation not only because of the Blucher Disaster, but even more so because of the lack of emotional responsiveness from his caretaker. While the Bluchers and their toxic spores are the obvious and material monsters that cut him off from the rest of the world, another insidious monster in the novel is his mother's mental illness and the way it keeps her locked inside, both physically and psychologically.

Ade is deeply neglected by his mother, who, as he recalls, "was there but she hadn't been talking to me a lot recently."⁵⁷ Unable to get out of bed because of her worsening depression, she resembles Carlson's zombie-like plant people in that she, too, stops eating and talking, is absent-minded, and does not do chores or go to work. Ade is the one parenting his mother, continually exposing himself to the threats of the disastrous world outside their apartment to search for water and food. In a similar vein, the teen main protagonists in *Bloom* and *The Plant People* are burdened with the challenging task of saving not only their families and local communities, but also the future of humankind by finding solutions for the vegetal and microbiological disasters happening all around them. In their position as involuntary youth activists leading the way on saving the world, they exemplify the very specific

role that is assigned to children and adolescents in the Anthropocene, which, according to Ashton, is marked by a “transition from protected to protector.”⁵⁸ Indeed, contemporary works of young adult fiction that envision environment-related disasters and dystopian future scenarios draw on this changing image of children and young adults, as they tend to explore the psychological and moral growth of a protagonist from helpless victim of environmental catastrophes and parental abandonment to agentic and independent citizen.

However, empowerment comes with a monumental responsibility in these novels, pressuring the teenagers to take on a heroic role that they cannot possibly fulfill on their own. A demand upon youth to fix the mess that older generations have left behind is a dominant narrative in many works of contemporary climate (non-)fiction with telling titles such as *Old Enough to Save the Planet* or *You Can Save the Planet: 101 Ways You Can Make a Difference*.⁵⁹ Such a reliance on the “power” of individual agency is problematic, as it directs attention away from the necessity of collective action, systemic transformations, and shifting narratives in the context of dealing with environmental change. In *The Plant People* and *Bloom*, this is ultimately the reason why the protagonists’ individual attempts at fighting the flora are shown to be noble at best and in vain at worst: both texts’ open endings leave it ambiguous to readers whether or not the toxic vegetal matters will eventually spread around the globe. Even though *Boy in the Tower* offers a more optimistic outlook by showing how the Bluchers are destroyed by the use of salt, it also suggests that only community engagement and intergenerational and interspecies solidarity will build the resilience needed to deal with environment-related crises in the long run.

The swarm agency of communities plays a central role in the context of *The Plant People*, *Bloom*, and *Boy in the Tower* because the contagion storied in these works suggests, to put it in Wald’s words, “the power and the pathology of crowds.”⁶⁰ While the collective intelligence of the microbiological matter tears apart families, isolates neighborhoods from each other, and feeds into mass panic and conspiracy theories that, in turn, result in deep societal divides, it also forces people to move closer together in their quest to survive. In *Boy in the Tower*, Ade finds new forms of companionship with his elderly neighbors as well as with a stray cat; in *The Plant People*, rivaling countries put aside their political conflicts and focus on finding a cure for the cactus disease together; and in *Bloom*, the teenage protagonists let go of their quarrels and make friends with each other to team up against the monstrous vegetal forces in the air and on the ground. This demonstrates once again how people exist in mutual relations with each other and their immediate surroundings, and that they are shaped individually and collectively by shifting patterns in the air that they breathe together on a planet that is undergoing rapid change.⁶¹

Even if the novels discussed here offer a rather dystopian outlook on our planetary future, their endings suggest that the collective agency the teenagers have developed through collaborating with other teens and adults finally has made their voices heard by corrupt politicians and adult oppressors. This becomes particularly evident in *The Plant People* and *Bloom*, as their open

endings leave it to readers whether or not the alliances formed by people because of the teenagers' radical action against the plant invasions will ultimately impact change. The imagined agency of the teenagers in these novels lies in their affective power to *inspire* people to *conspire* with each other. In this way, the young protagonists overtake a similar function as the monstrous vegetation: both force adults to help and listen to each other and to face their failures and ignorance, which is why the depicted plant life indeed functions as "an engine of speculation that helps us to negotiate our relationship to a late modernity that always seems on the verge of ending."⁶² In this respect, the microbiological contamination can be seen as a collaborative encounter, which according to Tsing "change[s] who we are as we make way for others. As contamination changes world-making projects, mutual worlds—and new directions—may emerge."⁶³ The teenagers' legacy in *The Plant People*, *Bloom*, and *Boy in the Tower* is that of cultivating such relationships of care against all odds, thus infecting readers with the idea that "this is what people do for each other."⁶⁴

Conclusion: Growing up in Suffocating Times

The botanical invasion imagined in the three contemporary works of microbiological plant horror discussed here demonstrate not only that each era creates their own monsters, but also that each generation projects differing fears on one and the same monster. While all of the novels draw on a strong sense of environmental emergency, they use microbiological plant horror to illustrate very specific cultural, historical, and generational anxieties. In *The Plant People*, the fog personifies the nuclear anxieties of the Cold War era as much as xenophobic fears of communist "infiltration" of US society. In *Bloom*, the black grass leads to conspiracy theories among the islanders about governmental control, bioterrorism, and the biblical apocalypse, thus functioning as a metaphor for the spreading of both viral diseases and viral fake news in a globally connected world. In *Boy in the Tower*, the Bluchers demonstrate the fragility of Western webs of communication as well as of the "permanent impermanence of any community,"⁶⁵ and allude to fears associated with isolation, abandonment, and homelessness.

The coming-of-age narrative adds another layer to the horrors expressed through microbiological menaces transmitted through toxic air, as it allows a reading of these works with regard to depictions of teenage-specific anxieties in an era of climate change. This is why the fog in *The Plant People* demonstrates to Mike his limited rights and agency in the context of adult policy and decision-making, whereas the spores of the black grass in *Bloom* as well as the pollen of the Bluchers in *Boy in the Tower* confront the teenage protagonists with their own vulnerability—and vegetality—as human *and* decaying bodies. Together, these stories give voice to teenage fears of not being protected from unsustainable futures at best, and of having to live in a futureless present at worst.

Horrific imaginations of how human beings lose control in the face of imminent yet imperceptible and highly complex environmental threats and

changes can be seen, however, as more than just expressions of unconscious fears and anxieties. Since microbiological plant horror brings to mind that “plants—not humans—hold the balance of power over the future of the earth,”⁶⁶ the genre becomes an allegory of how our day-to-day existence already feels in the ongoing sixth mass extinction. As the novels discussed in this chapter make clear, fighting against an invisible enemy is impossible, and technoscientific solutions will only bring humanity so far in regaining control over a natural world that seems to run havoc because of human action. In fact, these works of young adult fiction encourage readers to rethink this prevailing Western narrative of “us” against “them”—that is, humans versus nature, nation versus nation, generation versus generation, teenagers versus adults. Instead of conspiring against, the novels hint at the idea that human beings might want to reconsider conspiring *with* each other, including plant life, to avoid destructing the planet any further.

If plants embody “the mortality intrinsic to all natural beings, to our own nature,”⁶⁷ then the microbiological plant horror employed in these novels undoubtedly demonstrates the transience of Western lifestyle. Consequently, the suffocation experienced by the teenage protagonists is twofold: they choke on the microbiologically contaminated air just as much as they suffer from a feeling of *Weltschmerz* caused by external environmental, social, and societal conditions and bleak future scenarios. If one wants them to be able to breathe again, these novels remind readers, humanity needs to find ways of breathing together, of finding “embodied ways of ‘conspiring’ with other forms of life” and other human beings.⁶⁸ This includes identifying monstrous growth for what it is: a nonlinear “movement that entangles the lines of life in an ever more intimate meshwork.”⁶⁹ So let microbiological plant horror grow on us the idea that we are interconnected with each other and the world through airy and indeed eerie relations, for better or for worse.

Notes

- 1 Heather I. Sullivan, “Dirty Traffic and the Dark Pastoral in the Anthropocene: Narrating Refugees, Deforestation, Radiation, and Melting Ice,” *Literatur für Leser* 37, no. 2 (2014): 83.
- 2 Natalie Dederichs, *Atmosfears: The Uncanny Climate of Contemporary Ecofiction* (Bielefeld: Transcript, 2023), 112.
- 3 Patricia Yaeger, “Editor’s Column: The Death of Nature and the Apotheosis of Trash; or, Rubbish Ecology,” *Publications of the Modern Language Association* 123, no. 2 (2008): 323.
- 4 Stacy Alaimo, *Bodily Natures: Science, Environment, and the Material Self* (Bloomington: Indiana University Press, 2010), 2.
- 5 Dederichs, *Atmosfears*, 106.
- 6 Serpil Oppermann, “Toxic Bodies and Alien Agencies: Ecocritical Perspectives on Ecological Others,” in *The Postcolonial World*, ed. Jyotsna G. Singh and David D. Kim (London: Routledge, 2011), 412.

- 7 Rob Nixon, *Slow Violence and the Environmentalism of the Poor* (Cambridge: Harvard University Press, 2011).
- 8 Oppermann, "Toxic Bodies," 415.
- 9 Dawn Keetley, "Introduction: Six Theses on Plant Horror; or, Why are Plants Horrifying?" in *Plant Horror: Approaches to the Monstrous Vegetal in Fiction and Film*, ed. Dawn Keetley and Angela Tenga (London: Palgrave Macmillan, 2016), 1.
- 10 Elaine Gan, Anna Lowenhaupt Tsing, Heather Swanson, and Nils Bubandt, "Introduction: Haunted Landscapes of the Anthropocene," in *Arts of Living on a Damaged Planet*, ed. Elaine Gan, Anna Lowenhaupt Tsing, Heather Swanson, and Nils Bubandt (Minneapolis: University of Minnesota Press, 2017), 1.
- 11 Simon C. Estok, "Theorising the EcoGothic," *Gothic Nature* 1 (2019): 42.
- 12 Cf. Priscilla Wald, *Contagious: Culture, Carriers, and the Outbreak Narrative* (Durham, NC: Duke University Press, 2008); Lucy Irigaray and Michael Marder, *Through Vegetal Being* (New York: Columbia University Press, 2017), 22.
- 13 Focusing on microbes, Davina Höll shows that uncanny literary imaginations of microbiological life date back to scientific discoveries in the nineteenth century, paving the way for what she refers to as the "microgothic." Since this chapter focuses on plant- and fungi-based cellular life such as pollen and spores rather than on microbes, I chose the term microbiological plant horror for this analysis. See Davina Höll, "Microgothic: Microbial Aesthetics of Haunted Nature," in *Haunted Nature: Entanglements of the Human and the Nonhuman*, ed. Sladjja Blazan (London: Palgrave Macmillan, 2021).
- 14 Cf. European Commission, *The Fourth Clean Air Outlook* (Brussels: Publications Office of the European Union, 2025), 1; cf. Joela Jacobs, "Pollen," in *Microbium: The Neglected Lives of Micro-Matter*, ed. Joela Jacobs and Agnes Malinowska (n.p.: Punctum Books, 2023), 101.
- 15 Cf. Cynthia Deitering, "The Postnatural Novel: Toxic Consciousness in Fiction of the 1980s," in *The Ecocriticism Reader: Landmarks in Literary Ecology*, ed. Cheryll Glotfelty and Harold Fromm (Athens: University of Georgia Press, 1996), 196.
- 16 Alaimo, *Bodily Natures*, 2.
- 17 Kristen Magis, "Community Resilience: An Indicator of Social Sustainability," *Society and Natural Resources* 23, no. 5 (2010): 402.
- 18 Timothy Choy, "A Commentary: Breathing Together Now," *Engaging Science, Technology, and Society* 6 (2020): 586.
- 19 Dale Carlson, *The Plant People* (New York: Laurel Leaf Books, 1977), 25; Kenneth Opper, *Bloom* (New York: Yearling, 2020), 58.
- 20 Deitering, "The Postnatural Novel," 196.
- 21 Rachel Carson, *Silent Spring and Other Writings*, ed. Sandra Steingraber (New York: The Library of America, 2018 [1962]), 10.
- 22 Polly Ho-Yen, *Boy in the Tower* (London: Corgi, 2014), 116.
- 23 Opper, *Bloom*, 89, 67; Ho-Yen, *Boy in the Tower*, 202.
- 24 Carlson, *The Plant People*, 80; Ho-Yen, *Boy in the Tower*, 108; Opper, *Bloom*, 42.
- 25 Opper, *Bloom*, 68; Ho-Yen, *Boy in the Tower*, 86.
- 26 Michael Marder, *Plant-Thinking: A Philosophy of Vegetal Life* (New York: Columbia University Press, 2013), 3.
- 27 Keetley, "Six Theses," 10.
- 28 Keetley, "Six Theses," 12.

- 29 Ho-Yen, *Boy in the Tower*, 232–33.
- 30 Oppel, *Bloom*, 68.
- 31 Carlson, *The Plant People*, 25, 46.
- 32 Ho-Yen, *Boy in the Tower*, 302, 301.
- 33 Cf. Matthew Hall, *Plants as Persons: A Philosophical Botany* (New York: State University of New York Press, 2011), 7.
- 34 Victoria Flanagan, “Posthumanism: Rethinking ‘The Human’ in Modern Children’s Literature,” in *The Edinburgh Companion to Children’s Literature*, ed. Clémentine Beauvais and Maria Nikolajeva (Edinburgh: Edinburgh University Press, 2017), 39.
- 35 Carlson, *The Plant People*, 66.
- 36 Carlson, *The Plant People*, 67.
- 37 Carlson, *The Plant People*, 9, 73.
- 38 Carlson, *The Plant People*, 39, 61, 55.
- 39 Siobhan Carroll, “Speculative Fiction, Atmotechnic Ecology, and the Afterlife of Romantic Air,” in *Imagining Air: Cultural Axiology and the Politics of Invisibility*, ed. Tatiana Konrad (Exeter: University of Exeter Press, 2023), 99.
- 40 Oppel, *Bloom*, 58.
- 41 Oppel, *Bloom*, 195.
- 42 Alaimo, *Bodily Natures*, 63.
- 43 Heather Houser, *Ecosickness in Contemporary U.S. Fiction: Environment and Affect* (New York: Columbia University Press, 2014), 3; Dederichs, *Atmosfears*, 118.
- 44 David Punter, *Gothic Pathologies: The Text, the Body and the Law* (London: Macmillan, 1998), 6.
- 45 Oppel, *Bloom*, 7, 9.
- 46 Carlson, *The Plant People*, 87.
- 47 Tatiana Konrad, Chantelle Mitchell, and Savannah Schaufler, “Introduction: Toward a Cultural Axiology of Air,” in *Imagining Air: Cultural Axiology and the Politics of Invisibility*, ed. Tatiana Konrad (Exeter: University of Exeter Press, 2023), 2.
- 48 Simon C. Estok, “Theorizing in a Space of Ambivalent Openness: Ecocriticism and Ecophobia,” *Interdisciplinary Studies in Literature and Environment* 16, no. 2 (2009): 208.
- 49 Jerrold E. Hogle, *Cambridge Companion to Gothic Fiction* (Cambridge: Cambridge University Press, 2002), 3.
- 50 Peter Sloterdijk, *Terror from the Air*, trans. Amy Patton and Steve Corcoran (Los Angeles and Cambridge, MA: Semiotext(e); distributed by the MIT Press, 2009), 109.
- 51 Steven Bruhm, “The Contemporary Gothic: Why We Need It,” in *The Cambridge Companion to Gothic Fiction*, ed. Jerrold E. Hogle (Cambridge: Cambridge University Press, 2002), 264.
- 52 Ho-Yen, *Boy in the Tower*, 96.
- 53 Glenn Albrecht, “Solastalgia: A New Concept in Health and Identity,” *Philosophy, Activism, Nature* 3 (2005): 48.
- 54 Ho-Yen, *Boy in the Tower*, 131; Carlson, *The Plant People*, 33.
- 55 Carlson, *The Plant People*, 50.
- 56 Carlson, *The Plant People*, 63.
- 57 Ho-Yen, *Boy in the Tower*, 131.
- 58 Emily Ashton, *Anthropocene Childhods: Speculative Fiction, Racialization, and Climate Crisis* (London and New York: Bloomsbury, 2023), 4.

- 59 Loll Kirby and Adelina Lirius, *Old Enough to Save the Planet* (New York: Magic Cat Publishing, 2021); J.A. Wines, *You Can Save the Planet: 101 Ways You Can Make a Difference* (London: Buster Books, 2007).
- 60 Wald, *Contagious*, 132.
- 61 Cf. David Abram, *The Spell of the Sensuous: Perception and Language in a More-Than-Human World* (New York: Vintage Books, 1996), 267.
- 62 Natania Meeker and Antónia Szabari, *Radical Botany: Plants and Speculative Fiction* (New York: Fordham University Press, 2020), 27.
- 63 Anna Lowenhaupt Tsing, *The Mushroom at the End of the World: On the Possibility of Life in Capitalist Ruins* (Princeton, NJ and Oxford: Princeton University Press, 2015), 27.
- 64 Ho-Yen, *Boy in the Tower*, 302.
- 65 Wald, *Contagious*, 152.
- 66 Lydia Kokkola, "Critical Plant Studies and Children's Literature," in *Edinburgh Companion to Children's Literature*, ed. Clementine Beauvais and Maria Nikolajeva (Edinburgh: Edinburgh University Press, 2017), 279.
- 67 Keetley, "Six Theses," 1.
- 68 Raffaele Rufo, "Somatic Arts and Liveable Futures: (Re-)Embodying Ecological Connections," lecture, *(Re-)gaining Ecological Futures—Ecosomatics*, Floating University Berlin, June 23, 2022, 1. <https://doi.org/10.5281/zenodo.7629756>
- 69 Chloé Germaine, *The Dark Matter of Children's "Fantatsika" Literature: Speculative Entanglements* (London: Bloomsbury, 2023), 189.

Estranging Air in Ted Chiang’s “Exhalation”

Brent Ryan Bellamy

The locution “I breathe,” [M. NourbeSe] Philip notes, would not be possible without the prepositional act of “breathing for.” Respiratory autopoiesis—the self-maintenance and self-renewal of organisms—necessitates a hospitable milieu. To breathe-for is to generate such a milieu. It is to create the conditions not only for other people’s survival but also for their flourishing. When others breathe for us, holding our breath with anticipation and running out of breath with exhaustion feel tolerable.

Jean-Thomas Tremblay, “Acknowledgments”¹

Who are we breathing for? Critical theorist Jean-Thomas Tremblay raises this question by drawing on the work of writer M. NourbeSe Philip. Breath is a collective endeavor, not just of human animals, but of all plants and animals.² This way of imagining our breath, human breath, moves beyond the liberal fantasy of individual life. Even the powerful technique of using breath to mindfully center oneself can be reframed; connecting with one’s body also means connecting with countless unknowable others whose air moves through us as well. Tremblay uses this framing to shape the acknowledgments of *Breathing Aesthetics* (2022), a book that considers the cultural mediations of breath alongside its transcorporeal existence. Among the insights of Tremblay’s approach is a useful distinction for our purposes here in reading science fiction (sf) to estrange air: breathing can be understood as experience or as a symbolic act. Tremblay’s work mediates these inextricable ways of understanding breath. This chapter takes up the idea of an “aesthetics of breathing” to read sf author Ted Chiang’s work for breath (and, thus, for air) so that readers might come to a new understanding of breath and air in the real world.³

Before I explain the structure and argument of the chapter, please allow me to introduce Ted Chiang's work and his atypical approach to writing. Chiang has been writing since high school and has published work since the mid-1990s. In 1989, he attended the Clarion Workshop, which is considered "a premier proving and training ground for aspiring writers of science fiction, fantasy, and horror."⁴ Chiang's work has won four Nebula Awards, four Hugo Awards, the John W. Campbell Award for Best New Writer, and six Locus Awards. As I composed this piece, Chiang won the 2024 PEN/Bernard and Ann Malamud Award for Excellence in the Short Story. To say that he is a celebrated writer is an understatement. All of these accolades for just two short story collections: 1998's *Stories of Your Life and Others* and 2019's *Exhalation: Stories*. Many stories from each collection were published earlier in various magazines and journals. Sf critic Gerry Canavan has only one complaint about Chiang: "that it takes so long for him to craft his nearly perfect short fiction, publishing only 15 stories since 1990."⁵ In an interview with Joshua Rothman, Chiang explains that his "primary goal has to do with engaging in philosophical questions and thought experiments, trying to work out the consequences of certain ideas."⁶ Chiang has explained that before writing a story he waits to have an idea first, rather than forcing a story to arrive. To prepare for writing "Story of Your Life" (1998), Chiang apparently spent a few years reading in the field of neurolinguistics.⁷

I begin my reading of estrangement with "Story of Your Life" and Denis Villeneuve's adaptation *Arrival* (2016). The aim in discussing these texts first is to develop shared understandings of sf, estrangement, and Chiang's work. From there, I shift focus from sf alone to air as a matter of concern for representation. I focus on "Exhalation" (2008) to meditate on the cultural work sf does to represent air, and, as the title suggests, to estrange commonplace understandings of air.

Before beginning, I wish to address a common reading of "Exhalation."⁸ It might seem logical to connect it to the carbon-dense air currently blanketing the Earth. I'm unsure if this link is an act of interpretation or one of criticism, meaning I'm unsure if this reading is one that the story develops or one that a reader brings to the story from the real world. Chiang's story presents a closed world with an entropic problem for its residents. The story estranges air by degrees: Argon? A transcorporeal inhalation? A chromium barrier? Self-dissection? And so on. The narrator discovers that consciousness is finite in this world—each exhale draws the system closer toward equilibrium—and the story tracks what residents do with this knowledge, though there seems to be no ultimate solution in the opinion of the author-narrator. Before we jump to any analogy with climate crisis or even just the rising parts per million of carbon dioxide in Earth's atmosphere, the ties to our Earth-bound issues with air must first be further mediated. Chiang's work does not provide a direct commentary on Earth's late fossil capital climate; instead it offers a method for how to think air differently, how to estrange a real-world atmospheric, individuated bias.

“Story of Your Life”

First published in *Starlight 2* in 1998, “Story of Your Life” won the 2000 Nebula Award for Best Novella, as well as the 1999 Theodore Sturgeon Award. Linguist Dr. Louise Banks narrates the story on the day she conceives her daughter. Though the story is addressed to her daughter, Banks remembers past events and recounts future ones: aliens visited Earth and she learns their language; her daughter’s birth and untimely death. To oversimplify, the encounter with the alien language “Heptapod B” bootstraps Dr. Banks into an experience of time as simultaneous, rather than linear. She can exist across time rather than in a precise moment. Literary critic Jo Alyson Parker describes “Story of Your Life” as “Chiang’s most innovative investigation and enactment of time.”⁹ In the story, Chiang uses language as the mechanism to engage with time. Drawing on the Sapir–Whorf hypothesis of linguistic relativity, “Story of Your Life” plays out the suggestion that “the structure of a language influences its speakers’ worldview or cognition, and thus individuals’ languages determine or influence their perceptions of the world.”¹⁰ Heptapods, the Anglophone designation for the alien visitors, exist simultaneously across all times, rather than in a moment of time—what we call the present—and their written language reflects this form of conscious existence.¹¹

Professor of English Bran Nicol explains the scientific principle underlying Banks’ and the heptapods’ experience of simultaneous time. “Variable physics dictates that the endpoint must be understood at [the] beginning of any journey.”¹² “Story of Your Life” has the physicist Gary Donnelly teach Dr. Banks Pierre de Fermat’s principle, or the principle of least time, which comes from optics. Fermat’s principle states, “the path taken by a ray between two given points is the path that can be traveled in the least time.”¹³ Light bends when it passes from air to water. Donnelly unpacks the lesson for Dr. Banks: “You’re used to thinking of refraction in terms of cause and effect: reaching the water’s surface is the cause, and the change in direction is the effect. But Fermat’s principle sounds weird because it describes light’s behavior in goal-oriented terms.” While “the common formulation of physical laws is causal ... a variational principle like Fermat’s is purposive, almost teleological”: the “notion of a ‘fastest path’ is meaningless unless there’s a destination specified.”¹⁴ Or, as Nicol puts it, “light knows its future endpoint before it sets off.”¹⁵ According to critics Brophy and Malley, “the linguist deduces that the aliens have calculated their path through time as well as space, carefully weighing the variability of their actions against the sum total of their future,” which means that Dr. Banks faces an “interpretive challenge”: “to determine the linguistic equivalent of variational calculus, a language whose teleological logic and syntactical structures are in extreme variance with the principles of causality and temporal linearity that structure human thought and language.”¹⁶ Why the heptapods come to Earth must have something to do with what Nicol formulates as “the ending they already know.”¹⁷

Dr. Banks knows from the day her daughter is born that she will die in a climbing accident. Perhaps because of Dr. Banks' simultaneous experience of time, she does not feel the need to try to change how the story will end. After all, she already exists in all moments with her daughter; already knows the affects and emotions associated with each step on that journey.

Brophy and Malley provide an excellent transition from the text to the film. They read the graph as "an emblem" of how the story moves "between media" from short story to film: "just as light refracts on its journey from air and water, so too the story would seem to refract at the boundary between literature and film media." They call on their readers to "regard variation as a system rather than as a point of fracture" and this offers a key to a medium-specific reading as much as it does to the work of mediation in Chiang's story. Brophy and Malley go from interpreting one medium to another, as I do here, which they describe as "a differential approach to the expression of simultaneous consciousness, a light bound to find its optimal path through linguistic syntax and film montage."¹⁸ As with air and water, medium matters. Film makes legible this chapter's concern with air. Where Fermat's principle may have used air as medium, *Arrival* uses air and concern about breathing to dramatize Dr. Banks' first encounter with the heptapods.

Arrival

When it comes to Villeneuve's adaptation, most critics find it quite faithful to Chiang's story. Brophy and Malley suggest that "Like Chiang, Villeneuve tells two stories, one causal and one teleological."¹⁹ The narrative still hinges on Dr. Banks (Amy Adams) learning Heptapod B and gaining a simultaneous experience of time. The film subtracts the discussion of Fermat's principle and adds an element of geopolitics. The aliens visit twelve sites around the Earth, and each region establishes its own research team. How these teams work, and what conclusions they draw, is largely indicative of their worldview: their analysis says more about the scientists and their backing governments than it does about the aliens. Dr. Banks avoids a world war by using her experience of time to convey a message to General Shang of China (Tzi Ma) from his future self. Here, as in Chiang's story, time itself is the concept and experience being estranged by the narrative.

Rather than repeat the discussion on time from above, I'd like to consider how the film is able to do something that the published story is not: make air sensible. Through aural and visual effects, *Arrival* uses breath and air to differentiate humans from heptapods. While arguably not integral to an interpretation of the film, these techniques deepen the film's agenda of estrangement. To start to explore these techniques, allow me to provide a description of the alien encounter sequence, which happens just after Dr. Banks arrives at the encampment. The aim here is twofold: on the one hand, I'll discuss the form of estrangement that *Arrival* maintains from "Story of Your Life," and on the other, I'll attend to how the film's form materializes

air on order both to build tension in viewers and to distinguish Dr. Banks as a character.

After an alarm bell sounds the fifteen-minute warning, Dr. Donnelly (Jeremy Renner), Dr. Banks, Colonel G.T. Weber (Forest Whitaker), and the rest of the team suit up. The camera dollies backward through the characters as they put on double-layered hazmat suits. Dr. Donnelly asks, "What kind of radiation exposure are we walking into?" An unnamed character responds, "Nominal. These are just for safety." Dr. Banks asks, "So, is there any physical contact with the, um... Am I the only one having trouble saying 'aliens'?" Someone responds, "There's a wall. Like, a glass wall." Another adds, "You can't get to them."²⁰

The chatter continues. The shot cuts to the outside. As the team heads out to the field, the sound of breathing accompanies shots of the characters. After climbing onto the trucks, a long shot shows the alien ship hanging over the field. The swell of the score plays long drone notes over one another. Dr. Banks' breathing can still be heard whenever the camera shows her face in medium shots. The shot cuts from Dr. Banks to a low-angle shot up the side of the alien ship, which takes up three-quarters of the screen. Here, the shot references the monolith from *2001: A Space Odyssey* (1968), the Imperial Star Destroyer from *Star Wars* (1977), or the probe in *Star Trek IV: The Voyage Home* (1986). The team assembles beneath it. Dr. Donnelly runs a hand along the bottom of the extraterrestrial vehicle. Its surface is dark, stony, textured. As they lift into a hole in the object, a voice reports over the radio: "Oxygen level: 20.3%. No known contaminates. Over..."²¹

At this point, the film builds tension with the amplified breathing and through the visible trepidation of the characters. They need to jump up into the ship, into a new gravity. As they look back, they look straight down at the Earth. Ahead, the passageway, also dark, stony, textured, leads to a room of white light. A further tactic of disorientation: the shot of the team entering the chamber has them on its ceiling, upside down from the viewer's perspective. The shot cuts into Dr. Banks' point of view, through the suit's mask. The sound of her breathing grows louder. One of the team takes out a cage with a bird (a canary) that chirps and hops about. Everyone has eyes on the glass barrier, behind which mists swirl. Dr. Banks asks, "So, what happens now?"²² Colonel Weber responds, "They arrive." Whooshy, rushing noises sound with alien resonance. Shadowy figures appear beyond the glass. Weber says, "Dr. Banks. Dr. Banks, you can start."²³ There's an abrupt cut back to the ready room. The team is sprayed down. Dr. Donnelly throws up.

Breath builds tension. Breath invites viewers to share in Dr. Banks' stress. Viewers subconsciously breathe a little faster given the score and the heavy breathing sounds. The shot of the massive structure looms over the audience, making them small. The shot from inside Dr. Banks' suit confines the audience, trapping them in her perspective. These techniques of Hollywood filmmaking are familiar, yet they affectively mount tension. The film's referentiality, too, raises the question: what kind of aliens will these be? Does the audience have

reason to be afraid along with these characters? How will the scene play out? All this tension cleverly draws viewers into a moment-by-moment experience of time. The punctual instance of the encounter for Dr. Banks is affectively reinforced by the abrupt end to the sequence. The viewer and the characters have a resounding feeling of uncertainty: that just happened, right? Did I/they just see aliens? This cinematic moment will be replaced in the film as Dr. Banks learns Heptapod B and starts to experience time simultaneously. The audience will realize that cinema can show a simultaneous experience of time as well, which will play as an ultimate release of the tension built up from the first encounter.

Meanwhile, air visually differentiates the human research team from the heptapods. In the initial meeting, the glass and the space behind it is at a remove. The visual reference to the cinematic screen gestures to the layers of spectacle and viewership at work: we watch the characters watching the aliens arrive. In dark rooms looking at bright screens, we are mesmerized by the encounter. The air the characters breathe is differentiated from the heptapod air by the glass and the mists. In a later meeting, Dr. Banks removes her suit and approaches the glass, placing a hand on the surface. One of the heptapods responds by placing the flanges of a splayed tentacle against the glass on the other side. Dr. Banks says, "Now that's a proper introduction."²⁴ From this point in the film, Dr. Banks and Dr. Donnelly work to learn Heptapod B as the aliens, nicknamed Abbott and Costello, shoot an ink that hovers and resolves into circular written sigils. The medium of our aural communication is also the medium for heptapod written communication.

Estrangement here has viewers closely associated with Dr. Banks. The film establishes a non-chronological order of events from the start, meanwhile allowing viewers to assume that they are viewing things in chronological sequence. Viewers might imagine themselves learning along with Dr. Banks. The character knows as little about these aliens as viewers do; the viewer encounters this estrangement of the storyworld along with the characters. The ultimate question is then about perspective and experience: can we know time differently? Cinema is a device that allows us to visualize an answer to this question. Yes. But time is not the focus of this chapter. What Chiang and Villeneuve offer the exploration of the materiality of air are two trials in estrangement. Where these narratives feature a familiar world transformed, "Exhalation" takes readers to an alien world as a mystery unfolds.

"Exhalation"

"Exhalation" is inscribed by a scientist on a copper plate. This anatomist takes on the problem of why clocks seem to be running faster. The story begins: "It has long been said that air (which others call argon) is the source of life. This is not in fact the case, and I engrave these words to describe how I came to understand the true source of life and, as a corollary, the means by which life will one day end."²⁵ In this opening paragraph, the story

establishes a narrator who will act as a familiar guide to a world familiar to them. The engraver of these words introduces readers to a strange world with which the engraver is ultimately familiar. At the same time, it introduces a clear sign of differentiation: what others describe as argon, the narrator calls air. Moreover, the stakes of the story are set at the understanding of extinction or some other eventual end.

As readers learn more from the narrator, they are simultaneously made more familiar with them and their world and estranged from it.²⁶ The story's sf estrangement follows in the second paragraph: "For most of history, the proposition that we drew life from air was so obvious that there was no need to assert it." As the narrator explains, people tend to go through two lungs of air a day, which they remove to insert full lungs. When the air in the lungs runs low for a person, it leads to feelings of lethargy. If someone is unfortunate enough to not find a replacement in time—an "exceedingly rare" event—they die "within seconds of the air running out." This is a world distinct from yet analogous to the real world. The storyworld features communal living; indeed, the air depots are places of convivial social engagement. It has a sense of shared space and personal space, as indicated by the title of the public town criers.²⁷ Moreover, the inhabitants of this place are unwilling to kill in the name of science.²⁸ The narrator divulges that the boundaries of this world are definite: a "solid chromium wall that extends from the ground up into the infinite sky."²⁹ So, this world is bounded by chromium walls, its life is reliant on regular installation of argon-filled lungs, these lungs are refueled at pumping stations that rely on massive underground reservoirs, and, as readers discover along with the narrator, the thoughts of its inhabitants follow the flow of air itself.

The anatomist's *récit* is structured to inform unfamiliar readers of their ultimate discovery and philosophical conclusions. The introduction to this world is followed by a detailed account of the physiology of its inhabitants: they are hearty and can live hundreds of years, their frames and limbs are composed of titanium, and their uniform and replaceable lungs are plain aluminum canisters. The account of the inner working of these beings is delivered through the anatomist's self-dissection.

The anatomist undertakes an experiment: will self-dissection reveal the inscription theorem of memory to be correct, or is there some other way that memories are formed in people's minds? By assembling a series of prisms into a "solipsistic periscope" and expanding their lung capacity through a manifold, the narrator makes a startling discovery: "All that we are is a pattern of air flow. My memories were inscribed, not as grooves on foil or even the position of switches, but as persistent currents of argon."³⁰ This discovery leads to further realizations about the storyworld: the clocks are keeping steady time, and the brains of the people are slowing down. This must be because "the pressure of our surrounding atmosphere was increasing."³¹ Moreover, this means that the sky must not be infinite and instead these beings live in a closed system within solid chromium walls. Here, the problem, mechanism, and plot entwine: the slow dispersal of argon is what grants life,

and the impossibility of its replenishment aligns with the entropic turn in the anatomist's words.

The laws laid out by the anatomist mirror the first and second laws of thermodynamics. Recall that generally, the first law states that energy can neither be created nor destroyed; and the second law states that the tendency of systems is toward entropy, toward the unavailability of thermal energy for conversion into mechanical work. In "Exhalation," the anatomist posits: "Air can neither be created nor destroyed." It is air pressure, a dispersal from high pressure to low, that is the motive force of this world. "When the pressure everywhere in the universe is the same, all air will be motionless, and useless." Thus, the anatomist concludes, "We are not really consuming air at all."³² Others verify the anatomist's findings. Some try to find a technological fix, but their devices always move closer to equilibrium than if they had done nothing. However bleak the future seems, futility and inevitability do not pervade the ending of the tale. The anatomist imagines other realms in the chromium and eventually the arrival of explorers who might read the inscribed account, just as the reader is doing. "Your fellow explorers will have found and read the other books that we left behind, and through the collaborative action of your imaginations, my entire civilization lives again." Though the story ends with an enjoinder to enjoy the time available, I find this earlier insight to be a better place to leave the summary: "Some find irony in the fact that a study of our brains revealed to us not the secrets of the past, but what ultimately awaits us in the future."³³ The story only points forward. Unlike "Story of Your Life," "Exhalation" is not about understanding a story all at once, but instead about moving forward one exhalation at a time.

Estranging Air

How do critics read "Exhalation"? I opened this chapter with a passage from Jean-Thomas Tremblay. As well as *Breathing Aesthetics*, Tremblay has written on "Exhalation" and reads the story as "a thought experiment": "What if, we are invited to contemplate, inhalation and exhalation were distinct processes, rather than inseparable phases of an autonomic, autopoietic, and ecological cycle?" The story features bodies that do not inhale, which makes the process of filling the lungs an extractive one. As Tremblay puts it, "The disembodied inhale literalizes resource extraction, and the embodied exhale a process of extinction coextensive with the achievement of a certain equilibrium or homeostasis."³⁴

Another way to read Chiang's story is as a unique estrangement of a real-world atmospheric bias and the occasion to develop language for the carbon-dense air currently blanketing the Earth. For instance, researcher Essi Vatiló reads "Exhalation" as a story of discovery in a climate change context to argue that it builds capacity in readers for decoupling their identity with a belief-based group, thus resisting forms of climate-change denial. Vatiló emphasizes the risks of estrangement, quoting sf critic Simon Spiegel in the

process: “The relocation to a world completely unlike ours creates subtle parallels to climate change that avoid entanglement in real-world politics while at the same time drawing attention to them. Still, estrangement appears to be a double-edged sword: while some distance allows the familiar to be recontextualised, too much distance can leave the recontextualisation unnoticed.”³⁵ “Exhalation” presents its storyworld through the narrative vantage point of someone who is familiar with it. This approach inverts the sf trope where the narrative follows a reader insert who is also a fish out of water. Rather than learning along with the focal character about a strange world they are also unfamiliar with, readers of Chiang’s story are granted a view of the strange world from the perspective of someone intimately familiar with it. Vtilo argues that because the narrator addresses the narratee, critics can infer that the implied reader, all but unfamiliar with the world, is expected to become familiar as the narrative unfolds: as Chiang’s narrator explains, “through the act of reading my words, the patterns that form your thoughts become an imitation of the patterns that once formed mine.”³⁶

Here we reach a breaking point: one where I think slowing down to work through the implications of these readings is important. Tremblay makes three points that begin to mediate the work of “Exhalation” in representing air. The first is that the lungs featured in the story “appear” as “artificial” to readers, while “within the world of the story, they are not seen as replicas of ‘actual’ organs.” Second, though the inhabitants of the storyworld only exhale, their breathing can be measured alongside ours, as a way of “being in relation”: “to breathe in and out is to incorporate and process alterity, and to breathe the same air as others is to share conditions of experience, if not necessarily experience itself.”³⁷ Third, if in “Exhalation” the cognitive act is part of the flow of air, for example “to exhale is to convert air at high pressure into air at low pressure,” then “to think is to become extinct. *Cogito, ergo sum nihil.*”³⁸ Through Tremblay’s account, the characters’ transcorporeal existence becomes legible, as does their shared realization of the entropic current of thought.³⁹

Vtilo, on the other hand, connects the entropic situation to our real-world climate crisis, which may seem like a good fit until readers consider that the metaphor at the heart of “Exhalation” has one more strangeness to it. The comparison to the laws of thermodynamics holds the key: the way argon is treated in “Exhalation” could better be read to represent energy resources than it does air. Here, the sf estrangement of real-world air and of real-world energy resources can hold both aims in play at once, yet as critics we might need to tease out these distinctions a little more clearly.

Tremblay’s article reformulates Vtilo’s argument as follows: “the reduction of correlation (*extinction is tied to the way we live*) to causation (*life causes extinction*) gives credence to a political agenda that promotes urgent action to ward off climate catastrophe.” Tremblay intervenes, arguing that “Vtilo’s reading overstates the extent to which recognizing life’s movement toward extinction would protect” life against extinction.⁴⁰ I detect a similar unfortunate truth in our own communications about climate catastrophe. Making the mediation

between human life activity and climate change legible does not necessarily produce a movement toward climate justice. This kind of assumption is precisely what environmental communications scholars describe as the information deficit model of communication: *If only people had access to the information that I do, their behavior would change accordingly!* The model of social equity that "Exhalation" offers, one where "members of an undifferentiated humanoid species exhale all at once" on Tremblay's account, seems entirely "ill-suited to a context where respiratory afflictions testify to the uneven distribution of risk and harm."⁴¹ This latter description gestures to the real world, especially in the wake of the extrajudicial murdering of Black people by police, which was brought to global attention by the killing of George Floyd in 2020.

I do not read "Exhalation" as broaching health issues, nor as addressing anti-Blackness.⁴² Rather "Exhalation" provides a storyworld mediated by the anatomist narrator that provides heuristic tools for readers to estrange their real-world assumptions about air and breath. Chiang's delicate narrative produces a set of considerations about air and finitude, whether read along the line of energy or as a material commentary on a real-world atmospheric bias. If readers can keep both readings in mind at once, they might find a stronger resonance, not in reading argon alongside oxygen, but in reading it alongside carbon dioxide. Here the title does the most work as we remember the crux is not inhalation, but exhalation. Whereas air for the inhabitants of the bounded chromium world has a physical function, for us the distinction is a chemical one. Inhale oxygen. Exhale carbon dioxide. This point leads me to Tremblay's "uneven distribution of risk," which can further be indexed through a "respiratory enmeshment of vitality and morbidity"; human breath is an autopoiesis, "the self-maintenance and self-renewal of living systems."⁴³

Our Oxygen Bodies

I am involved in an ongoing conversation about Chiang's work with my friend and colleague, author and poet Aaron Kreuter. He encourages readers to think of Chiang's mode of writing as focusing on storyworld paradigm shifts. Aaron writes,

The quintessential Ted Chiang story is one that introduces readers to a world different from ours—robots who breathe argon, a world that is at the center of god's creation, where aliens with a strange language visit earth—but that is commonplace to the story's characters, only to have the characters realize their world is not actually as they originally thought it was. This paradigm shift that the stories enact leads to energetic and compelling narrative momentum and is a productive example of defamiliarization. Reading Chiang stories makes it abundantly clear that the world is always ripe for change. See you at the argon refill station,

Aaron.⁴⁴

The paradigm shifts in the stories under consideration play out differently. They both involve this cognitive transformation, but formally we have distinct mediations of estrangement. "Story of Your Life" develops a proleptic understanding in the reader. Heptapod B is a conceptual bridge to imagine simultaneity rather than the present as a point where past and future meet. Readers are encouraged by the non-chronological plot to hold the entire story in their mind at once, tracking Dr. Banks as she moves through time to produce a total understanding of the arrival of the heptapods. Now we fold this understanding, smoothing its edges into a rounded, elongated form. "Exhalation" works toward an epiphany that plays on a similar dynamic, with the exception that its focus is not with the simultaneous existence of all possible moments. Instead, the story features the movement of argon as the source of life. It presents flow, containment, and flow; slow dispersal; entropic balancing; a long, calm sigh that leads to resignation. "Story of Your Life" is elegantly titled because it aims toward a totality effect; the cleverness of "Exhalation" is in its treatment of discovery sentence by sentence until all that will happen has happened. Is not the experience of the story, in each instance, another form of the telling? In terms of meta-fiction one story features a linguist who experiences time as simultaneous by learning Heptapod B, whereas the other is narrated by an anatomist who discovers the source of life is not argon but the passage of argon across the mechanism of their own mind. How well do we know our own reliance on air as breathing bodies? The somatic process happens; theoretical understanding is not required. Our oxygen bias establishes an expectation that future air will be breathable and plentiful; it may even be better described as an atmospheric bias. Being able to read breath, through a work such as Chiang's, moves readers from breath as an experience toward a greater understanding.

I owe the idea of an atmospheric bias to the media studies scholar Melody Jue, who draws on the work of feminist science and technology scholar Donna Haraway to elaborate a striking dive into oceanic epistemology. In *Wild Blue Media*, Jue elaborates a "terrestrial bias" as "a necessary partial perspective," there describing it as a trait that "once recognized, erodes the dream of a master language that would be totally objective, distant, and adequate to articulating and describing the world in its entirety." Jue goes on to posit that "[t]he milieu of the ocean offers an epistemological check on human knowledge formation, presenting entirely different conditions for perception, sensation, and life than terrestrial environments."⁴⁵ What "Exhalation" offers is a reframing of air as a vast, contained, and ultimately shared substance that touches on all terrestrial and oceanic life on Earth. The estranging of the oxygen-rich, carbon-dense air of Earth through the imaginative worldbuilding of an argon-dependent people offers readers a chance to understand their own situatedness in air. The final twist of Chiang's estranging conceit in "Exhalation" is of course our own position as reader (addressed as "explorer" by the narrator). Have you held your breath as you read? What pressures

exert on your lungs now? What we learn from Chiang's narrator is a way to imagine our own collective transcorporeality. Chiang offers the gift of language that may help readers imagine and describe the movement from breathing as experience to breathing as a socially symbolic act.

Notes

- 1 John-Thomas Tremblay, *Breathing Aesthetics* (Chapel Hill, NC: Duke University Press, 2022), ix. Alongside an epigraph drawn from acknowledgments, I would like to write my own all too brief thank-yous: Tatiana Konrad, Aaron Kreuter, Freddy Carruthers, Veronica Hollinger, and the students of the Popular and Media Cultures / Cultural Studies lecture series "Materiality of Air: Representation, Crisis, Health" that took place in the summer term of 2024 (lecturer and organizer: Tatiana Konrad; Department of English and American Studies, University of Vienna).
- 2 Tremblay, *Breathing Aesthetics*, 2. Ute Kehse reports on research at the Max Planck Institute for Biogeochemistry in Jena that includes soil in an analysis of CO₂ levels. See Ute Kehse, "The Breath of the Earth," *Max-Planck-Gesellschaft*, August 14, 2023, <https://www.mpg.de/7451137/earthsytem-modeling>.
- 3 "The aesthetic isn't one of many, equally valid domains in which to study the contemporary dynamics of breathing. Instead, it is the aesthetic mediation or aestheticization of breathing that structures threat and injury into something like individual and collective persistence. I posit the existence of an aesthetics of breathing, rather than subsuming engagements with breathing under an all-encompassing aesthetics of sociopolitical and environmental peril, in order to underscore a distinct mode of creation and expression whose fluidity and translucence defy the codes of aesthetic judgment" (Tremblay, *Breathing Aesthetics*, 2).
- 4 "About Clarion," *Clarion Workshop*, 2024, <http://clarion.ucsd.edu/about-clarion/>.
- 5 Gerry Canavan, "Living in the Future," *Science Fiction Film and Television* 11, no. 3 (Autumn 2018): 492.
- 6 Ted Chiang, "Ted Chiang's Soulful Science Fiction," interviewed by Joshua Rothman, *New Yorker*, January 5, 2017, <https://www.newyorker.com/culture/persons-of-interest/ted-chiangs-soulful-science-fiction>.
- 7 This chapter uses the anthologized version of stories throughout for citational purposes, as these are the most accessible copies with page numbers. Both stories are available online, with "Story of Your Life" searchable and "Exhalation" being printed in *Lightspeed Magazine* (2014) and posted online. The original publication dates for each text are given at first reference.
- 8 I was delighted to be in the audience for a talk with Ted Chiang at Toronto Public Library in fall 2024. He spoke at length about the misconception that "Exhalation" is about climate change. For Chiang, the story is about thermodynamics—the heat death of the universe being an inevitable end. He was perplexed that readers would treat the scientific exploration of the author-narrator in the story as a parable of climate change, which Chiang understands as non-inevitable. Of course, readers bring their own concerns to a story. One cannot write sf and compose the ideal audience as well. Nonetheless, it is affirming to hear from Chiang and to share that sense of befuddlement about how people read this story.

- 9 Jo Alyson Parker, "Ted Chiang's Time-Travel Narratives: Predetermination, Predictability, and Free Will," *Science Fiction Studies* 49, no. 1 (March 2022): 148. <https://doi.org/10.1353/sfs.2022.000>
- 10 Wikipedia contributors, "Linguistic Relativity," *Wikipedia, The Free Encyclopedia*, https://en.wikipedia.org/w/index.php?title=Linguistic_relativity&oldid=1224246059.
- 11 Brett J. Esaki reads "Story of Your Life" through the framework of humor: that is, he reads it as a series of "atemporal joke(s)" ("Ted Chiang's Asian American Amusement at Alien Arrival," *Religions* 11, no. 2 (2020): 14. <https://doi.org/10.3390/rel11020056>). Esaki posits that the heptapods have a sense of humor unique to the distinction between their simultaneous experience of time and humans' sequential one. In the context of an alien encounter, which many critics argue must be read as a colonial encounter as well, this humor is well situated as an intercultural exchange. For a thorough primer on sf's colonial imaginary see John Rieder, *Colonialism and the Emergence of Science Fiction* (Middletown, CT: Wesleyan University Press, 2008).
- 12 Bran Nicol, "Humanities Fiction: Translation and 'Transplanetarity' in Ted Chiang's 'The Story of Your Life' and Denis Villeneuve's *Arrival*," *American, British and Canadian Studies* 32, no. 1 (June 2019): 114. <https://doi.org/10.2478/abcsj-2019-0008>
- 13 Wikipedia contributors, "Fermat's Principle," *Wikipedia, The Free Encyclopedia*, May 19, 2024, https://en.wikipedia.org/w/index.php?title=Fermat%27s_principle&oldid=1224551996.
- 14 Ted Chiang, "Story of Your Life," in *Stories of Your Life and Others* (New York, NY: Vintage Books, 2016), 124–25.
- 15 Nicol, "Humanities Fiction," 114.
- 16 Gregory Brophy and Shawn Malley, "'There Is No Time': Parsing the Future Perfect in Ted Chiang's 'The Story of Your Life' and Denis Villeneuve's *Arrival*," *Literature/Film Quarterly* 51, no. 1 (December 2023): n.p.
- 17 Nicol, "Humanities Fiction," 114.
- 18 Brophy and Malley, "'There Is No Time,'" n.p.
- 19 Brophy and Malley, "'There Is No Time,'" n.p.
- 20 *Arrival*, directed by Denis Villeneuve (Paramount Pictures, 2016), 23:05–18.
- 21 *Arrival*, 27:11–15.
- 22 *Arrival*, 31:32–36.
- 23 *Arrival*, 32:44–54.
- 24 *Arrival*, 46:45.
- 25 Ted Chiang, "Exhalation," in *Exhalation* (New York, NY: Alfred A. Knopf, 2019), 37.
- 26 I owe this insight to Essi Vatiilo who writes, "The world in 'Exhalation' is not a normal world with a twist of the strange, but a rather strange one with a twist of normalcy. ... Instead of naturalising a strange aspect in an otherwise familiar reality, 'Exhalation' naturalises the entire world with the help of familiar features and customs within this strange reality" ("Climate Change in a Chromium World: Estrangement and Denial in Ted Chiang's 'Exhalation,'" *Fafnir* 6, no. 2 (2019): 40.
- 27 Chiang, "Exhalation," 37–39.
- 28 On this point, the narrator explains that they would be unwilling to kill "even an imbecile," which also indicates a social stratification along behavior lines or surrounding perceived capacities. Though we never learn the narrator's name or that of any other character, these characters think of themselves as individuals. Chiang, "Exhalation," 42.

- 29 Chiang, "Exhalation," 39.
- 30 Chiang, "Exhalation," 43, 50.
- 31 Chiang, "Exhalation," 50.
- 32 Chiang, "Exhalation," 50.
- 33 Chiang, "Exhalation," 56.
- 34 Jean-Thomas Tremblay, "Homeostasis and Extinction: Ted Chiang's 'Exhalation,'" *SubStance* 52, no. 1 (2023): 22. <https://doi.org/10.1353/sub.2023.a900524>
- 35 Vátilo, "Climate Change," 39; Simon Spiegel, "Things Made Strange: On the Concept of 'Estrangement' in Science Fiction Theory," *Science Fiction Studies* 35 (2008): 375.
- 36 Vátilo, "Climate Change," 40; Chiang, "Exhalation," 56.
- 37 Tremblay, "Homeostasis and Extinction," 22.
- 38 Tremblay, "Homeostasis and Extinction," 24.
- 39 Understandably, Tremblay puts the idea in different terms in *Breathing Aesthetics*: "Breathing is inevitably morbid" (Tremblay, *Breathing Aesthetics*, 1).
- 40 Tremblay, "Homeostasis and Extinction," 25.
- 41 Tremblay, "Homeostasis and Extinction," 25. Tremblay cites Susanna Rankin Bohme, *Toxic Injustice: A Transnational History of Exposure and Struggle* (Oakland: University of California Press, 2014); Alison Kenner and Chloe Ahmann, "Breathing Late Industrialism," *Engaging Science, Technology, and Society* 6 (2020): 416–38; and Rob Nixon, *Slow Violence and the Environmentalism of the Poor* (Cambridge, MA: Harvard University Press, 2011).
- 42 "Health disparities pertaining to the COVID-19 pandemic have made glaring Black, Indigenous, and other marginalized communities' restricted access to care and services ('Health Equity Considerations'). The now-ubiquitous mantra 'I can't breathe' denounces two temporalities of the necropolitics of anti-Black asphyxiation: one chronic (environmental and structural racism), the other accelerative (police violence). As an utterance, 'I can't breathe' indicates that there is nothing universal about human extinction. Nor is it a future occurrence. Extinction is ongoing among populations deemed disposable by the state and the market" (Tremblay, "Homeostasis and Extinction," 25).
- 43 Tremblay, *Breathing Aesthetics*, 1, 2.
- 44 Personal correspondence via email.
- 45 Melody Jue, *Wild Blue Media: Thinking through Seawater* (Durham, NC: Duke University Press, 2020), 10. <https://doi.org/10.1515/9781478007548>

Thinking over the Airwaves: Immediate Connection in Geoff Ryman's *Air* and Tade Thompson's *The Wormwood Trilogy*

Arthur Rose

Too much connection is in the air. In this chapter, I show how air provides a narrative hinge for expressing anxieties about hyperconnectivity by putting works of speculative or science fiction (sf), Geoff Ryman's *Air; or Have Not Have* (2004) and Tade Thompson's *The Wormwood Trilogy* (2016; 2019), into conversation with discussions of 5G conspiracy theories and immediacy as a cultural style.¹ Ryman's *Air*, which describes an isolated village as it prepares for the introduction of a wireless transmission system that beams information directly into the receiver's brain, and Thompson's *Trilogy*, which imagines an already existent airborne psychic media laying the foundations for a larger alien invasion, offer compelling depictions of societies grappling with the social, structural, and affective dimensions of hyperconnected worlds. In these speculative universes, air provides the physical medium of these new technologies *and* the means for articulating a response to them. By drawing our attention to air's materiality, these novels remind us that even the very air that we breathe, the *sine qua non* for the immediate and the present, is mediated by the stories we tell ourselves about it. If such narrative mediation provides solace in an age where everything feels all too immediate, we should temper its comforts by recalling the risks such narratives pose, when they are celebrated as providing a privileged access to truth: a warning that fictions about air help us heed.

In what follows, I give brief introductions to *Air* and *The Wormwood Trilogy*, stressing the narrative function air plays in these speculative universes, as medium and mediator of instantaneous communication and data transfer. Then, I consider how this mediating role fits into a longer tradition of thinking about air, as examined by Michel Serres, Peter Sloterdijk, and Steven Connor.

Having established air's use as a mediator in the novels, I turn to Anna Kornbluh's diagnosis of the contemporary cultural preoccupation with immediacy. Acknowledging Kornbluh's important work in this area, I nevertheless suggest that the mere inclusion of further layers of mediation may produce as many problems as they mitigate. The stakes of this interpretation may be found in the forms of mediation employed in conspiracy theories, of which that relating COVID-19 to 5G is perhaps most relevant. As works that engage with immediacy while parsing its engagement with mediation, *Air* and *The Wormwood Trilogy* nuance unchecked celebrations of either mediation or immediacy.

From *Air* to Rosewater

At the beginning of *Air*, the novel's protagonist, Mae, acts as a fashion broker between her village in the fictional Central Asian republic of Karzistan and the closest town, Yeshizbokent. She introduces the villagers to select dress-makers, fabric sellers, and hairdressers, in return for money, minor favors, and greater status. Her role depends on her knowledge of fashion, knowledge which is protected by the village's isolation. The novel's opening sentences signal both this isolation, and the disruption it and Mae's privileged position are about to experience: "Mae lived in the last village in the world to go online. After that, everyone else went on Air."² Where going "on air" might seem like a reversion to the regime of radio, a backwards step when the world is finally, with Mae's village, fully online, the capital A prepares us for the introduction of Air as something different: as a product that comes "after" everyone is online, and, as such, constitutes an advance in communications technology.

Importantly, Air will provide universal access to information: "for too long," complains a television presenter (termed a "Talent"), "the world has been divided into information haves and have-nots."³ Echoing the novel's subtitle "Have Not Have" (also the title of a Ryman short story, first published in 2001 and reproduced as the novel's first chapter), this introduces the "have-not" and "have" distinction that Air and the novel will challenge: the first by enabling information access, and the second by calling into question the very label "have-not." Mae, for instance, cries indignantly, "how dare they call us have-nots?," a fair criticism, given the novel's rich description of Mae's interiority and that of the other villagers.⁴

At first, Air simply appears to be the next generation in telecommunications: an interface that grants an immediate access to knowledge, without the need for a mediating device such as a computer, television, or phone. Soon, however, its more radical social consequences begin to emerge. It will be, someone announces over the public address system, "a tremendous advance for culture," which, unlike previous advances, which depended upon "wiring and machines," "will be in the air we breathe. This new thing will be like TV in your head. All you need is the wires in the human mind." "[I]t's not just

TV,” as Mae’s neighbor, Wing, elaborates, “It is the whole world ... the Net—only, in your head.”⁵ Soon, it becomes clear that the process is more complicated: access to Air depends on an initial formatting process, to “make a complete map of minds, and that’s what exists in Air, and Air happens in other dimensions,” which is depicted as a flow of lightning that strikes people’s heads. As one of Mae’s friends sardonically remarks, “hitting people with lightning ... that does sound so safe, doesn’t it?”⁶ Her sarcasm proves prescient. When Air is first tested in Karzistan, it has unforeseen consequences.

Amidst the confusion of the first test, Mae’s elderly neighbor, Mrs. Tung, spills boiling water over herself. As Mae tries to help her, Air’s start-up protocols cheerily interrupt descriptions of their distress. Mistaking Mae’s call for Mrs. Tung as an attempt to “mail” her, the system demands that Mae set up a personal account, a process initiated by saying her own name over and over. This coincides with Mrs. Tung’s own repeated cries for Mae. It is never explained why or how, but an imprint of Mrs. Tung’s mind fixes itself to Mae’s, at the same moment that Mrs. Tung herself dies of her wounds. The rest of the novel focuses on the consequences of this possession, as Mae prepares for the eventual rollout of Air a year later. Motivated in part by her psychic connection with Mrs. Tung, Mae has an affair with Mrs. Tung’s grandson, Ken, which produces a fantastical pregnancy in Mae’s stomach. Mae starts a school teaching basic Net skills on a local Networked television, receives a state grant to sell local products online, is kidnapped and experimented upon by an Air entrepreneur, saves the majority of the village from a flood whose warning signs Mrs. Tung is able to recognize, loses control of her body to Mrs. Tung, and finally returns to consciousness in time to give birth to her stomach child and celebrate with the village as Air is finally turned on. The novel ends with her and the surviving villagers tuning in to “walk together into the future.”⁷

Tade Thompson’s trilogy focuses on the fictional Nigerian city of Rosewater in the years 2066, 2067, and 2068, with sporadic flashbacks to earlier moments in its characters’ lives. In the first volume, *Rosewater*, we are introduced to the first-person narrator, Kaaro, a cynical, world-weary Sensitive who makes ends meet working as a psychic for a bank and as a somewhat louche secret agent for a special intelligence division of the Nigerian government. Sensitives are people who can read the thoughts of others by accessing what is called the xenosphere: a network of minute, fungus-like alien hyphae that have invisibly distributed themselves across Earth’s atmosphere. The novel’s mycologist, Ileri, explains:

[I]t is everywhere, in every environment on Earth. These delicate filaments are too small for the naked eye to see, and they are fragile, but they form multiple links with the natural fungi on human skin. ... Everybody linked to this network of xenofoms, this xenosphere, is uploading information constantly, passively, without knowing. There is a global store of information in the very atmosphere, a worldmind that only people like you can access.⁸

Like Air, the xenosphere constitutes a massive data hub; unlike Air, access is limited to a select few, “haves” determined by a genetic quirk rather than entrenched social privilege. Both networks are imagined as systems whose hardware has migrated to the air, or to the mind via the air. While Ryman makes this explicit, Thompson has also likened his conception of the xenosphere to a biological network, based on his experience as a network professional for the US digital communications corporation Cisco Systems:

The xenosphere is like a brain that encompasses [*sic*] the entire biosphere of Earth. It’s a network of artificial neurones [*sic*] that traps information in real time. I used to work with Cisco routers and switches and firewalls (I was a Cisco Certified Network Professional), so I used that knowhow with my biology background to inform how the xenosphere functions.⁹

In other words, the xenosphere is both an externalized brain diffused that is across the air *and* a network which captures and transmits data. In this, it acts as a useful inversion of Ryman’s internalized network, where the moniker Air provides a metaphor for complex and unwieldy forms of multidimensional communication that seem to occur between minds. As *Rosewater* progresses, we learn that the xenosphere, too, involves quantum communication across dimensions. It was seeded by a large alien entity, a “footholder” called Wormwood, which, since going underground after landing in London in 2012, has emerged in rural Nigeria. Rosewater, the town, has sprung up around it, largely because Wormwood periodically causes mass healings and even resurrections. These acts of apparent beneficence are, in fact, a key feature of the invasion plan; with each intervention, the footholder replaces human cells with xenofoms.

By the end of *Rosewater*, Kaaro has discovered that the replacement of human cells with xenofoms is deliberate. In the second book, *The Rosewater Insurrection*, we learn that its aim is to prepare human hosts to be possessed by consciousnesses from another planet, called “Home.” At some point in the past, the “Homians,” realizing that their own planet was doomed, uploaded imprints of their identities to a large database, after sending “footholders” out to establish xenospheres on new worlds. This database and the various planetary xenospheres are connected, via quantum entanglement. When the human hosts are sufficiently alien in composition, the xenosphere will provide a file transfer protocol to download these imprints into human bodies. Conditions of political ecology threaten to derail both this plot and the humans trying to foil it. Under the direction of its mayor Jack Jacques, Rosewater rebels against the Nigerian state (the eponymous insurrection), spurred on by the belief that Wormwood will protect it from the Nigerian army. Meanwhile, Wormwood finds itself compromised by a plant that inhibits its power and the growth of the xenosphere.¹⁰ In return for help with the plant, Wormwood repels the Nigerian forces from Rosewater; as a compromise, they agree that

Homians will only inhabit the bodies of resurrected people, called reanimates, since the resurrection process doesn't bring consciousness back. When, in the final volume, *The Rosewater Redemption*, Kaaro and other key characters discover the Homians are actively killing regular humans, to reanimate and imprint them, they resolve to destroy the Homian database. Despite dying, Kaaro finds himself living on as an "imprint" in the xenosphere, which enables him to travel back to the database and construct a virus that destroys it, the xenosphere, and himself, thus eliminating any possibility of further colonization.

"All that is solid ..."

In both universes, air, or what is in the air, constitutes a novum, that term that Darko Suvin uses for sf's "totalizing phenomena," the fundamentally new objects, artefacts, or conditions that serve to differentiate speculative worlds from our own.¹¹ The cognitive estrangement afforded by such phenomena enables readers to rethink the world in new and potentially revolutionary ways. Here, we might say that air, in *Air* and *The Wormwood Trilogy*, affords a new metaphor for the "space" information occupies, the ways we access that space, and the social and ethical ramifications these entail.

Or, perhaps, not so new. Ryman and Thompson implicitly offer an alternative materiality for air, where our attention is grabbed by light transmissions, fungal hyphae, and radio waves, instead of the gases, spirits, or fluxes that have typically caught it in the past. But, as Steven Connor has shown, air has a long history as a metaphor for describing the movement of information and as a vehicle for the dead. Writing of the rise of radio, he describes how "wireless signalling unleashed a dream of absolute communication."¹² Quoting W.E. Ayrton's 1897 evocation of "an electromagnetic voice" that can "be heard" by "the electromagnetic ear" from "the bottom of the coal-mine, or crossing the Andes, or in the middle of the Pacific," but which is "silent to everyone else," Connor notes how such dreams imagined absolute communicability, while confirming silence and secrecy.¹³ Only death would draw a limit to this infinite availability for Ayrton, a limit which, of course, the imprints of Mrs. Tung and Kaaro call into question. With radio technology, Connor notes, there emerged new forms of audibility for air. Once only vocalized by "the sougling and screechings of wind, electrification gave the air a new, more diffuse, unpredictable and illegibility sonority," the forms of "atmospheric disturbance" or "atmospherics" that intruded upon the clarity of signals.¹⁴ If anything, when the conditions of absolute communication, secrecy, and atmospheric abandon the air as a prevailing metaphor in favor of nets and webs, they become ever more entangled in conditions that depend on dialectical relations: openness and secrecy, information and noise.

We might follow Connor in stressing, with Serres, that the volatility of information flows finds its explanatory frame in the volatility of air, and, with Sloterdijk, that this volatility eludes the more weighty, earthbound language

that precedes it. So, from Serres, “the volatile, mixed elements form material supports for an information which is yet more volatile.” Sloterdijk notes that “previous natural languages, including theoretical discourse, were developed for a world of weight and solid substances. They are thus incapable of expressing the experiences of a world of lightness and relation.”¹⁵ Connor, Sloterdijk, and Serres are all acutely aware of the associations that air has to delusion, fantasy, and the ephemeral: it is fragile, in a way that more grounded, weighty, and solid discourses are not. But it is this very riskiness that makes air so apt for the ungrounded forms of information flow permitted in today’s age of hyperconnectivity. If “all that is solid melts into air,” as Marx and Engels famously wrote in *The Communist Manifesto*, then air provided the material solvent into which capitalist communications could dissolve.¹⁶

At first glance, then, air affords a more immediate experience of information. This then begs the question: what is an immediate experience of information? Immediacy, Anna Kornbluh has noted, has become a key feature of contemporary aesthetics. “The medium is missing,” she writes. “Conventionally, art takes up a discernable medium and takes creative distance from ordinary communication or banal functionality, making an appeal to the senses that reroutes common sense.”¹⁷ So, returning briefly to Suvin, *sf* provides a useful lens with which to examine contemporary life, precisely because of the distance afforded by its mediation or “cognitive estrangement.” “In the current climate,” continues Kornbluh, “art renounces its own project of mediation. Directness and literalism are the techniques; immersiveness and surety are the effects.” Kornbluh diagnoses this contemporary aesthetic tendency as conditioned by a general tendency towards “disintermediation”: “this urge to cut out the middleman does not upraise art so much as merge it with a sweeping spate of other social and commercial activities, from gig labor to self-publishing to e-brokerage.”¹⁸ In part, this preoccupation with, and valorization of, immediacy is the cultural fallout of the economic circumstances that have characterized the last fifty years, when, in the West at least, stagnant productivity has forced markets to develop ever more sophisticated techniques for circulating capital. Marx observed, in Kornbluh’s summary, that “production is the ‘hidden abode’ of value, the often-invisible employment relation in which labor receives a wage in exchange for pouring its power into the making of commodities; circulation is the *unhidden, manifest* abode of value, the exchange sphere where ‘an immense collection of commodities’ emanates value.”¹⁹ So, use-value is situated in production, a value which is covered over by the exchange-value created by circulation. When production slackens, capital must make up this shortfall by intensifying circulation, which is managed by “closing the time lags, geographic gaps, and information chasms of exchange.”²⁰

The West’s production crisis, from the 1970s onwards, yielded a space-time compression, which brought “the places and zones of the globe in more proximate contact through communications technology and transportation.” One of the key features of this development was, of course, the digital

revolution that facilitated the rapid transfer of information and the new media (“user interfaces, email, websites, gaming, social platforms and streaming services”) that constitute its face for most consumers.²¹ Like *Air* and the xenosphere, this face has, as its key dimension, an occlusion of code in the user interface. To use *Air*, one simply has to “imagine that your mind is like a courtyard,” in which the various applications can be assigned to “pens” marked “Help,” “Info,” “Airmail,” or “Entertainment.”²² The xenosphere demands no volition at all: unwary Sensitives, who do not establish defenses, are soon overwhelmed by the thoughts of others; in *Rosewater*, the sick or injured are healed, whether they want to be or not. In a crucial sense, the worlds postulated by Ryman and Thompson present accelerated versions of immediacy culture, to establish its consequences for the people forced to grapple with it.

On the face of it, the artifice of sf means that, in themselves, the books are more aligned with arguments about postmodernism (or a prior modernism) than with the immediacy that follows. Postmodernism, following diagnoses by David Harvey and Fredric Jameson in the 1980s and 1990s, was the sociocultural fallout of the production crisis, which saw the rise of pastiche and palimpsest, as an ever more globalized world synthesized the cultural products of everywhere into a homogenous aesthetic that could be from anywhere. The contemporary cultural condition is somewhat different, Kornbluh argues:

[A]fter postmodernism’s skepticism and irony, immediacy’s authentications and engrossments now plat realness. Where postmodernism revels in mediation—intertextuality, irony, the meta—immediacy negates mediation to effect flow and indistinction. Where postmodernism aesthetically activates pastiche, a ‘blank,’ playful ‘heterogeneity without a norm,’ immediacy precipitates blur, a demediated meld that lacks the contours to array heterogeneity. Where postmodernism aesthetically and epistemically embraces the surface and eschews depth, immediacy mires itself in profundities of corporeality, affect, and polarized extremity.²³

I have quoted Kornbluh at some length, because she sets up a useful dialectic with which to examine the forms of mediation to which the books are obviously indebted, the digital immediacy that they are critiquing, and, compellingly, their apparent reliance on corporeality, affect, and polarized extremity as a salve against digital immediacy’s most pernicious effects. After all, a straightforward reading of *Air* might find in its attention to the lived experiences of the villagers—Mae’s sexual encounter with Ken, her relationships with Mrs. Tang and the other villagers, her strange stomach baby—a solution to the mediated immediacy of the digital: the greater immediacy of the corporeal. Even as the xenosphere disintegrates at the end of *The Rosewater Redemption*, the genius builder who resides in it, Oyin Da, finds solace in the

immediacy of contemporary experience, in “the smile of my daughter. . . . Soon my daughter and my wife and our house on the side of a mountain will be gone, but we will be happy. We will die happy. Remember us.”²⁴ In this respect, the solution to digital immediacy, the writers posit, may be greater affective, corporeal immediacy. However, in Kornbluh’s analysis, this simply seems to recapitulate the problem of immediacy as a style: erasing mediation means that the potential for collective action collapses, since the very grounds of our collectivity are constituted through the mediation of our identities into larger polities. This is perhaps unsurprising. If immediacy style emerges out of circulation-production crises, then solving it either through digital immediacy or its corporeal counterpart mistakes symptoms for causes. “Immediacy is not an inner disposition of media, attaining ever-greater actualization in the digital era, but an outer configuration of the circulation system that digital media effectuate, with the mode of production as its cause.”²⁵ Imagining the solution from within the corporeal-digital dyad misses the use of circulation to shore up the actual crisis in production.

In fact, neither speculative world is blind to this problem. When Mae realizes that digital connections can bring new markets to the village, she sets up a website to sell local products to wealthy New Yorkers. They are soon inundated with orders, which forces her to buy a special machine to mass produce their “authentic,” “hand-woven” products. Greater connectivity, even as it produces markets, also produces crises for production, in the face of expectations of just-in-time circulation. *Rosewater* opens on Kaaro creating interference in a local bank. Since Sensitives can easily discover the basic elements of banking information, other Sensitives must be hired to secure these details by creating a veil of white noise. Not only does this concretize the worries about security raised by Connor, but it also shows how the greater connectivity of the xenosphere produces crises for capital, which can only be resolved by mediating this connectivity.

Air’s Situations

While *Air* and the trilogy undoubtedly lionize corporeal connections in the face of digital immediacy, their treatment of their respective media—Air and the xenosphere—is too ambivalent to survive such simple opposition. After all, when Mae’s stomach baby is born, “tiny . . . burned black—black by acids [with eyes] seared shut,” it will be able to live because of its connection to Air. “You are blind,” Mae comforts it, “but you will not need to see, for we can see for you.”²⁶ Catechistically, she offers Air as a mediator for the baby’s missing eyes, hands, and ears. While Oyin Da simulates a corporeal immediacy, she does so from *within* the xenosphere; her daughter, Junior, is a product of the xenosphere and depends upon it for her “corporeality.” Better, then, to say that the attachment to corporeality shared by the writers is to a corporeality that is possible within and because of their respective media: a corporeality of air.

To make sense of air as both digital and corporeal in its immediacy, we might return to Suvin's notion of the novum. Emphasizing Air and the xenosphere as distinct from the world we inhabit, from the air as such, misses the opportunities afforded by the novels to think of air's relation to its digital and corporeal immediacies. Instead, air might be considered as a situation in the novels: a situation that uses Air and the xenosphere as its defining infrastructure. To do so, we must first ask: what is a situation? Contemplating this question, Marcie Frank, Kevin Pask, and Ned Schantz turn to Lauren Berlant, who writes:

A situation is a state of things in which something that will perhaps matter is unfolding amid the usual activity of life. It is a state of animated and animating suspension that forces itself on consciousness, that produces a sense of the emergence of something in the present that may become an event.²⁷

Discussing this quote, Frank et al. argue that, while plot and situation are inevitably intertwined, situation is the state of conditions from which events, or plots, emerge; situations are, in other words, the background circumstances of a story. To establish the situation as a narrative category, Frank et al. argue, this background relies on a relationship between at least two elements, which has some consequence for the story. They are situational, rather than plot-driven, because they have the "potential to be utterly impersonal" (i.e., depend on implicit agreements about reality) and because, as they "scale up," "that shared experience spreads."²⁸

So, for example, a narrative situation may be a person trapped under a boulder, as in Danny Boyle's *127 Hours*, or two planets on a collision course, as in Lars von Trier's *Melancholia*. The benefits of situations include plot development, political messaging, and the direction of attention "towards the general conditions and towards their specific features," but perhaps most importantly, they set up "a field of relation among the basic elements of plot, character, setting, and audience," while quietly eroding clear distinctions between narrative and lived experience.²⁹ Focusing on situations creates a ground against which the figures of more substantive narrative categories can be set. This is because situations stress the repetitions of actions or continuations of conditions across time, rather than their changes.

What does it mean to read Ryman's *Air* and Thompson's *Rosewater* for their situations? Perhaps most significantly, it reenters the position of air (and its materialization through Air and the xenosphere). Let's consider how we might present their situations, using Frank et al.'s "elevator pitch" model.³⁰ *Air* describes an isolated village faced with the promise of instant access to the world. *Rosewater* describes an isolated city, as it grapples with the consequences of a similarly momentous break with the past, though here the benefits that accrue to the many take the form of instant healing, and only a few are beneficiaries of instant knowledge about others. In both, it is air

that constructs these situations as different, and worthy of attention: air becomes a second “element” that, when put into relation with the community, establishes the stakes of technological advancement or of covert alien invasion.

Ryman develops this through the internal play on the capitalization of the words ‘air’ and ‘Air’, while Thompson establishes a set of airy situations that evolve across the *Rosewater* trilogy. As a result, the challenges to immediacy are achieved not, as I first suggested, by contrasting digital and corporeal immediacies, but by undercutting this contrast with an implicit challenge to the unchanging and immediate nature of air itself. Indeed, it seems that the most important development of these books might be in foregrounding the lie on which immediacy is premised, that presence is ever actual present, that experiences of air are ever immediate.

As a substance, air provides the means for connectivity. But it does not provide that connection in itself: it mediates this connection through Air or the xenosphere. At the level of the text, we might say that a parallel mediation is found in the language of air, as a metaphor. Ryman, for instance, is always clear to capitalize Air, the product, to differentiate it from air as breathable space. At first, this appears to be a necessary step for semantic sense-making: how else might we understand Air to be a particular device, differentiated from atmosphere, except by capitalization? The novel, however, indulges in greater wordplay between Air and air than merely this. Consider this moment, when Air, the product, is first introduced: Wing stops to listen, “taking nips of smoke from his cigarette.” His wife, Kwan, “fanned the air. ‘Your modern wires say that smoking is dangerous. I wish you would follow all this news you hear.’”³¹ Kwan’s manipulation of the physical air seems to dismiss the informational potential of its digital counterpart. This could be simply where the digital and corporeal meet in the novel, as a tussle over the term air, whose digital effects are outplayed by the ways that the characters address its corporeal aspects. But it also sets up a relation between the two forms of air, which establishes the efficacy of the metaphor, while also negating the possibility that the two could either be separated or conflated. Holding the two forms of air in dynamic tension, the novel seems to suggest that the immediacy it apparently valorizes will always need to be held at some remove, through air’s metaphoric potential, rather than its physical qualities.

Reading *The Wormwood Trilogy* demands a different approach. The sequence of three books allows for something that Frank et al. do not consider: a circumstance where the narrative situation changes from book to book. In *Rosewater*, the situation is constituted by a ubiquity of the xenosphere, which can only be held at bay temporarily, through the liberal use of antifungal cream. In *The Rosewater Insurrection*, however, this ubiquity is threatened, when the triffid-like Beynon plant, a plot device to be sure, attacks the xenosphere and causes it to break down. This means that, once constituting an ever-replicating, inexhaustible data bank, the xenosphere is then given an enemy that can destroy it. By the third book, *The Rosewater Redemption*, the

xenosphere is susceptible not just to an external enemy but also a virus from within, which Kaaro constructs and transports to the Homian data banks. As the virus spreads, the xenosphere begins to collapse. These are certainly plot points; but, I'd argue, they also fundamentally reconstruct the conditions of the xenosphere itself, as laid out in the previous books. If the xenosphere shows that air can be reconstituted, then the consequence of these permutations is to show that such reconstitution is neither stable nor certain; this is an infrastructure that turns out to be fallible and liable to degenerate, either from attacks by competing species or from susceptibility to a virus modelled on computer code. There is, then, a field of relation not simply between the air in *Rosewater* and "the basic elements of plot, character, setting, and audience," but also between the different airs of *Rosewater*, *The Rosewater Insurrection*, and *The Rosewater Redemption*.³² Between these situations, we might even suggest a meta-plot begins to take shape, whereby air's strangeness is asserted, then attacked, and finally becomes susceptible to its own internal weaknesses.

Reading *Air* and *The Wormwood Trilogy* primarily for their situations focuses our attention on air as medium, as material. Indeed, as soon as we turn our attention to air's materiality, what becomes clear is that its "immediacy" parses mediations of culture, scientific understanding, even breathable life itself. Concomitantly, we might observe that mediation is immanent to any form of immediacy, a condition of form itself. As a generic observation, this simply returns us to that foundational doctrine of media studies: Marshall McLuhan's observation that "the medium is the message."³³ But if air is message and medium both, what is to be learned from the tautology? Perhaps, first, that air is a vanishing mediator, or, at least, an object that retreats from view. Presented with such an object, narratives about air can never really settle on what air *is*; they must constantly wrestle with air's entailments across multiple, often contradictory cultural and scientific discourses. Because air is, paradoxically, contradictorily, so saturated with meaning as to become meaningless, its situations provide useful tools for exploring narrative mediation itself. This affords the potential to address other situations where the referent of a particular argument recedes, such as in the *mise en abyme* of contemporary conspiracy theories about air-based illness.

5G and COVID-19

Alongside their more sustained treatment of air, *Air* and *The Wormwood Trilogy* usefully exploit conspiracies and conspiracy theories to further their plots. In *Air*, Mae is introduced to two rival formats of Aircasting: one, developed by the UN, will permit free use of Air, while the other, the Gates format, is private and will be commercialized. Efforts to discredit the UN format are shown to have a commercial incentive. Of course, the use of Gates, as a barely concealed allusion to Bill Gates, has its correlative in long-standing conspiracy theories about Gates and his "hidden agenda" (an agenda which, in different

narratives, ranges from 5G through vaccines to genetically modified organisms). GM (genetic modification), too, is mentioned several times through the novel, as a parallel concern for both Airheads and their detractors. Ryman's conspiracies suggest that the popularization of new technologies generates conspiracy theories, whether these technologies be genetically modified food like the Flavr Savr tomato (released in 1994) or an instantaneous transfer system that beams information directly into one's head.

In *Rosewater*, the realization that the Homians are planning to invade by using what seem to be their greatest gifts—the power of healing and the xenosphere—confirms the novel as *sf noir* detective fiction by offering, as its key hook, the opportunity to uncover this plot, without the means to resolve it. Subsequent conspiracies, between Aminat and the Homians, between the Homians and the people of Rosewater, and finally between Kaaro and his compatriots, all resolve, as conspiracies usually do, in the disclosure of secrets to some and not others. Thompson parallels these more fantastical conspiracies with repeated allusions to forms of collective belief that characterize Nigerian society, which he figures through quasi-fantastical or magical images. One such image appears when Kaaro is discovered to have stolen his mother's jewelry. She uses her thief whistle, which summons a mob ready to dispense justice, without judge or trial. The shared identity of the mob, described as a “tentacle,” emerges, it seems, from the whistle, indexing a shared belief that justice must be dispensed by communities and not by corrupt officials to the collection of the mob's members via the air passing through the whistle.³⁴

There is, then, a way in which reading the plots of these novels leads from air through conspiracies about new technologies to violence. How then might this model our responses to conspiracy theories that many people do not take as fictions? To consider this, let us return to 2020, when anti-5G conspiracy theorists found new support in reactions to COVID-19. In March 2020, during an anti-vaccination conference in Tucson, Arizona, Thomas Cowan, former physician and holistic health practitioner, argued that the COVID-19 infection was connected to 5G, the fifth generation in cellular network technology. This, he continued, was just the latest in a history of radio-wave-induced illnesses that extends back to the launch of commercial radio and the 1918 influenza pandemic. When former footballer David Icke called COVID-19 a “hoax” orchestrated by an international cabal on Brian Rose's “London Real” YouTube channel in April, the video went viral. By Easter, polling suggested some 8 percent of the UK population believed in some connection between COVID-19 and 5G. Twenty suspected arson attacks were made on phone masts over the Easter weekend of that year, in addition to the twenty-something phone masts vandalized the weekend before. Memes emerged, like that of the £20 banknote, which supposedly pictured a 5G mast alongside the SARS-CoV-2 virus, but which subsequently turned out to be Margate lighthouse and the staircase of Tate Britain. Things snowballed, as a *mélange* of pseudoscientists, celebrities, quacks, and YouTube talking-heads asserted, variously, that 5G caused COVID-19 itself, that it was responsible for the

symptoms falsely associated with COVID-19, and that COVID-19 was simply a fabrication deployed by governments to enable a faster rollout of 5G infrastructure.

Of course, these stories have a longer history, both during the emerging pandemic and before. When Cowan gave his speech, fringe commentators had already been debating the link for a couple of months. As early as January 19, 2020, tweets were suggesting a link between the disease and 5G exposure, based on the proliferation of “5G base stations” in Wuhan. Cowan himself was presumably following these lines when he asserted, wrongly, that Wuhan was the first city to have complete 5G coverage. Given that the WHO only declared COVID-19 an outbreak on January 30, 2020, there was surprising alacrity in associating COVID-19 and 5G. They could become entangled so quickly, in all probability, because key conspirators had been trying to pin various problems to 5G for years. Self-described weapons expert Mark Steele, for instance, has maintained that 5G is part of a distributed Kill Grid, responsible for 400 deaths. In 2018, he argued that children were being “microwaved in their beds.”³⁵ All these aped similar protests, complaints, concerns, and conspiracies that accompanied the introduction of 4G, 3G, and, as Cowan’s speech suggests, even commercial radio broadcasting in the early twentieth century.

How, you’d be forgiven for asking, does this relate to the materiality of air? Certainly, anti-5G propagandists depend, implicitly or explicitly, on air as the space through which the waves must pass, and whose qualities these waves exploit to generate their ill effects. Steele, for instance, has adapted the process by which ozone (O₃) is formed in the upper atmosphere (through absorption of shortwave ultraviolet rays) into a pseudoscientific account of radio waves “charging” the air, whereby radiation “gets stuck in the oxygen molecule,” “breaks its covalent bonds” and leads to the formation of “O₃” which “kills any biological structure at fifty parts per million.” Combining the language of basic high school chemistry with a “folksy” version of wave-particle duality—“charged” waves lead to particles of radiation “getting stuck”—such accounts appeal to the same scientific authority whose representatives they frequently dismiss.³⁶ Not only does this result in stylistic infelicities like the expression “kills any biological structure”; it positions the speaker in the same epistemically privileged role often granted to scientific experts. We might follow Steele down the rabbit hole, as we try to unpack the contradictions, conflicting logics, and outrageous claims upon which *his* notion of air depends, and, in so doing, come up with the ways that, in the face of competing theories, air’s materiality begins to fracture into different narratives about materiality. However, I am more interested in how this narrative justifies fears that seem to coalesce about the air and what it carries. From this, we can establish air’s *narrative* function: as a mediator, container, but also as a sometime amplifier, sometime impediment to transmission. In this capacity, even as it mediates, contains, amplifies, and impedes *materials*, it also mediates, contains, amplifies, and impedes *concerns* and *affects*.

In this regard, air functions somewhat like conspiracies, which, like air, mediate, contain, amplify, and impede materials, concerns, and affects. Further, air, perhaps, can be said to supply the very medium of conspiracy. Recall the etymology of conspiracy, in the Latin term *conspiratio*, which means a literal “breathing together.” The *conspiratio*, recalls Ivan Illich, names a moment in the Christian liturgy of the first century, when participants share a mouth-to-mouth kiss, “sharing their breath or spirit with one another.” Later replaced by the euphemism *pax* and with a staid handshake, the notion of the *conspiratio* and its bastardization into conspiracy still implies a meeting of like minds, whose metaphorical meaning today echoes an earlier, more material embrace. Air, in this regard, enables such meeting and comingling to happen; this shared atmosphere, Illich writes, is carried by “the air that weaves and wafts and evokes memories.”³⁷ In an age when most conspiracies are carried on the very fiberoptic cables or 5G waves that people like Mark Steele are railing against, this air is obviously metaphorical. But, if anything, *Air* and *The Wormwood Trilogy* show us that air is always both material and metaphorical, and that its composition is determined by the narrative frame brought to bear upon it.

Conspiracy theories usefully illustrate this, since, in addition to being carried on the air, they too can be understood as narrative frames that make sense of phenomena. Michael Barkun makes this clear when he distinguishes conspiracies from conspiracy theories: “Conspiracies are actual covert plots, planned and/or carried out by two or more persons. Conspiracy theories, on the other hand, are intellectual constructs. They are modes of thinking, templates imposed upon the world to give the appearance of order to events.” If conspiracies describe actual instances of collusion, conspiracy theories provide frameworks that explain a deep sense of unease about the status quo, while inducting their consumer into a “self-identified elite, differentiated from what they often view as the ignorant, herd-like public.”³⁸ Importantly, conspiracies have a determinable fixed referent, whereas the referents of conspiracy theories can change, according to their narrative value. Building on Barkun’s work, Timothy Tangherlini et al. have argued that conspiracy theories have a narrative structure, in part because, as constructs, modes, and templates, they only exist in narrative, as narrative exposition of various phenomena.³⁹ Turning to the prominent Pizzagate theory—the belief that various US political elites were operating a pedophile sex-trafficking ring out of a Washington DC pizza store—Tangherlini et al. show how conspiracy theories establish a stable narrative fairly quickly, and resist significant alteration unless they can be successfully absorbed into larger theories, as in the case of QAnon. In a subsequent paper by the same team (lead author Shadi Shahsavari), they suggest that a further consequence of this narrative ontology lies in the relative freedom of contributors to the conspiracy theory to attach it to other conspiracies: narrative bids that may or may not be taken up in the marketplace of conspiracy theories, but do account for the heterogenous associations that some of these develop.⁴⁰

So, for instance, the airborne nature of the non-ionizing electromagnetic radiation emitted by 5G lends itself nicely to association with COVID-19, an airborne virus, spread by the exhalation of aerosolized fluids. COVID-19 had loaded, even overloaded, the air with an aura of threat, much like that exuded, on a much smaller scale, by 5G for its detractors. In this atmosphere, the cumulative effect of masking, social distancing, and public health messaging was to grant air a narrative thickness, or rich descriptive detail, at the height of the pandemic. We might say that this thickness had a correlative effect of focusing our attention on materials in the air and, by extension, the materiality of air itself. Rather than dispute the essential dimension of threat from the air, anti-5G advocates could shift the threat's point of origin, from the virus to 5G, while retaining the essential threat itself. This is also why the same story elements keep cropping up: ivermectin and its suppression by mainstream medicine; George Soros and the global cabal; Bill Gates and microchips in vaccines; politicians, pedophile rings, and pizza delivery shop basements. Their truth-value largely irrelevant, the story elements are often used and discarded as conspirators test out different versions of possible conspiracies on platforms like 4chan and Reddit until they stumble on one that finds traction, is shared widely, goes viral, and makes its way into more mainstream discussion. If conspiracy is, as the etymology suggests, a matter of breathing together, then the metaphorical shared air of internet chatrooms cements together shared narratives that have very real consequences IRL.

I close this chapter with conspiracy theories about COVID-19 and 5G, not just because they give voice to contemporary anxieties about hyperconnectivity and its potential health detriments, but because they too, in their own way, interrupt the immediate, obvious, and present by introducing new forms of mediation, new layers of meaning, new inflections on the data that air is presumed to carry. Air's materiality may be shaped by narrative, but, in a real sense, narrative constitutes air's material. Nowhere is this more evident than in the ways that air flick-flacks between the metaphorical and the material. The two are folded together, or, perhaps more accurately, present a Möbius strip, as metaphor blends into material and material into metaphor. In this way, perhaps, air finds its materiality as what Connor calls a "body of thought." "From being an image of the immediacy of thought," he continues, "the air became an image of the mediate matter of thought. ... The air has become mediation itself. We find our own image in this mediate matter (mediated and mediating), not just because we communicate through our (largely airborne) media, but because we are the throughput of those mediations."⁴¹ Freeing as these forms of recursive mediation may be, they find their unpleasant inversion in the stories that people tell to make sense of frustration, fear, and shame—stories that, as they gain traction, become theories, accusations, doctrines of belief. If such stories offer a palliative to the problems of immediacy that Kornbluh diagnoses, we would do well to recall that such palliatives may leave matters of truth up in the air.

Notes

- 1 Geoff Ryman, *Air; or Have Not Have* (London: Gollancz, 2006); Tade Thompson, *Rosewater* (London: Orbit, 2018); Tade Thompson, *The Rosewater Insurrection* (London: Orbit, 2019); Tade Thompson, *The Rosewater Redemption* (London: Orbit, 2019).
- 2 Ryman, *Air*, 1.
- 3 Ryman, *Air*, 9.
- 4 Ryman, *Air*, 19.
- 5 Ryman, *Air*, 6, 7.
- 6 Ryman, *Air*, 10.
- 7 Ryman, *Air*, 390.
- 8 Thompson, *Rosewater*, 76.
- 9 "Interview with Tade Thompson," *Tannhauser's Gate*, August 2018, <http://tannhausersgate.over-blog.com/2018/08/interview-with-tade-thompson-vo.html>.
- 10 The plant is named the Beynon plant, after John Wyndham Parkes Lucas Beynon Harris, better known as John Wyndham, the writer of *The Day of the Triffids*, whose eponymous vegetal invaders are its inspiration.
- 11 Darko Suvin, "Science Fiction and the Novum," in *Defined by a Hollow: Essays on Utopia, Science Fiction, and Political Epistemology* (Bern: Peter Lang, 2010), 68.
- 12 Steven Connor, *The Matter of Air* (London: Reaktion, 2010), 195.
- 13 W.E. Ayrton, "Sixty Years of Submarine Telegraphy," *The Electrician* 42 (February 19, 1897): 548.
- 14 Connor, *Matter*, 198.
- 15 Connor, *Matter*, 11, 12.
- 16 Karl Marx and Friedrich Engels, *The Communist Manifesto* (London: Penguin Books, 2002), 223.
- 17 Anna Kornbluh, *Immediacy; or The Style of Too-Late Capitalism* (London: Verso, 2023), 5.
- 18 Kornbluh, *Immediacy*, 5.
- 19 Kornbluh, *Immediacy*, 28.
- 20 Kornbluh, *Immediacy*, 30.
- 21 Kornbluh, *Immediacy*, 30.
- 22 Ryman, *Air*, 23.
- 23 Kornbluh, *Immediacy*, 13.
- 24 Thompson, *Redemption*, 367.
- 25 Kornbluh, *Immediacy*, 42.
- 26 Ryman, *Air*, 389.
- 27 Lauren Berlant, *Cruel Optimism* (Durham, NC: Duke University Press, 2011), 5.
- 28 Marcie Frank, Kevin Pask, and Ned Schantz, "Situation: A Narrative Concept," *Critical Inquiry* 50, no. 4 (2024): 660.
- 29 Frank, Pask, and Schantz, "Situation," 659, 661.
- 30 Frank, Pask, and Schantz, "Situation," 660.
- 31 Ryman, *Air*, 6.
- 32 Frank, Pask, and Schantz, "Situation," 661.
- 33 Marshall McLuhan, *Understanding Media: The Extensions of Man* (New York: McGraw Hill, 1964), 7.
- 34 Thompson, *Rosewater*, 98.

- 35 Ian Johnson, "Children Are Being 'Microwaved in Their Beds' by 5G Transmitters, Campaigner Tells Court," *Chronicle Live*, September 1, 2018, <https://www.chroniclelive.co.uk/news/north-east-news/children-being-microwaved-beds-5g-15087406>.
- 36 Mark Steele, "The Dangers of 5G," *Democrats and Veterans*, January 19, 2019, <https://vimeo.com/312295416>.
- 37 Ivan Illich, "The Cultivation of Conspiracy," in *The Challenges of Ivan Illich: A Collective Reflection*, ed. Lee Hoinacki and Carl Mitchum (Albany, NY: SUNY Press, 2012), 240.
- 38 Michael Barkun, "Conspiracy Theories as Stigmatized Knowledge," *Diogenes* 62, nos. 3–4 (2015): 114, 115.
- 39 Timothy Tangherlini et al., "An Automated Pipeline for the Discovery of Conspiracy and Conspiracy Theory Narrative Frameworks: Bridgegate, Pizzagate and Storytelling on the Web," *PLoS ONE* 16, no. 6 (2020): e0233879. <https://doi.org/10.1371/journal.pone.0233879>
- 40 Shadi Shahsavari et al., "Conspiracy in the Time of Corona: Automatic Detection of Emerging COVID-19 Conspiracy Theories in Social Media and the News," *Journal of Computational Social Science* 3 (2020): 279–317. <https://doi.org/10.1007/s42001-020-00086-5>
- 41 Connor, *Matter*, 31.

PART III

AIR AND ART:
PRESENCE, SIGNIFICANCE,
ACTIVISM

A Deep, Slow, Strenuous Breath: Art in the Shadows of Capitalist World-Ecologies

Raphaëlle Occhietti

[T]he skies and the earth are in a continuous dialogic relationship. When she [Bopape] mirrors cosmic phenomena on the land or the soil in her work, she is drawing from this dynamic that I have elsewhere called *terra-firmament* (continuity between earth and the cosmos, the earthly and celestial) which in our limited perception can be understood through dynamics such as condensation and rain. But it runs deeper in the comprehension of the people, in the texturalities of their mythologies.

Uhuru Phalafala, “Cosmic Footnotes to a Soil Dance”¹

[A]s plentiful as the air you breathe—whether it be good or bad—and that I don’t know.

Elizabeth Gaskell, *North and South*²

Capitalism and neoliberalism carry wars within them like clouds carry storms.

Éric Alliez and Maurizio Lazzarato, *Wars and Capital*³

In a commercial launched by the American corporation United Fruit Company close to its fifty-year anniversary, the opening scene, set in a stylized tropical world of soft pinks and blues and greens, shows a steamboat from which the evaporating steam forms the company’s new brand name, “Chiquita Banana,” in the sky.⁴ Produced in the 1940s and lengthy by today’s standards, the video advertisement features a singing banana à la Carmen Miranda, wearing a bowl of fruit as a hat, in this case with the top of her head—her own cut stalk—serving in itself as the fruit filling the bowl. Her audience is a group of white middle-aged men who embody the corporate profit-makers, and

who look quite greedy and grotesque while they contemplate the exoticized and sexualized figure of the dancing and singing woman banana. Created at the end of the nineteenth century, the United Fruit Company “came to control vast territories and transportation networks in Central America, the Caribbean coast of Colombia, and the West Indies” while maintaining a quasi-monopoly in banana production; countries where the United Fruit Company tampered with local politics would even come to be known as “banana republics.”⁵ The history of the United Fruit Company is in fact fraught with violent episodes, dispossession, and unfair treatment of workers.

Fast-forward to 2024, and Chiquita Brands International—the name adopted by the United Fruit Company in the 1990s for the entire corporation—is once again launching a visually attractive advertising campaign that similarly appeals to popular culture by stylizing nature.⁶ Alongside the recurrent and easy subtitle “pop by nature,” the overall visuality of the advertisements empties what pop art would sometimes attempt to criticize about consumerism in its elevating of ordinary consumeristic objects. Furthermore, the explicit use of “nature” is a direct prompt for consumers to equate the banana with an idealized concept of “nature” as healthy, even though the advertisements are totally devoid of any connection with actual ecosystems. The bananas are individually set against a background of lively colors and joyful patterns while rigorously sporting the blue, white, and yellow Chiquita brand sticker displaying the famous lady with the fruit hat. Both advertisements illustrate how from the 1940s to the 2020s, the industry and economic interests have conveniently tried to camouflage what production often entails. Who would really say that today there is no more violent exploitation or protection of monopolies in the plantations that produce the “tropical” fruits shipped to North American and European markets? In fact, on June 10, 2024, the National Security Agency of the United States announced: “Today, an eight-member jury in West Palm Beach, Florida, found Chiquita Brands International liable for funding a violent Colombian paramilitary organization, the United Self-Defense Forces of Colombia (AUC), that was responsible for major human rights atrocities during the 1990s and 2000s.”⁷ A momentous decision, “[t]his historic ruling marks the first time that an American jury has held a major U.S. corporation liable for complicity in serious human rights abuses in another country,” as EarthRights International, the nongovernmental and nonprofit organization that, among other law firms, represents victims in the matter, reports.⁸ Though the ruling highlights recent crimes of the corporation, the fact remains that this kind of violence has been endemic to the corporation’s activities since its founding. United Fruit Company, now Chiquita Brands International, represents one of the many elements of the capitalist economic infrastructure that actively rely on violence of one sort or another to compete and attain economic goals of profit-making.

In the 1940s advertisement, the steam lettering of “Chiquita Banana” shows the United Fruit Company’s branding of air as a way to assert dominion over the whole ecology of Latin American countries where it holds plantations

and swings the course of local political life. In an unintended way, the 1940s advertisement demonstrates how much the spheres of agricultural production, mobility, control of territories, energy, and profit-making are closely intertwined in a capitalist economy. Branding the sky with the name of a powerful corporation from the United States epitomizes the conceptualization of air in capitalist terms. And in the more recent advertisement campaign, the staged bananas are still odorless and totally cut from the plot where they were produced, set in a kind of advertisement bearing witness to a cultural ambience that continues to obscure the violence, toxic contamination, and exploitation fostered by agribusiness to this day. The 1940s video advertisement apparently proved fruitful, especially through its jingle, as Kevin Coleman notes:

The United Fruit Company launched a wildly successful advertising campaign built around a half-banana, half-woman cartoon character. Based on Miranda's signature carnivalesque Afro-Bahian market-woman costume, Chiquita Banana performed a calypso that established the singing commercial: "I'm Chiquita Banana / And I've come to say / Bananas have to ripen / In a certain way."⁹

"Bananas have to ripen in a certain way" begs the question: what is the odor of ripe bananas, and what would it mean to stay still and breathe it in; what other rot does it signal? Branding and advertisement are effective means to camouflage the past and current conditions of the cultivation and creation of a modern crop like the bananas sold worldwide today. They furthermore serve as a means to hide the realities of the lands and cultures appropriated, and of the slaves and workers enlisted, transported, and attacked as part of an ecological expansion of some European countries and its continuation by the United States.¹⁰ This is true not only of banana cultivation but of the entire ecological order of the socioeconomic system known as capitalism. Could molecules of the ripe banana and its allied materialities counteract the steam of the all-conquering corporate logic that still lingers in the air?

And what "air" are we breathing in and speaking of, then? An abstract notion like "nature?" No, of course, the last thing we would want is to transfer the stereotyped pristine and separated vision of "Nature" to another of its elements;¹¹ many authors have shown how a divorced and implicitly exclusionary definition of nature is functional to economic thinking and operation. However, when speaking about air, it almost seems inevitable to generalize. And should it not be so? Should not "air" be ubiquitously the same, a general commons that, even more so than the soil, should be standard and durably homogeneous? This competing logic is interesting inasmuch as it reveals that to guarantee a foreseeable future for air-as-precondition-for-life, we must address air-as-a-capitalist-victim. And yet "air" cannot be considered a given because it is irremediably subsumed in the capitalist ecology, in the capitalist "order and creorder."¹² In fact, examining the question of the materiality of air presents the double challenge of confronting the very materiality of the

consequences of capitalist destruction, of which air is a major issue, as well as addressing the cultural climate that authorizes a division of the world between who gets to appropriate and who is forced to comply. What “air” are we speaking of then? Of air-as-resource, of air-as-sink, and of air-as-denial, as one out of many repressed elements that economics fails to account for in its description of optimal economical processes. This means that air is not neutral not only because it is physically contaminated by capitalist scoriae, but also because it holds an ontological status in capitalist societies that conveniently “forget air,”¹³ all the while using it in an exploitative manner. It is this definition of air that some artists are working against.

For these reasons, I will analyze artworks that showcase engagement with air specifically via olfactory elements. Olfactory art has garnered some attention in recent years,¹⁴ and its specificity presents fertile ground to tackle pressing issues of the contemporary condition. As Hsuan L. Hsu, a professor in literary studies specializing in olfactory studies and environmental humanities, explains, “As an inherently trans-corporeal form, olfactory art defies the spectatorial logic that organizes both art galleries and commonsense perceptions of ‘Nature’ as a space that is distinct from the human.”¹⁵ Smells are an extraordinary medium since “[o]lfaction is also deeply bound up with material atmospheres and trans-corporeal ecologies and thus conveys embodied engagements with issues of geographic inequity and environmental health”; and “[b]ecause smell is conditioned and inflected through material smellscape, decolonizing smell is not just a metaphor for changing how one thinks or perceives: it requires material transformation of both land and air.”¹⁶ As beautifully summarized by French anthropologist Joël Candau, “Invisible and intangible, smells are nevertheless material.”¹⁷

Within the disciplinary focus of art history, acknowledging the materiality of air unlocks much more than considering the physical properties of the singular molecules that compose this mixture of gases. How does art render and make palpable this materiality as something that bears meaning? And is it an end in itself? Air interlocks with so many levels of reality, like pollution of course, but also politics and semiotic processes. But by questioning this materiality of air as hinged to the predictable failures of capitalism and its many violations, past and present, specific interpretation challenges emerge that contemporary art is singularly equipped to address. I want to highlight actual odors in artworks and the alteration in the composition of air to which they testify, as a meaningful way to confront the nature of the air that capitalism imposes. But smell itself is not an end, either. I thus concentrate on two artworks by two contemporary artists, South African artist Dineo Seshee Raisibe Bopape and Colombian artist José Alejandro Restrepo, that allow for an expanded if slightly nonconventional exploration of the materiality of capitalist air.¹⁸ In their respective artworks, both artists first engage visitors through the olfactory elements of their respective installations; however, they do so while still firmly grounding their installations in natural materialities that give shape to human figures. This is an importantly specific feature, since

in inserting a human presence, and not a generic one but a connoted one, of people who fought and resisted, were crushed or won, the artists potently inscribe the exploitation of human labor into the exploitation of nature. Even though air is not ostensibly the focus of attention in the two installations, their eloquence stems precisely from this subtle yet sustained transformation of the air's composition as a temporary device that alters the visitors' own corporeal postures. I propose to link these two artists' contributions—one of the first if not the first direct comparison of their work—as operating in continuity. José Alejandro Restrepo's artwork *Musa paradisiaca* was created in 1996, with its first installation in the United States in 2017, while Dineo Seshee Raisibe Bopape's career gained traction in the mid-2010s, with the first iteration of her artwork *Lerole: footnotes (The struggle of memory against forgetting)* in 2017. The existing continuity I identify here between these artworks is not only temporal or linear, but conceptual, material, and circular. I do not derive any new periodization from this intellectual vicinity, but show how envisioning these two artworks simultaneously forms a sort of echo chamber that highlights how these installations enrich the air's density both materially and metaphorically. With its trail of pollution, social injustice, exploitation, massacres in the name of private property and profit, capitalism as a socioecological system professes a poisonous rhetoric that devastates Earth's life-supporting systems and threatens any dignified presence of humanity in this delicate, beautiful, and complex "web of life."¹⁹ The atmospheres of capitalism are putrid.

José Alejandro Restrepo's *Musa paradisiaca* and the Pestilence of Capitalism

The dazzling installation *Musa paradisiaca* was created by Colombian artist José Alejandro Restrepo in 1996, and has been reinterpreted a number of times since then, at least once in the United States but primarily in Colombia, with the most recent exhibition at the Museo de Arte Moderno de Medellín in 2023–24.²⁰ Composed of bunches of bananas hanging from the ceiling, the installation's impressive effect relies on the fruits slowly decaying, eventually revealing the bunches' cores which eerily resemble human spines. Adding to this frightful and poignant image, the smell of the rotting bananas gradually pervades the installation room (see Fig. 7.1). As prominent art historian Mari Carmen Ramírez described it in 2017, the artwork presents itself "with dense clusters of real, rotting and stinking bananas that evoke hanging bodies in a spectacle that stimulates both the eye and the senses."²¹ Another commentator of the 2016 iteration in Bogotá mentions that the work "saturates the three-floor exhibition space with the acrid smell of overripe fruit."²²

Restrepo's installation plays on the discrepancy between the inviting title—the botanical name, evoking a tropical paradise, invented by biologist Carl Linnaeus for a type of banana—and the masterful evocation of the 1928 massacre of peaceful striking banana plantation workers in the town of



Fig. 7.1. José Alejandro Restrepo, *Musa paradisiaca*, 1996. Installation view at LAXART, Los Angeles, 2017. Photo Ruben Diaz. Courtesy the artist and The Brick, Los Angeles.

Ciénaga, Colombia, perpetrated by federal troops under the influence of the United Fruit Company.²³ The power of this installation lies in the fact that the viewer comes to equate the rotting fruit with human bodies in decomposition. As such, this is an artwork that deftly embodies how capitalist economies build upon the consumption and destruction of labor force, matter, and ecosystems, in order to guarantee the creation of profit. By falling on the ground, slowly revealing the banana tree stems' resemblance to human spines, the ripe bananas become a magnificent and potent medium whose scent and subsequent stench take hold of the visitors' senses.

The way the artist drastically recomposes the air of the exhibition venue by rendering it unpleasant to breathe is an essential feature that expands the range of the critique of capitalist *modus operandi*. It is instructive to envision Restrepo's installation as a forerunner in a genre of recent artworks relying on former colonial products installed directly into the exhibition space, which thus comes to bear the stamp of each of these products' distinctive scents. I am thinking here especially of artworks that work with sugar, like Kara Walker's *A Subtlety, or the Marvelous Sugar Baby* (2014), María Magdalena Campos-Pons' *Alchemy of the Soul* (2016), and Beatrice Glow's *Blanc: Le Colonial* (2016), among others; also recently installed are the Cercle d'Art des Travailleurs de Plantation Congolaise's sculptures of cocoa, sugar, and palm oil which pervaded the Netherlands pavilion at the 60th Venice Biennial

with a sweet and slightly nauseating scent.²⁴ This kind of artwork provides some of the most thought-provoking contributions in contemporary art, which address the history of the production of food commodities for markets in Europe and the United States in colonial and postcolonial settings. In fact, if we consider that “[t]he cradle of modernity is no longer the enclosures, Enlightenment, and the Industrial Revolution, but conquest, colonization, and forced labor in the New World, Asia, and Africa,” as Wendy Wolford keenly states,²⁵ then these artworks address much more than simply agriculture. Instead, they give a testimony of one of the major areas of organization by capitalism that defined “[a] commodity frontier strategy [that] was central to an epochal shift because it raised labor productivity by treating uncaptialized nature as a force of production,” emphasizing what Jason W. Moore coins as “Cheap Nature.”²⁶ By allowing sugar, cocoa, tobacco, or fruits to “speak” through their smell, these different artists open a sensorial space to a past that still very much structures the present. Because they oblige visitors to consciously connect with these stories, to take in the smell whether they like it or not, these artists foster a rewiring of the way parts of the history and current functioning of capitalism are received, remembered, and contested. Their artworks engage visitors through an embodied incorporation of the meaning of overproducing these crops for capitalistic purposes that brilliantly translates into the saturated atmospheres of the exhibition rooms, echoing the compulsive quest for production. What stands out in Restrepo’s installation is the almost untransformed aspect of the bananas that seem to hang as if still in the plantations. This nearly unmediated presentation of the fruit and the releasing of odorous molecules brings the spectator in even closer contact with the actual reality of banana plantations and the violence inflicted on bodies and ecosystems.

The decaying process of the fruit is the core of *Musa paradisiaca* as the artist intrinsically links vegetal matter to human flesh, thus merging the fruit with the immense work and violence endured by workers prior to product exportation. Curator and critic Jennifer Burris smartly links Restrepo’s artwork to a passage in Gabriel García Márquez’s book *Cien años de soledad* (*One Hundred Years of Solitude*) that alludes to the 1928 massacre, where the author compares piles of bodies of the assassinated strikers with piles of bunches of bananas ready for exportation.²⁷ Restrepo pushes even further the literary operation of inter-materiality. Adding to the visual and textual conflation between banana bunches and bodies, the decaying process of the bananas in the exhibition space amplifies the merging of flesh as the viewer equates the rotting fruit with the decomposition process of human bodies. It is important to note that the conflation with bananas is not merely made with any dead bodies, but with the bodies of the very people exploited for export production that thus come to resemble the fruits to which they are bound by capitalist labor.²⁸ As Jason W. Moore states, “let us not forget that capitalism is premised on the dissolution of human specificity—craft knowledge and the like—that is embodied in the incessant drive to replace ‘living’ with

‘dead’ labor.”²⁹ Thus, what Silvia Federici comments about the capitalist class in early modern Europe and its expansion in the “New World” is actually prolonged well into the twentieth century, made apparent in Restrepo’s work: “In other words, primitive accumulation consisted in an immense accumulation of labor power—‘dead labor’ in the form of stolen goods, and ‘living labor’ in the form of human beings made available for exploitation—realized on a scale never before matched in the course of history.”³⁰ It is quite interesting to note that even the United Fruit Company, which was involved in the massacre of its own workers, had to recognize that the racialized workforce had been pivotal in achieving their production goals.³¹

Notably, here in the installation, the “living labor” becomes “dead labor,” and Restrepo thus magnificently materializes the fungibility of human and extra-human nature on which capitalism relies.³² In Restrepo’s artwork, the bunches are not piled up, but rather in hanging position, hence bringing the spectator directly into an imagined plantation and its “plantocracy” order, to use a term coined by Eric Williams in his seminal work *Capitalism and Slavery*.³³ But most importantly, whereas in García Márquez the bunches of bananas resembled human corpses only because they were piled horizontally and thus echoed the workers’ corpses fallen to the ground in a similarity of shape, with Restrepo the human body *emerges from* the decaying fruits that reveal the central structure of the floral stem of the banana tree (see Fig. 7.2).

So, not only do the bunches of bananas come to resemble the rib cages of hanged human corpses, but as the bananas mature, decay, and fall, they also reveal the underlying branch—the rachis—that holds them, thus leaving in the exhibition space these grim, human-spine-like dangling structures. In fact, by detaching from the stalk, the bananas—arranged in “hands” and “fingers”—leave a raised scar on the rachis where they were attached by their pedicel. The long, curved branch, stripped of its rotting fruits, is left with a wavy texture, as if composed of vertebrae. Restrepo thus creates a monument to the workers who gave their lives to produce staple food under wrongful conditions, but he suggests a more complete ecosystem in which fruits, too, give life to humans. Restrepo simultaneously represents what capitalism does—the transformation of human labor into value at the cost of the destruction of labor power and ecosystems—and offers a glimpse at how to oppose this ecological order.

Restrepo and García Márquez are not alone in revealing how capitalism equates the exploited human flesh with agricultural commodity. In *Decolonial Ecology: Thinking from the Caribbean World*, Martinican author and researcher Malcom Ferdinand most movingly starts every chapter with a sort of poetic and thus even more distressing description of the names and trajectories of different slave ships as the carriers of what capitalists saw as products. At the start of Chapter 8, both tobacco and bananas are featured as intertwined with the fate of enslaved Africans: “Like the tobacco of the same name, the Cavendish compressed 170 leaf-bodies within the wood of the slave ship,” and people captured on the African continent were transformed into a



Fig. 7.2. José Alejandro Restrepo, *Musa paradisiaca*, 1996. Installation view at FLORA ars+natura, Bogotá, 2016. Photo Gonzalo Angarita. Courtesy the artist and FLORA ars+natura, Bogotá.

“material”, “moist and sweet, [that] could be extracted [and] that would perfume the plantations.”³⁴ The chilling evocation of the fate of Africans is made absolutely more harrowing precisely because the pleasant smell of the final product is in such stark contrast with the realities of the capture and deportation of millions of people from Africa.³⁵ Ferdinand follows the story of the slave ship: “In the port of Liverpool, on June 6th, 1757, the British ship Cavendish set sail for the Atlantic coast of Africa”; however, “[c]aptured en route by the French, the ship was brought to Guadeloupe, and 151 dried-out bodies were unloaded as colonial manure to be spread on the hillsides of Basse-Terre.” Here, like tobacco leaves, the kidnapped Africans have lost vitality, and their fate will be to decompose and nourish the foreign soil with their dead bodies. But first they are also soon tasked with a new production crop: “At the end of sugar cane’s reign, another Cavendish, the dessert banana variety, docks in Guadeloupe. The Cavendish carries within its flesh working class miseries and racist hierarchies, misogynistic warehouses and shaded pain, toxic storms and collapsed landscapes, in order to extract in return a profitable, tender, and savory taste that enlivens the palates of the North.”³⁶ Ferdinand too sees how the flesh of the banana destined to exportation markets bears miseries and injustices of class, gender,³⁷ and race in its molecular structure, defiling practices that cross ecological realms and atmospheric contexts. It is precisely these molecules that are released in the air in Restrepo’s staging of banana bunches in relation to agribusiness. The ripening process of the fruit made tangible through smell echoes the many ways capitalism degrades

environments and social relations, and thus, with a very minimal gesture, Restrepo evokes a whole socioecological order. In *Musa paradisiaca*, what suffocates visitors is as much the odor of decomposition of the human-fruit flesh that releases molecules into the air, as the gangrenous and putrefying ethos of capitalist activities. The stench in Restrepo's installation manifests the decaying human flesh and the exhausted soil and air alongside their spoiled joint fruits, as part of the rotten core of capitalist operations.

Activating the Air in Dineo Seshee Raisibe Bopape's *Lerole: footnotes* (*The struggle of memory against forgetting*)

As visitors move between sections of adobe brick walls organized with different heights, discreet smells of sage and other medicinal herbs, dry earth, and charcoal unite in a delicate and coherent presence in South African artist Dineo Seshee Raisibe Bopape's *Lerole: footnotes (The struggle of memory against forgetting)* (2017) (see Fig. 7.3). The setting of the installation is reimagined for each new exhibition location, but always with the same ensemble of earthy materials forming the core of the artwork. While the "separate piles of unfired earth bricks arranged in geometric constellations that create a sculptural landscape" may appear barren,³⁸ in reality they play host to a number of elements that foster an enriched sensorial experience. In fact, the latter's specific olfactive particles blend into a peculiar smell that becomes one of the distinct structuring elements of the installation. The scent here is neither sweet nor pungent, nor is it completely "natural" or strictly artificial. It has something akin to the identity of ritual spaces like churches or yoga rooms, without being wholly limited to such spaces. It is not easy to convey the range of intellectual and sensorial experiences created by *Lerole: footnotes (The struggle of memory against forgetting)*, as it is an artwork that truly calls for an on-site exploration, encouraging visitors to slowly take in every aspect.

In a recent presentation in the solo exhibition "Born in the first light of the morning [moswara'marapo]" held in the Pirelli HangarBicocca contemporary art center in Italy in 2022–23, *Lerole: footnotes (The struggle of memory against forgetting)* occupied the far-right corner of the exhibition room, but the spatial delimitation of the installation did not rely exclusively on the brick walls.³⁹ The installation is described as a "sensorial work, characterized by both olfactory components ... and acoustic ones, with portable record players spreading the sound of the roar of African oceans, rivers, and lakes recorded by the artist during her travels or by friends."⁴⁰ Both of these less conventional dimensions—olfactive and acoustic—are added to textures, movements, sight, and knowledge that blend into one whole. The subtle mix of scents forms the intentional backdrop from which to enter into the various dimensions of the installation, simultaneously helping to delineate in the exhibition space a specific physical area as well as an intangible identity made of olfactive components.

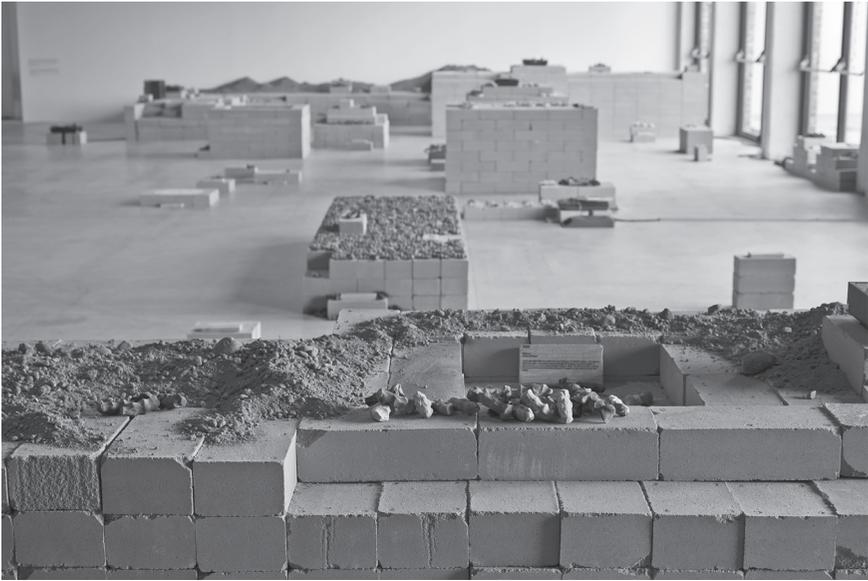


Fig. 7.3. Dineo Seshee Raisibe Bopape, *Lerole: footnotes (The struggle of memory against forgetting)* (detail), 2017. Installation view at Pirelli HangarBicocca, Milan, 2022.

Courtesy the artist, Sfeir-Semler Gallery, Beirut/Hamburg and Pirelli HangarBicocca, Milan. Photo Agostino Osio.

Positioned with great care throughout the space and on the bricks are engraved wooden plaques, each presenting a text recording an event of resistance that took place on the African continent, mostly against European imperialism (see Fig. 7.4).⁴¹ Presented in the exhibition catalogue as a disordered chronology, these events, a hundred in all, start somewhere in the eighth century but rapidly increase in number from the year 1400. European attempts of conquest range from the appropriation of lands and of people, to tampering with landscapes and the robbing of cattle, to intervention through religion, political alliances, politics, and war.⁴² The full meaning of the installation's title becomes clear in Bopape's recording of anti-colonial and anti-imperialist episodes of resistance, bringing to light, as the artist states, "people whose voices were rendered obsolete in the history books."⁴³ Bopape uses the different mediums with great sensibility and insight to make visitors experience the installation through various senses. She thus grants visitors a chance to access this nondominant narrative of episodes of resistance from various groups and civilizations far beyond the mere words consigned to the plaques. The installation as a whole seems to deliver these stories, and the resulting effect is that the historical events emanate as much from the plaques as from the bricks, the incense, the charcoal, the gold leaves, the sounds, the pigments, the soil, and their collective smell. The chronology corresponds to what is called the "longue durée," as the accumulation of events bears witness to the relentless aggressions perpetrated on the African continent by the Dutch,

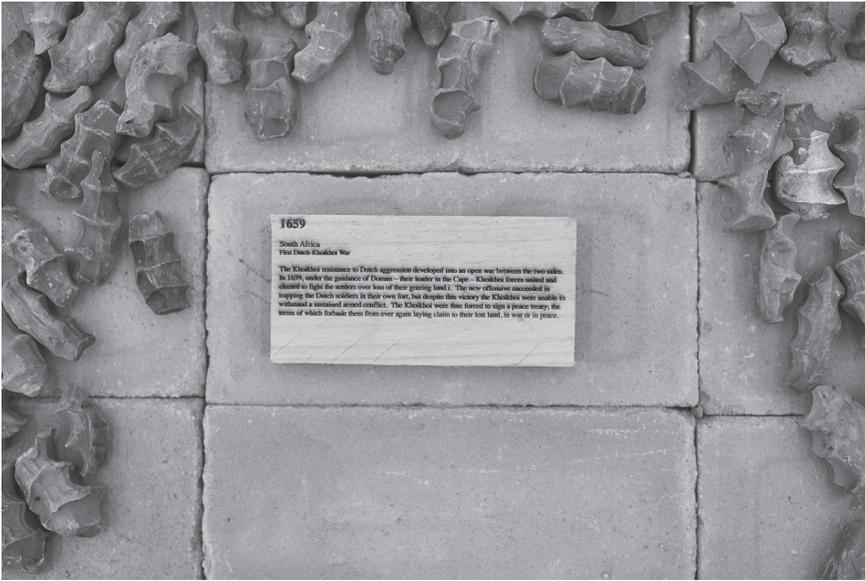


Fig. 7.4. Dineo Seshee Raisibe Bopape, *Lerole: footnotes (The struggle of memory against forgetting)* (detail), 2017. Installation view at Sfeir-Semler Gallery, Beirut/Hamburg, 2018. Courtesy the artist and Sfeir-Semler Gallery, Beirut/Hamburg. Photo Volker Renner.

the Spanish, the Portuguese, the English, the Germans, the French, and the Italians. By showcasing historical patterns of invasion, appropriation, abuse, and destruction by European powers, these events recorded on wooden plaques highlight the long-term, systematic, and systemic nature of those aggressions. Looked at together, it becomes clear that these violent episodes did not occur accidentally or spontaneously, and that they were in fact meticulously carried on because they were essential for the reproduction of the socioeconomic-ecological system of Europe.

One last component completes Bopape's powerful installation. Occupying the whole scenery are pieces of clay molded by clenched fists, each one different in size and color from the others, aligned in hundreds or alternatively scattered in small groups. As visitors gradually take in the meaning of the different elements of the installation, these forms stand out as little figurines of human beings. Suddenly, humans of past stories of resistance emerge from the earth, from the bricks, from the walls, from the wooden plaques. They are like fallen bodies on the ground, but these figurines are not just victims, they are also representative of those who resisted—men and women warriors, farmers, kings, villagers—those who reorganized in the face of systematic invasion. In the artist's words, "[i]t's hard to metabolize that history, or that presence, or that memory ... How to metabolize those who did struggle, those who did say no."⁴⁴ The use of the word "metabolize" carries weight. In order to alter the status quo, visitors today are the ones who must metabolize not only stories

but bodies in a radically different way than they were subsumed in the capitalist absorption of lands and peoples. While each of these forms made directly by clenching the clay gives rise to what can be seen as a whole human body, these shapes can also resemble vertebrae.⁴⁵ The title of the exhibition featuring *Lerole: footnotes (The struggle of memory against forgetting)* includes an expression in brackets, “moswara’marapo,” which the artist explains is a Sepedi word, or even a phrase, “meaning ‘mc’, ‘master of ceremonies,’ but it is also literally the ‘holder of bones.’”⁴⁶ The artist goes on to say: “Bones being the mineral that holds the memory, the memory of the body, of the soul.”⁴⁷ The presence of charcoal subtly alludes to the bones and their destruction, as charcoal can be derived from burnt bones and both of these materialities serve as a traditional base for black pigment. Burning the charcoal alongside the sage and the herbs enhances the honoring of the lost lives and bodies of valiant souls who fought and whose courage is materialized before us. Whether visitors experience the clay shapes as the bodily reminiscence of the many individuals who resisted, or as a rendition of the hardest part of these brave people’s bones springing up from the soil of their graves, the effect is similar and testifies to Bopape’s magnificent craft as she recreates in a singular place many environments, epochs, stories, and feelings that exist in one coherent whole.

Bopape’s artwork titles are extremely precise and geared towards expanding the significance and the experience of her artworks through words. In the case of *Lerole: footnotes (The struggle of memory against forgetting)*, the title is composed of three parts, the last two easily disclosing their meaning when read against the backdrop of the engraved wooden plaques featuring the dates and the accounts of opposition to the invaders. The first word, however, is less immediately evident to those who do not know the Sepedi language of South Africa, and yet truly embodies the essence of the installation. Bopape discloses the meaning of this Sepedi word first as “dust,” and then as “active dust.”⁴⁸ “Lerole” is neither in parenthesis nor at the end of the title, as in her other installation *Mabu, mubu, mmu, sa _ ke lerole, (sa, lerole ke _)* (2022), whose presentation side by side with *Lerole: footnotes (The struggle of memory against forgetting)* at Pirelli HangarBicocca revealed a meaningful tandem between the two artworks. What do “footnotes”—in reality significant events that vanquishers in the long run have tried to wipe out—and “memory”—the important recovery and intentional commemoration of these events—have to do with dust? A collection of diverse microscopic matter, dust travels along wind routes, sways in unintentional patterns, drops and creates deposits. The beauty of dust is that it ranges across different realms: botanical (pollen), biological (bacteria and viruses), organic (skin, hair, and cells), inorganic (ash), and mineral (crystals, gold, and sand).⁴⁹ As residue of past lives and molecular compositions, dust’s airborne nature makes it in fact the optimal material for enacting memory and commemoration.⁵⁰ Its materiality functions much like smell or industrial pollution performed in art, whose transcorporeal attributes and qualities of permeation have been analyzed for example by Hsuan L. Hsu and Jeff Diamanti respectively.⁵¹ However, Bopape chooses a specific

type of dust, and with *lerole* the unintentionality of scientifically observed dust makes room for a conceptually enriched matter. “Active” should not be limited to Jane Bennett’s notorious “vibrant matter.”⁵² The adjective “active” posits an intentionality that may spring from the material or from its conscious incorporation into human cultural frameworks inspired by the material properties of dust in conjunction with elemental forces. As the artist states: “Lerole (dust) is also sometimes unseen whilst in action—especially in its singular form—it only makes ‘sense’ collectively as a body/a movement travelling through wind/air ... or water.”⁵³ With the term-concept-matter of *lerole*, the signification and significance of the materiality of air is expanded.

South African scholar and writer Uhuru Phalafala is right not to confine Bopape’s work to a critique of capitalism and its many forms of connected hierarchies: “It is all too easy and tempting to frame Bopape’s work within what bell hooks calls white supremacist capitalist heteropatriarchy, but that would do a disservice to her work.” The author goes on: “Bopape’s work is not only about oppression and negation. Its sophistication hinges on its recentring of something else: she is concerned with ethics of care, repair, intricacies of Black love, radical empathy, and revolutionary relationality amongst us as Black people, and as it pertains to interrogating the human question.”⁵⁴ I find it extremely interesting that the event that prompted Bopape to actually engage with a ritualistic dimension in her artworks was the 2012 Marikana massacre in South Africa, in which thirty-four miners from the Lonmin Marikana platinum mine who were protesting for better wages were killed by government forces.⁵⁵ Bopape then links the massacre to the Land Act of 1913 in South Africa, and to the enslavement of African people. The different materialities that come to create the active dust of *Lerole: footnotes (The struggle of memory against forgetting)* all coincide in bringing to life a form of ritual in relation to these events (see Fig. 7.5). In the words of Phalafala, “These are the materials of our regeneration, the rituals of our rebirth. In her work we find ceremony.”⁵⁶ As biologist, scholar, and member of the Potawatomi Nation Robin Wall Kimmerer points out, “Ceremony focuses attention, so that ‘attention’ becomes ‘intention’”; for her, as in Bopape’s installation, “Ceremony has power.”⁵⁷ In the midst of *tension*, Bopape brings *attention* and, subsequently, *intention*; the active dust she creates opens the way to an active participation and reorganization of one’s engagement with history.⁵⁸ Oxygen is the defining feature for life, but the air charged with dust, and the dust charged with traces of bodies and minerals, open a space for ceremony, embodied memory, ritual, and honoring that are active and activated.

Re-earthing the Air and the Bodies

The materiality of air that Bopape and Restrepo elicit is not sought after for its own sake; instead, the two compose material and olfactive atmospheres that remarkably recreate past climates of colonial oppression along with their



Fig. 7.5. Dineo Seshee Raisibe Bopape, *Lerole: footnotes (The struggle of memory against forgetting)* (detail), 2017. Installation view at Sfeir-Semler Gallery, Beirut/Hamburg, 2018. Courtesy the artist and Sfeir-Semler Gallery, Beirut/Hamburg. Photo Volker Renner.

lingering affective and structural persistence.⁵⁹ In view of today's most drastic reconfiguration of air as represented by global warming's radical acceleration and the subsequent climate crisis it entails, I contend that Bopape and Restrepo both transfer our attention sideways or backwards in order to better grasp the root causes of such phenomena, which is a requisite to actually move forwards. Commenting on climate change is not Bopape's or Restrepo's focus or probably even intention, and yet their artworks serve as stepping stones towards those themes. As activist and investigator Nityanand Jayaraman rightly observes, "Motivated by the fear of cataclysm, climate discourse tends to be futuristic and ahistorical. Meanwhile, communities engaged in environmental justice conflicts are fighting to spotlight their oppressed pasts and improve the present as a necessary pre-condition to securing their futures."⁶⁰ Both Bopape and Restrepo avoid the pitfalls of trying to replicate ecosystems as artificially independent from human actions, human mental projections, and the stratified history of the occupation of lands. This sets their work apart from a number of artworks dealing more or less directly with elemental aesthetics and climate change that tend to materialize air by charging it with humidity or smoke, and in which the necessity to accentuate air's visually perceptible materiality limits the artworks to an enclosed device. But manifesting atmospheric effects of climate change can only ever be partial, and materializing within art a constructed air for immediate access to climate change as a whole is in fact an impossible task. The same thing goes for an

access to “nature” through artistic installations that pleasantly approximate the scents of gardens or fields or woods.

With Restrepo, the “garden” is a plantation, and the floral stems of the banana tree, bare of their fruits and resembling human vertebral columns, create a sort of “brutalidade jardim” that makes past and ongoing violences collide into vegetal matter.⁶¹ Neither is Bopape’s installation about creating a “pastoral” air, as identified by Jean-Thomas Tremblay’s definition of the “pastoral and its ideals of natural purity and vitality.”⁶² A pseudo-healthy air created in the exhibition space with green leaves, plants, and trees would only falsely emulate what they can procure in terms of oxygen and scents. Recall for example how Bopape suggests the presence of rivers and waterfalls through recordings, without actually making spectators experience mist and humidity. The birdsong of the native Central American quetzal “that has become a symbol of freedom: [l]egend has it that the animal commits suicide when captured”⁶³ implicitly connects the moist air of Africa’s water ecosystems to some of the most humid forests on Earth where the quetzal lives, and which are often referred to as forests of clouds. As such, visitors do not have to experience the rainforest in their own lungs, and humidity or mist can be imaginatively inferred. Therefore, while Bopape’s and Restrepo’s installations start with more or less easily recognizable scents, these “natural” smells blend with the air without the claim to literally provide “fresh” or “pure” or “natural” air. All in all, both installations are about something more than their olfactory components. For that matter, the anthropology of smells mentions how scents have a tendency to become squashed: they flatten in our perception, and the brain gets used to them, so they cannot always be clearly discerned.⁶⁴ The effect of Bopape’s and Restrepo’s installations is then to move from “natural” and recognizable scents to a general atmosphere where odors structure the sensorial access to a complex history and its ongoing afterlives.

I see much correspondence between Bopape’s *Lerole: footnotes (The struggle of memory against forgetting)* and the intellectual call deployed by Christina Sharpe in her book *In the Wake: Blackness and Being*.⁶⁵ In fact, all aspects of *Lerole: footnotes (The struggle of memory against forgetting)* could be interpreted as perfectly in tune with the place, form, attitude, process, trace, posture—“in the wake”—that Sharpe unrelentingly explores through a range of mediums. I want to highlight here the resonance between Bopape’s installation and Sharpe’s exploration of an expanded meaning of the terms “weather” and “climate.” Sharpe squarely states: “In my text, the weather is the totality of our environments; the weather is the total climate; and that climate is anti-black.”⁶⁶ This sentence epitomizes what the artistic engagement with climate change should seek. Only one chapter in Sharpe’s work is entitled “The Weather,” but the whole book puts forward an integrated way of understanding social phenomena, in particular those mechanisms and attitudes that have direct roots in slavery and which still contribute to maintaining Black lives at risk today. Though “The Weather” centers on the materiality of air, it must nonetheless be understood in light of the other chapters’ titles and themes:

“The Wake,” “The Ship,” and “The Hold.” Sharpe’s inquiry can be read in combination with Malcom Ferdinand’s framework confronting “the modern tempest,”⁶⁷ where he too reads the entanglement between disruptions in the atmosphere—physical and cultural—and the capitalist and colonial economy. As elemental critical cultural researchers have shown, the current climate crisis demands that “[f]rom the pathos of weather, we leap now to the historicity of atmosphere.”⁶⁸ In an *e-flux* issue on the theme of *Survivance*, South African professor Lindsay Bremner perfectly summarizes the scope of Sharpe’s book, where “weather is used as a concept for thinking atmospheric conditions ... as inseparable from the ‘total climate’ of social, political and cultural existence.”⁶⁹ Again, Bopape’s and Restrepo’s installations do not deal directly with questions of atmospheric perception of climate disaster, but do however bring the lens back to narratives and histories that sustain the dominant rhetoric currently responsible for enacting climate change, and thus tackle the “total climate” decried by Sharpe. Using the concept of “social climate” or “total climate” is not just a metaphor, since the air we breathe depends, in part but even more dramatically so now, on social choices and economic goals that follow a precise logic which is still very much operative and aggressive today. Colonial histories and neocolonial practices that subtend capitalist economy do intersect with and nourish the current climate crisis.

Bones, and the underlying, violent, racialized deaths they signal, are the visual pillars of Bopape’s and Restrepo’s installations. There are no actual bones, but the shapes the artists carve out from other mediums, and that gradually enrich the air with their charged molecules, anchor the issue of air deep inside the materiality of the earth, the organization of land, and the hierarchies between its inhabitants. With Restrepo, the banana tree inflorescences are cut from the earth, but the cycle and cyclicity of growth and decay carry on. In Bopape’s 2022 version of *Lerole: footnotes (The struggle of memory against forgetting)*, earth is present in the form of the clay figures/vertebrae (baked) and the unfired earth bricks (air-dried), both of which are made by hand. A third element completes the presence of earth in the installation, this time as untransformed earth mounds, scattered over some of the brick constructions. The earth is reddish, dry, and sandy with occasional stones in it. It frames the clenched fist clay sculptures as well as the wooden plaques. Aimé Césaire’s words “Red earth, blood earth, blood brother earth” come to mind.⁷⁰ The earth in Bopape’s installation criss-crosses time, frontiers, and experiences: the “clay clumps [are] formed by African migrants and [the] sand [is] collected from the diaspora.”⁷¹ Each clay form made by a clenched palm has thus been created individually by a new generation of displaced Africans in a strong gesture of resistance.⁷² These small sculptures’ beautiful mix of hues of red and ochre, mixed with black, white, and gray, and the outstanding glazed black that shines from their brick pedestal, make the clay clenched fists stand out as vivid presences of earthy life from which breath has been stolen (see Fig. 7.6). Although the display of the clenched fist figures could look like it voids of agency the people they materialize, the overall



Fig. 7.6. Dineo Seshee Raisibe Bopape, *Lerole: footnotes (The struggle of memory against forgetting)* (detail), 2017. Installation view at Pirelli HangarBicocca, Milan, 2022. Courtesy the artist, Sfeir-Semler Gallery, Beirut/Hamburg and Pirelli HangarBicocca, Milan. Photo Agostino Osio.

effect completely avoids what Dionne Brand achingly describes, referencing the slave trade, as “bodies emptied of being, bodies emptied of self-interpretation, into which new interpretations could be placed.”⁷³ Bopape, on the contrary, guides visitors to discover meaningful interpretations rising from these potent figures that seem to rally through time.

The violence of the physical and cultural robbery combined with the dispossession of knowledge and dignity enacted by centuries of slave trade and forced labor do linger. The fragmented earth, piled so as to form an incomplete hilly landscape, hints at the “loss of a sense of grounding” of the African diaspora identified by bell hooks, but its intentional insertion by the artist can be seen as partly counteracting this loss, in a way that reflects Katherine McKittrick’s reading of Sylvia Wynter, where what is usually kept “outside” is not just identified and made present, but can also “outline the ways in which this place is an unfinished and therefore transformative human geography story.”⁷⁴ The actual presence of the sandy earth is fundamental and its meaning reaches further than the visual landscape it creates, as some particles become airborne and give a sense of belonging through the material remodeling of the air. *Active dust*. Uhuru Phalafala explains that “[i]n the soil exists a type of uncontainable life that is connected to the various sites where she [Bopape] collects this soil, sites of historical anti-Black violence and trauma: Senegal (Ziguinchor, St Louis), Ghana (Jamestown, Achimota forest, Elmina, Cape Coast Castle), Richmond (James River), New Orleans

(Mississippi Delta).⁷⁵ *Lerole: footnotes (The struggle of memory against forgetting)* is maybe less evidently categorized as “earth art” compared to *Mabu, mubu, mmu, sa _ ke lerole, (sa, lerole ke _ _)* for example, but the range of the presence of earthy materials—the mounds of red dry earth and the bricks that become the base onto which other materials are placed, including coal, ashes, and gold—bind the artwork’s sensorial and philosophical meaning to the earth of the soil. As art historian Amanda Boetzkes highlights about earth and its importance for earth art: “Not only is it the ground from which all organic matter, organisms, and life issue, but it also determines one’s sense of movement, stillness, space, and other bodies.”⁷⁶ With Restrepo and Bopape, the earth’s fruits and the earth’s various granularities that give rise to the human body actively co-create air.

Bopape’s and Restrepo’s artworks meet where the unfurling of the capitalist’s ecology, embedded in the exploited and assaulted bodies, forces, in turn, an embodied and active response from visitors. In fact, both installations engage the spectator in a specular relationship with the materialized human bodies that emerge from fruit and earth. In *Lerole: footnotes (The struggle of memory against forgetting)*, one can literally kneel down to read the text on the plaques. As art critic and editor Kwanele Sosibo recounts, the “walls of soil bricks ... do not rise very high off the ground, *forcing a form of supplication* in order to engage the anti-colonial conflicts it documents.”⁷⁷ In Restrepo’s case, technology and the visual are used as bait for visually centered publics: “Dangling from the bottom of the stems are tiny cathode ray tubes featuring videos of dead bodies of plantation workers murdered while on strike. Small mirrors on the floor reflect these haunting images back to the viewer.”⁷⁸ Here, the diminutive images are subordinated to the overall effect of the rotting fruits’ presence, but in order to reach the monitors displaying these images, visitors have to step even nearer to the banana tree stems and its rotting fruits, thus getting in closer contact with its materiality. Hence, to gain access to the “real” images of the massacre, visitors are forced into proximity with the plant-corpses, unlocking another level of engagement with the historical events of the strike and its violent repression that circumvents the habitual visual locus (see Fig. 7.7).

By bending over, visitors to the installations do not simply humble themselves to become righteous receivers of these stories; they also come in closer contact with the volatile materials. In Bopape’s installation, the gold dust, red pigments, charcoal, and ashes reminiscent of burnt bones and forests all conjure up stories of extortions and greed, bloodshed and agony, destruction and arrogance rendered systemic by capitalist imperatives, not only visually but also at an intimate and almost imperceptible level. This remodeling of the atmosphere of the exhibition expands on olfactory art’s tendency to isolate fragrances. Here, the whole position of the body and its movement are implicated in the reception of smells and other microscopic matter added to the air, giving new meaning to what sculpture can elicit, where “bodily actions are synonymous with gestures of interpretation.”⁷⁹ There is a momentary apnea



Fig. 7.7. José Alejandro Restrepo, *Musa paradisiaca*, 1996. Installation view.
Photo the artist. Courtesy the artist.

when visitors slowly assimilate the extent of the presence of these past deaths. Apart from the stench of rotting fruit, or the microscopic pollens and grains of sandy earth, there are no active constraints or deterrents to breathe. The air is not toxic per se. Yet before all these lost lives and cultures, visitors must still decide, maybe unconsciously, how they want to breathe. The meaning of their breathing is accentuated through the mediated breathing of the dead, as vegetal life slowly exudes the last of its organized matter and releases part of the decomposed elements in the air, and the rocks and earth materials slowly continue their disintegration journey while releasing dust particles into the exhibition's atmosphere.

Conclusion: Remember and Revolt

What counter-ecologies can art foster to resist and actively recast the capitalist air? José Alejandro Restrepo's and Dineo Seshee Raisibe Bopape's installations presented here highlight the human and ecological cost of the socioeconomic expansion of capitalist societies. They stage two moments of the capitalist process: while Restrepo unravels how capitalist profit-making is tightly enmeshed with exploitative labor practices, complicity with armed force, overproduction, monocultures, and toxicity, Bopape in turn recalls the

fundamental step of capitalist societies in appropriating “free” labor and “free” ecosystems through violent expansion and negation of existing cultures, knowledges, and kinships. The air in the exhibition space becomes a carrier of meaning and memory, an ally into the unearthing and possible assimilation of whatever aspects of these stories were previously unknown to visitors. In that way, both artworks offer a glimpse at how true alternative ecologies will have to consider labor, as Nora Räthzel and David Uzzell resolutely explain in their article “The Future of Work Defines the Future of Humanity and All Living Species.”⁸⁰ Even though they mobilize the air of the exhibition space in different ways, Bopape’s and Restrepo’s installations present similarities, especially in the olfactory component acting as a mode of sensorial access to capitalism as a socioecology, as well as a means to operate a restoration of the damaged earths, histories, and souls. The air thus modified becomes a nourished aerial whole that binds the other materials together, and to which the other materials contribute. With Bopape, the different scents instantly define an aerial space for ritual postures, enhanced in the way the records of resistance are displayed in the architecture of unfired earth bricks. With Restrepo too, the duration of the rotting process allows for multiple encounters with the artwork. What is important is that visitors of both exhibitions can take their time in soaking in the meaning, the impressions, the reminiscences that these installations may bring to the surface, something that can be missing in other more historical exhibitions.⁸¹

Both in Bopape’s and Restrepo’s installations there is a strong notion of temporality. Restrepo alludes to the 1928 massacre, but he also deepens the temporal range of this historic episode by referencing through the title—the *Musa x paradisiaca* coined in the eighteenth century by Linnaeus—to the European classification and appropriation of ecosystems since the conquest of the Americas, perpetrated alongside the displacement and enslavement of African populations, that fostered a subsequent relocation of banana production.⁸² Bopape too weaves different temporalities, as historical events of resistance to European conquest are recalled and showcased throughout the setting. Bopape’s installation locates these stories of the African continent before, during, and after the transatlantic and Indian Ocean slave trades.⁸³ And, most importantly, both artists work with another temporality, that of air: with Restrepo, through the slow process of decomposition, the volatile components that are released unevenly permeate the atmosphere of the exhibition space at their own rhythm; with Bopape, the temporality of permeation in the air of the natural substances, organic *and* inorganic, brings the installation back to even a telluric chronology (see Fig. 7.8).

In this way, both artists echo what researcher Yolanda Ariadne Collins explores with regard to colonial atmospheres and their lingering presence. She explains that “[t]he voluminous political ecology of atmospheres ... demonstrates that although atmospheres can indeed appear flattening, numbing us into a state of constancy, they are not top-down, fixed or unyielding. Rather, atmospheres emerge through slow, sometimes sudden, and violent, cumulative

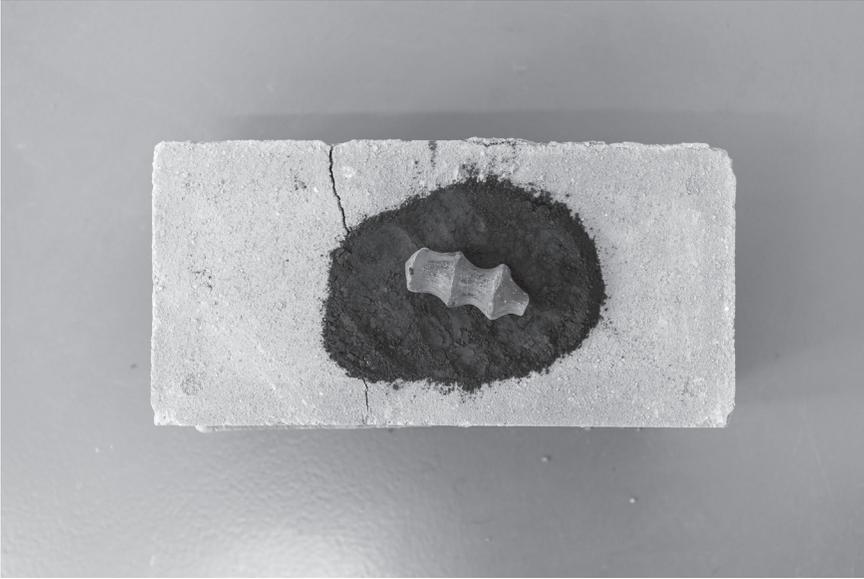


Fig. 7.8. Dineo Seshee Raisibe Bopape, *Lerole: footnotes (The struggle of memory against forgetting)* (detail), 2017, in *Para | Fictions* at Kunstinstituut Melly, Rotterdam. Photo Aad Hoogendoorn. Courtesy the artist and Kunstinstituut Melly, Rotterdam.

interactions across millennia that go on to affect other spaces and places, speeding up at times and remaining relatively still at others.”⁸⁴

Bopape’s and Restrepo’s artworks stand for many other past and contemporary slow processes of death. For example, the scandals around the contamination of Guadeloupe and Martinique with chlordecone (CLD), a pesticide also commercialized in the United States under the brand name “Kepone,” are currently resurfacing.⁸⁵ Even before this renewed presence in the news, Malcom Ferdinand spent a whole chapter on this question. He explains that CLD, an organo-chlorine compound used against a beetle considered to be a pest in banana monocultures, has been used forcibly in Martinique and Guadeloupe specifically for banana production even after its ban, despite the fact that its toxicity was known to the French companies, and even after agricultural workers went on strike.⁸⁶ CLD comes as a dust that leaves no traces on bananas that are sent for exportation, but the problem of course is that the spray drift of the CLD contaminates the soil with the airborne particles. As Malcom Ferdinand writes:

The use of CLD from 1972 to 1993 in the banana plantations of the French Antilles resulted in the contamination of agricultural lands for a period of time ranging from sixty years to several centuries. One-sixth of the global production of a cancer-causing compound—also an endocrine disruptor—was spread over 20,000 hectares of agricultural land on two small, densely populated islands. This

contamination affects all the ecosystems of Martinique and Guadeloupe. CLD is found in soils, aquifers, mangroves, and coastal waters, in certain agricultural and animal foodstuffs, and in fishery products.⁸⁷

While the bananas slowly ripen and fall off their stems in Restrepo's installation, different workers, different bodies, are foregrounded, and these presences are as much those of the executed workers of the 1928 pacific strike in Colombia as they are those of the contemporary inhabitants of Guadeloupe and Martinique, bearing the stories of their displaced ancestors, and who face the insidious lasting effects of capitalist pollution. In *Musa paradisiaca* and *Lerole: footnotes (The struggle of memory against forgetting)*, visitors' breathing has to be meaningful; it is about taking the time to consciously know what kind of historical and present atmospheres we are breathing *in AND out* because we, too, are participating in them. As such, these artworks show that it is not only what visitors breathe that counts, but *how* they breathe.

In both artworks, the human bodies made of other materialities are *in revolt*.⁸⁸ This is an essential feature that further unites Bopape's and Restrepo's respective installations. Both artists materialize the bodies of those who succumbed to violent deaths under the rule of capitalist expansion and production. The fact that these presences arise from other natural materialities—fruit or earth-related materials and herbs—with minimal shaping and staging by the artists, further accentuates how the artists confront capitalist imperatives of conquest and exploitation as an *ecological whole*. And the artworks foreground the co-construction of human societies and systems of power through a control of resources and materials of the Earth, human and more-than-human. These installations contribute to defining the terms of a critical political ecology, where history is very much present and embedded in the present ecological situation. In truth, there is no altering the course of how capitalist societies are functioning and destroying ecosystems and populations if we do not actively reckon with the culture that allows for such appropriation and destruction to take place, and upon which the current capitalist system is predicated. This is the total climate we must consider. But there is room for opposition.

Notes

- 1 Uhuru Phalafala, "Cosmic Footnotes to a Soil Dance," in *Dineo Seshee Bopape: Born in the first light of the morning [moswara'marapo]*, ed. Lucia Aspesi and Fiammetta Griccioli (Venezia: Marsilio Editori; Milano: Pirelli HangarBicocca, 2022), 55.
- 2 Elizabeth Gaskell, *North and South* [1854–55] (London: Penguin Classics, 2012), 370.
- 3 Éric Alliez and Maurizio Lazzarato, *Wars and Capital*, trans. Ames Hodges (South Pasadena, CA: Semiotexte, 2016), 1.
- 4 In fact, "United Fruit registered 'Chiquita Banana' as a trademark in 1947" (John Soluri, *Banana Cultures: Agriculture, Consumption, and Environmental Change in Honduras and the United States* [Austin: University of Texas Press, 2005], 164, <https://hdl.handle.net/2027/heb07959.0001.001>) For more about the character of Chiquita

- Banana, see especially Chapter 6, “The Lives and Time of Miss Chiquita”. The video of the advertisement is available on YouTube: “Chiquita Banana” (1947; United Fruit Company), video, 1:32, https://youtu.be/_arYpFG2vY8?si=gP-GN-60d9ZOJic1.
- 5 “United Fruit Company,” *Wikipedia, The Free Encyclopedia*, last modified July 5, 2024, 00:02, https://en.wikipedia.org/wiki/United_Fruit_Company. For a full account of the history of the corporation, see Marcelo Bucheli, *Bananas and Business: The United Fruit Company in Colombia, 1899–2000* (New York: New York University Press, 2005).
 - 6 The advertisement campaign is the result of a collaboration with Brazilian artist Romero Britto. See “Pop by Nature,” *Chiquita*, accessed July 4, 2024, <https://www.chiquita.com/pop-by-nature-usa/>.
 - 7 Michael Evans, “Chiquita Found Liable for Colombia Paramilitary Killings,” *National Security Archive* (Washington, DC), June 10, 2024, <https://nsarchive.gwu.edu/news/colombia-chiquita-papers/2024-06-10/chiquita-found-liable-colombia-paramilitary-killings?eType=EmailBlastContent&cId=79d29912-5564-4511-9602-990dee5b28d0>; I owe to the mailing list “CRIT-GEOG-FORUM” the circulation of this news.
 - 8 “Colombian Victims Win Historic Verdict over Chiquita: Jury Finds Banana Company Liable for Financing Death Squads,” *EarthRights International*, June 10, 2024, https://earthrights.org/media_release/colombian-victims-win-historic-verdict-over-chiquita-jury-finds-banana-company-liable-for-financing-death-squads/.
 - 9 Kevin Coleman, *A Camera in the Garden of Eden: The Self-Forging of a Banana Republic* (Austin: University of Texas Press, 2016), 91.
 - 10 For an extraordinary account of the history of the banana, its origins in Asia, its cultivation in Africa, and its subsequent introduction in the colonies, see Judith Carney, *In the Shadow of Slavery: Africa’s Botanical Legacy in the Atlantic World* (Berkeley, CA: University of California Press, 2011).
 - 11 For a discussion on the distinction between “nature” and “Nature,” see Jason W. Moore, “The Rise of Cheap Nature,” in *Anthropocene or Capitalocene?: Nature, History, and the Crisis of Capitalism*, ed. Jason W. Moore (Oakland, CA: PM Press / Kairos, 2016), 78–115.
 - 12 Jonathan Nitzan and Shimshon Bichler, *Capital as Power: A Study of Order and Creorder* (London: Routledge, 2009).
 - 13 To recall Belgian and French philosopher Luce Irigaray’s expressive formulation in Luce Irigaray, *L’oubli de l’air chez Martin Heidegger* (Paris: Les Éditions de Minuit, 1983).
 - 14 For different examples see Hsuan L. Hsu, “Olfactory Art and Museum Ecologies,” in *The Smell of Risk: Olfactory Aesthetics and Atmospheric Disparities* (New York: New York University Press, 2020); Larry Shiner, *Art Scents: Exploring the Aesthetics of Smell and the Olfactory Arts* (Oxford: Oxford University Press, 2020); “Odeurs/Odors,” *ESPACE art actuel* 135 (2023); Erika Wicky, “L’art olfactif contemporain, ses médias et leurs inventions fin-de-siècle,” *Sens public* (2018). <https://doi.org/10.7202/1059015ar>
 - 15 Hsuan L. Hsu, *The Smell of Risk: Olfactory Aesthetics and Atmospheric Disparities* (New York: New York University Press, 2020), 86.
 - 16 Hsu, *The Smell of Risk*, 153.
 - 17 Joël Candau, “Dix idées reçues en anthropologie des odeurs,” in *Collectes sensorielles: Recherche-Musée-Art*, ed. Véronique Dassié et al. (Paris: Les éditions PETRA, 2021).
 - 18 Prior to 2024, the first artist has also been credited under the name Dineo Seshee Bopape. I would like to warmly thank my colleague and friend Adriana Peña Mejía who first mentioned José Alejandro Restrepo’s artwork to me.

- 19 To quote and adopt Jason W. Moore's formulation in Jason W. Moore, *Capitalism in the Web of Life: Ecology and the Accumulation of Capital* (London and New York: Verso, 2015).
- 20 The installation was recreated in 2016 in the independent art space FLORA ars+natura in Bogotá, a space co-created by curator José Roca and where he served as artistic director until the space's closure. For a good description of the artwork as well as more images, see "Musa paradisiaca: José Alejandro Restrepo," *FLORA ars+natura*, <http://arteflora.org/exposiciones/musa-paradisiaca-jose-alejandro-restrepo/>. For a video tour of the most recent exhibition, see "Musa paradisiaca, de José Alejandro Restrepo," at the Museo de Arte Moderno de Medellín, <https://youtu.be/hoMxFIZy-TA?si=ePfqgaOU252VEI>, March 4, 2024. For an analysis focused on the themes of memory and the archive, and the stakes of credibility of alternative narratives that counteract historical forgetfulness, see María del Rosario Acosta López, "The Resistance of the Unarchivable: From Myth to History in José Alejandro Restrepo's *Musa paradisiaca*," in *Violence and Resistance, Art and Politics in Colombia*, ed. Stephen Zepke and Nicolás Alvarado Castillo (Cham: Springer Nature, 2023). For more on this artwork and the notion of counter-memory, see Marta Cabrera, "Impossible Histories: Violence, Identity, and Memory in Colombian Visual Arts," in *Technologies of Memory in the Arts*, ed. Liedeke Plate and Anneke Smelik (Basingstoke: Palgrave Macmillan, 2009). I would like to sincerely thank José Roca and José Alejandro Restrepo for their help, and express my profound admiration for their work.
- 21 Mari Carmen Ramírez, "Pacific Standard Time, LA/LA: Latin American and Latina/o Art's Transformative Momentum," *ArtNexus*, 108 (2018): 44.
- 22 Jennifer Burris, "José Alejandro Restrepo—FLORA Ars + Natura, Bogotá, Colombia," *Frieze*, September 13, 2016, <https://frieze.com/article/jose-alejandro-restrepo>. A similar account describes the "sickly sweet aroma, edged with the tang of decay." Sharon Mizota, "Review: Artist's Simulated Banana Grove Is a Stinking Indictment of American Corporate Greed," *Los Angeles Times*, October 15, 2017, sect. "Entertainment & Arts", <https://www.latimes.com/entertainment/arts/la-et-cm-jose-alejandro-restrepo-review-20171015-story.html>.
- 23 Don Vaughan, "Banana Massacre," *Encyclopaedia Britannica*, November 29, 2023, <https://www.britannica.com/event/Banana-Massacre>.
- 24 Hats off to my seminar students at the University of Guelph for engaging with the two artworks by Walker and Campos-Pons that I proposed as a first way of starting our exploration of natural materialities in the arts; Beatrice Glow's artwork *Blanc: Le Colonial* is extremely eloquent, too. The artist abstracts the actual materiality of the sugar even further than the other artists I mentioned, and she incorporates it in a combined scent that brings sweetness in relation to the horrors it was born from: as Glow recounts, "*Blanc: Le Colonial* was nauseatingly sweet with sugary and milky synthetic fragrance mixed in with vanilla reinforced by tonka beans. It's an overdose of sweetness" (qtd. in Hsuan L. Hsu, "Beatrice Glow and the Botanical Intimacies of Empire," *Panorama* 1 [Spring 2021]: 5). I would like to thank Mariam who worked as a facilitator in the Netherlands pavilion of the Venice Biennial for most generously explaining to me the many layers of the collective contribution from the Democratic Republic of Congo, entitled *The International Celebration of Blasphemy and the Sacred* (2024).
- 25 Wendy Wolford, "The Plantationocene: A Lusotropical Contribution to the Theory," *Annals of the American Association of Geographers* 111, no. 6 (2021): 1–18.

- 26 Moore, *Capitalism in the Web of Life*, 67–68.
- 27 Burris, “José Alejandro Restrepo.” For the impact that Márquez’s book has had on historical research and the interest it sparked among researchers in the history of the United Fruit Company, see Bucheli, *Bananas and Business*, 1–3.
- 28 One photograph of the organizers of the strike, used by officials of the United Fruit Company to identify the leaders of the movement, was preserved in the corporation archives, and thus allows us today to see them as individuals who organized and resisted. See Kevin Coleman, “The Photos that We Don’t Get to See: Sovereignties, Archives, and the 1928 Massacre of Banana Workers in Colombia,” in *Making the Empire Work: Labor and United States Imperialism*, ed. Daniel E. Bender and Jana K. Lipman (New York: University Press 2015), 104–33.
- 29 Moore, *Capitalism in the Web of Life*, 104.
- 30 Silvia Federici, *Caliban and the Witch: Women, the Body and Primitive Accumulation* [2004] (London: Penguin, 2021), 64.
- 31 Jason M. Colby, “Progressive Empire: Race and Tropicality in United Fruit’s Central America,” in *Making the Empire Work: Labor and United States Imperialism*, ed. Daniel E. Bender and Jana K. Lipman (New York: New York University Press, 2015).
- 32 For an exceptional cultural analysis of fungibility and the Black body in the plantation, see Tiffany Lethabo King, *The Black Shoals: Offshore Formations of Black and Native Studies* (Durham, NC: Duke University Press, 2019). See especially pages 103–10 and Chapter 3, “At the Pores of the Plantation.”
- 33 Eric Williams, *Capitalism and Slavery* [1944] (London: Penguin Classics, 2022).
- 34 Malcom Ferdinand, *Decolonial Ecology: Thinking from the Caribbean World*, trans. Anthony Paul Smith (Cambridge: Polity Press, 2021), 106.
- 35 For further insight on this theme, see Andrew Kettler, *The Smell of Slavery: Olfactory Racism and the Atlantic World* (Cambridge: Cambridge University Press, 2020).
- 36 Ferdinand, *Decolonial Ecology*, 106.
- 37 This aspect is present too in the 2016 version of Restrepo’s installation, where the artist presented contemporary images of women eating bananas, as well as a reproduction of a nineteenth-century painting depicting a racialized and eroticized gendered stereotype of the “mulata.” See José Roca, “José Alejandro Restrepo: Musa paradisiaca (1996–2016),” *Artishock revista* (August 31, 2016), <https://artishockrevista.com/2016/08/31/jose-alejandro-restrepo-musa-paradisiaca-1996-2016/>; as well as Burris, “José Alejandro Restrepo.”
- 38 Lucia Aspesi, Fiammetta Griccioli, and Tatiana Palenzona, *Dineo Sesbee Bopape: Born in the first light of the morning [moswara’marapo]* (Venezia: Marsilio Editori; Milano: Pirelli HangarBicocca, 2022), 16.
- 39 The exhibition at Pirelli HangarBicocca in 2022–23 was curated by Lucia Aspesi and Fiammetta Griccioli. I would like to thank the institution for their help. A beautiful interview with the artist presents the different parts of the exhibition in *Dineo Sesbee Bopape | Born in the first light of the morning [moswara’marapo]*, dir. Francesco Margaroli, Pirelli HangarBicocca, November 15, 2022, <https://www.youtube.com/watch?v=i13Lw3OJ3gM>.
- 40 Aspesi, Griccioli, and Palenzona, *Dineo Sesbee Bopape*, 16.
- 41 According to the booklet of the exhibition, “[t]he chronology [is] derived from extensive study by the artist together with several researchers.” Aspesi, Griccioli, and Palenzona, *Dineo Sesbee Bopape*, 17.

- 42 See Lucia Aspesi and Fiammetta Griccioli, ed., *Dineo Seshee Bopape: Born in the first light of the morning [moswara'marapo]* (Venezia: Marsilio Editori; Milano: Pirelli HangarBiccoca, 2022), 72–102.
- 43 *Dineo Seshee Bopape | Born in the first light of the morning [moswara'marapo]*, 3:22.
- 44 *Dineo Seshee Bopape | Born in the first light of the morning [moswara'marapo]*, 3:42.
- 45 I owe it to Jeff Diamanti for bringing this to my awareness. I would like to thank him wholeheartedly for the invitation to present this research at the University of Amsterdam, during my time as a guest researcher at ASCA (Amsterdam School of Cultural Analysis).
- 46 Dineo Seshee Bopape, Lucia Aspesi, and Fiammetta Griccioli, “Holding the Dust, Tuning with Nature,” in *Dineo Seshee Bopape: Born in the first fight of the morning [moswara'marapo]*, ed. Lucia Aspesi and Fiammetta Griccioli (Venezia: Marsilio Editori; Milano: Pirelli HangarBiccoca, 2022), 30.
- 47 *Dineo Seshee Bopape | Born in the first light of the morning [moswara'marapo]*, 1:23.
- 48 Bopape, Aspesi, and Griccioli, “Holding the Dust,” 37.
- 49 Since it is very complete compared to the usual definition given of dust, I use the list of elements in Kim Rutledge et al., “Dust,” *National Geographic*, last modified October 19, 2023, <https://education.nationalgeographic.org/resource/dust>.
- 50 For an example in the literary field, see the novel set in Kenya by Yvonne Adhiambo Owuor, *Dust* (New York: Knopf, 2014).
- 51 Hsu, *The Smell of Risk*; as Hsu mentions on page 85, he builds on the notion of transcorporeality developed by Stacy Alaimo in *Bodily Natures: Science, Environment, and the Material Self* (Bloomington, IN: Indiana University Press, 2010). Jeff Diamanti, “Respiratory Realism: Elemental Intimacies between ‘Carbon Black’ and *Red Desert*,” in *Imagining Air: Cultural Axiology and the Politics of Invisibility*, ed. Tatiana Konrad (Exeter: University of Exeter Press, 2023).
- 52 Jane Bennett, *Vibrant Matter: A Political Ecology of Things* (Durham, NC: Duke University Press, 2010). For a cautious take on the approach of Jane Bennett see Andreas Malm, *The Progress of This Storm: Nature and Society in a Warming World* (London and Brooklyn, NY: Verso, 2020).
- 53 Bopape, Aspesi, and Griccioli, “Holding the Dust,” 37, my emphasis.
- 54 Phalafala, “Cosmic Footnotes,” 48.
- 55 See Bopape, Aspesi, and Griccioli, “Holding the Dust,” 42–43; “Marikana Massacre,” *Wikipedia, The Free Encyclopedia*, last modified June 5, 2024, https://en.wikipedia.org/w/index.php?title=Marikana_massacre&oldid=1222236200.
- 56 Phalafala, “Cosmic Footnotes,” 57.
- 57 Robin Wall Kimmerer, *Braiding Sweetgrass: Indigenous Wisdom, Scientific Knowledge and the Teachings of Plants*, audiobook read by the author (Milkweed Editions, 2015), 10:18:50 and 10:21:00.
- 58 For scholars, I think Bopape’s art also resonates with the path that Cynthia B. Dillard has been exploring and embracing. See Cynthia B. Dillard, *On Spiritual Strivings: Transforming an African American Woman’s Academic Life* (Albany, NY: State University of New York Press, 2012). See also the discussion with Bopape about slowness and a “space of prayer” in Lotta Petronella, “Between Mud, Matter and Mother: A Conversation with Dineo Seshee Bopape,” *NO NIIN Magazine* 21 (December 2023), <https://no-niin.com/issue-21/between-mud-matter-and-mother-a-conversation-with-dineo-seshee-bopape/>.

- 59 “Colonial” in its wider sense, as theorized by Aníbal Quijano and the Grupo Modernidad/Colonialidad. See, for example, Santiago Castro-Gómez and Ramón Grosfoguel, eds., *El giro decolonial: reflexiones para una diversidad epistémica más allá del capitalismo global* (Bogotá: Siglo del Hombre Editores; Bogotá: Universidad Central, Instituto de Estudios Sociales Contemporáneos, Pontificia Universidad Javeriana, Instituto Pensar, 2007).
- 60 Nityanand Jayaraman, “The Perils of Climate Activism,” *e-flux Architecture*, “Survivance” (2021): 6, <https://www.e-flux.com/architecture/survivance/410014/the-perils-of-climate-activism/>.
- 61 For a study of the expression “brutalidade jardim,” created by Oswald de Andrade in 1924 and reinterpreted by artists of the Tropicália movement Gilberto Gil and Torquato Neto in the song “Geléia geral,” see Christopher Dunn, *Brutality Garden: Tropicália and the Emergence of a Brazilian Counterculture* (Chapel Hill: University of North Carolina Press, 2014), 94–98. In Dunn’s terms: “The military regime sought to represent Brazil as a peaceful ‘garden’ even as it brutally suppressed its opposition. Oswald’s paradoxical phrase, alluding to violence within a tropical arcadia, telegraphically encapsulates the drama of Brazil in the late 1960s as seen through the tropicalist lens” (*Brutality Garden*, 98). About the specific expression, the author most interestingly explains: “The critique of brasilidade turns mordant in the final two lines, which juxtapose ‘hospitaleira amizade’ (hospitable friendship), a reference to Brazilian cordiality, and ‘brutalidade jardim’ (brutality garden), a line from Oswald de Andrade’s 1924 novel *Memórias Sentimentais de João Miramar*. Oswald’s phrase is particularly striking because it does not follow Portuguese syntax (i.e., ‘jardim da brutalidade’) in which the garden would necessarily be the site of brutality. Instead, the phrase constitutes a cubist montage in which the two halves contaminate each other but never cohere. The garden and brutality coexist in contradictory juxtaposition. Oswald’s phrase captures the ambivalent stance of the tropicalists, who were fascinated with the Edenic national mythology yet also cognizant of its ideological premises and insidious uses” (Dunn, *Brutality Garden*, 96–97).
- 62 Jean-Thomas Tremblay, *Breathing Aesthetics* (Durham, NC: Duke University Press, 2022), 40. See in particular the chapter “Breathing against Nature,” where Tremblay works with the notion of “post-pastoral” to complicate the definition of “nature” by analyzing artworks presenting a constriction and a restriction of personal breathing.
- 63 Jens Asthoff, “Dineo Seshee Bopape,” trans. Gerritt Jackson, *Artforum* (2019), <https://www.artforum.com/events/dineo-seshee-bopape-243801/>. He adds: “Bolstered by this evocative allusion, the installation as a whole was an ephemeral monument to anti-colonial struggle.” To learn who inspired this inclusion of the quetzal as well as other sources of inspiration mentioned by the artist, see Kwanele Sosibo, “Ancestry in Progress: Dineo Seshee Bopape’s Instinctive Experiments in Sonic Therapy,” in *Dineo Seshee Bopape: Born in the first light of the morning [moswara marapo]*, ed. Lucia Aspesi and Fiammetta Griccioli (Venezia: Marsilio Editore; Milano: Pirelli HangarBicocca, 2022), 65.
- 64 Candau, “Dix idées.”
- 65 Christina Sharpe is an academic and professor who holds the Canada Research Chair in Black Studies in the Humanities at York University in Toronto. See Christina Sharpe, *In the Wake: On Blackness and Being* (Durham, NC: Duke University Press, 2016). For another comment on the relationship between Sharpe’s work and Bopape’s

- art, with a focus on a different artwork and on the question of water and the Atlantic, see Zoë Hopkins, “Dineo Seshee Bopape,” *BOMB Magazine*, December 15, 2023, <https://bombmagazine.org/articles/dino-seshee-bopape-zoe-hopkins/>.
- 66 Sharpe, *In the Wake*, 104.
- 67 Ferdinand, *Decolonial Ecology*.
- 68 Lynn Badia, Marija Cetinić, and Jeff Diamanti, “Introduction,” in *Climate Realism: The Aesthetics of Weather and Atmosphere in the Anthropocene*, ed. Lynn Badia, Marija Cetinić, and Jeff Diamanti (New York: Routledge, 2021), 1–16.
- 69 Lindsay Bremner, “Weathering, Weathermaking,” *e-flux Architecture*, editorial to “Survivance” (June 2021), <https://www.e-flux.com/architecture/survivance/397842/editorial-weathering-weathermaking/>.
- 70 Aimé Césaire, *Return to My Native Land* [1956] (New York: Archipelago Books, 1969), 29–30, qtd. in Kathryn Yusoff, *A Billion Black Anthropocenes or None* (Minneapolis: University of Minnesota Press, 2018), 64.
- 71 Sosibo, “Ancestry in Progress,” 65.
- 72 The clenched fist has a specific inspiration in *Lerole: footnotes (The struggle of memory against forgetting)*: “Bopape also draws from a story about Robert Sobukwe (1924–1978), a prominent South African political dissident, who founded the Pan Africanist Congress in opposition to apartheid. Upon the arrival of new prisoners at Robben Island, Subokwe—who was held in solitary confinement—had grabbed a hand full of soil, raised his fist, and saluted the new (political) prisoners.” Mentioned in Defne Ayas and Patrick Constantin Haas, “Dineo Seshee Bopape—*Lerole: footnotes (The struggle of memory against forgetting)*,” *Kunstinstituut Melly*, 2017, <https://www.kunstinstituutmelly.nl/en/exhibitions/2410-dineo-seshee-bopape-lerole-footnotes-the-struggle-of-memory-against>.
- 73 Dionne Brand, *A Map to the Door of No Return: Notes to Belonging* (Toronto: Doubleday Canada, 2011), 25, qtd. in Sharpe, *In the Wake*, 32.
- 74 bell hooks, “Postmodern Blackness,” *Postmodern Culture* 1, no. 1 (1990): 6; Katherine McKittrick, *Demonic Grounds: Black Women and the Cartographies of Struggle* (Minneapolis: University of Minnesota Press, 2006).
- 75 Phalafala, “Cosmic Footnotes,” 52.
- 76 Amanda Boetzkes, *The Ethics of Earth Art* (Minneapolis: University of Minnesota Press, 2010), 14.
- 77 Sosibo, “Ancestry in Progress,” 65, my emphasis.
- 78 Ramírez, “Pacific Standard Time, LA/LA,” 44.
- 79 See the analysis of Rosalind Krauss, *Passages in Modern Sculpture* [1977] (Cambridge, MA: The MIT Press, 1981) by Amanda Boetzkes, who explores the peculiarity of Krauss’s contribution and in particular the scope of the “common flesh” developed between sculpture and spectator: Amanda Boetzkes, “Phenomenology and Interpretation Beyond the Flesh,” *Art History* 32, no. 4 (2009): 708, 705.
- 80 Nora Räthzel and David Uzzell, “The Future of Work Defines the Future of Humanity and All Living Species,” *International Journal of Labour Research* 9, nos. 1–2 (2019), https://soc21.nl/wp-content/uploads/2021/09/Raethzel-ILO_Journal.pdf.
- 81 See for example the review of a recent exhibition at the Fitzwilliam Museum in Cambridge, UK, held from September 8, 2023 to January 7, 2024: Kadish Morris, “Black Atlantic: Power, People, Resistance—Review—A Welcome if Partial Reckoning,” *The Observer*, sct. “Art and Design,” September 24, 2023, <https://www>.

- theguardian.com/artanddesign/2023/sep/24/black-atlantic-power-people-resistance-fitzwilliam-museum-cambridge-review. Morris states: “It isn’t depictions of brutality that are missing here, but *more declassification, more storytelling* and more exposition on how blood money and power shaped the legacy of the very building where these works hang” (my emphasis).
- 82 For a precise account of the colonial history of the banana as intertwined with slavery, see Carney, *In the Shadow of Slavery*.
- 83 For more about this important aspect of the European-led slave trade, see Maria Holtrop, ed., “Indian Ocean Slave Trade,” African Studies Center Leiden, Universiteit Leiden, <https://www.ascleiden.nl/content/webdossiers/indian-ocean-slave-trade>, accessed May 29, 2024.
- 84 Yolanda Ariadne Collins, “A Political Ecology of Atmospheres: A Voluminous Case Study of the Guiana Shield,” *Political Geography* 109 (2024): 1–10.
- 85 See Mickaël Correia, “Scandale du chlordécone : le Conseil de l’Europe est saisi,” *Mediapart* (Paris), March 21, 2024; Karl Laske, “Chlordécone : un dernier espoir pour juger les responsables du drame,” *Mediapart* (Paris), June 9, 2024.
- 86 Malcom Ferdinand, “The Masters’ Chemistry (Martinique and Guadeloupe),” in *Decolonial Ecology: Thinking from the Caribbean World*, trans. Anthony Paul Smith (Cambridge: Polity Press, 2021), 106–13.
- 87 Ferdinand, *Decolonial Ecology*, 109.
- 88 I use and adapt the vocabulary of adaptive cycles in ecology. See Stefano Menegat, “From Panarchy to World-Ecology: Combining the Adaptive Cycle Heuristic with Historical-Geographical Approaches to Explore Socio-Ecological Systems’ Sustainability,” *Sustainability* 14, no. 14813 (2022): 1–14.

Creative Writing: On Air

Davina Quinlivan

During the winter of 2008, I watched my father's breath through his last winter. Then, illness returned his body to the stars. To write about this, as I have done in my book *Shalimar*,¹ is to remember not only breath, but also the intimacy of air. By this I mean the language we shared and the spaces in between—the things we cannot express and the rhythms of life which go on, even in the snaking of a train across the hills in Devon where I live, which is also like a breath in the throat of the valley. So, I go on. I did not choose this style of creative practice. Rather, it chose me, and I embraced it, as I tried to find the words through creative fulfillment.

Over time, I have come to accept that there might be a creative-critical methodology at work here, a writing *through* air, which will continue to haunt my creative practice, especially in terms of my investment in creative non-fiction, memoir, and environmental writing. Further, there is an undoubtable, increasing growth of interest in breath studies and what Tatiana Konrad might call “the politics of invisibility” which attends specifically to climate activism, social justice, and the impact of the global pandemic.² As I have written elsewhere, monumental global events have also stirred up, within me, new and urgent thoughts on air. Of course, it is very timely to think about the air we breathe and its correspondences with illness, the environment, politics, culture, and society, especially in the context of major global events—namely, the pandemic, the Black Lives Matter movement and the ongoing climate crisis.³

While it is beyond the scope of this chapter to try to grasp the impact of such multiple and major events which have all been, in some way or another, intensely configured around our human relationship with air (in the age of the Anthropocene), it is important to recognize how impactful these events have been and how they have altered the way I think about air. Before I move

forward, it is useful to reflect on the development of my own methodology and the rootedness of my work in breath studies. Prior to writing *Shalimar*, a memoir which reflects on my Burmese and Colonial heritage, I had developed a body of work concentrated on breath and air in visual and material culture. My research contributed to the wider field of phenomenological humanities and could not have been made possible without the pioneering work of Laura U. Marks (*The Skin of the Film*) and Vivian Sobchack (*The Address of the Eye*). Phenomenological film studies had already explored the potential of the embodied spectator but never, in any depth, the breathing gaze of that body.

Given her critical dialogues with Martin Heidegger (*The Forgetting of Air in Martin Heidegger*) and Maurice Merleau-Ponty (*An Ethics of Sexual Difference*), the French philosophy of Luce Irigaray seemed most revelatory and enriching. In her text *The Age of the Breath (Le temps du souffle)*, Irigaray writes about how we have forgotten about air as the most fundamental mode of being; she establishes a new model of habitation with respect and care for this space. Irigaray's thoughts seem startlingly literal in our pandemic era, but at the time of writing my first academic book I was specifically drawn to the question of how cinema can do something different with that space, with the air between *us* as well as within our bodies. As Derek Jarman's single blue screen calls into being in his seminal film *Blue* (1993), there is an "air" conjured by the screen—a blurry, fuzzy, intersubjective space made up of dust and light particles. Contrastingly, in Douglas Gordon and Philippe Parreno's *Zidane: A 21st Century Portrait* (2006), the digital representation of French footballer Zinedine Zidane, we see and hear Zidane's misty breaths and groans on the pitch. This markedness of the human voice and its movement through echoes and the air "outside" is almost like ultrasound through a vibrant ecology of lived environments. After all, breathing engenders a duality between environ and self. Of course, there is also the wind, the desert storm, the mist, and the fog.

The materiality of air has been discussed most recently by theorists such as Jean-Thomas Tremblay in his book *Breathing Aesthetics* and Chloe Preedy in her analysis of early modern performance in *Aerial Environments on the Early Modern Stage*;⁴ these are works which call attention to air in the context of culture and art, but it remains rarely discussed within the theoretical analysis of contemporary creative writing.

I have written elsewhere about rhythms and silences of all kinds, especially in the theorization of trauma or healing in literature as well as film.⁵ In recent years, I have written about ecologies of air and the evocation of such spaces in literature and art; the postcolonial representation of invisible or silenced bodies and water as well as fire. This also extends to my creative writing and the rural soundscapes of wind and bells chiming in *Shalimar*, which I have also recorded as an audiobook, aptly emphasizing the role of listening and the elemental sounds present within the narrative.

Creative Writing

In my memoir, published ten years after *The Place of Breath in Cinema*, there exists a tangible point of collapse between my academic, theoretical interests in air and breath,⁶ which I have written about for twenty years, and the impact of my father's death from lung cancer in 2008, leading to several house moves across what I can only describe as Deep England. *Shalimar* follows the events which were parallel to the writing of my PhD and the life outside of it—namely, my move away from home and the new connections of belonging and community I sought after my father's death, the birth of my children, and the passing of many other close relations along the way. It is clear that my academic interest in the philosophies of air and its situation in language, aesthetics, and the environment have since shaped my creative writing and underpinned a certain kind of *modus operandi* which I have come to understand as a particular form of embodied subjectivity, a way of looking and feeling through the world. Writing “through” air is at once a turn towards a specific comprehension of place, of the body, of language and, more precisely, the sounds and movements which correlate with an elemental approach to writing. As this passage from *Shalimar* makes clear, the elemental and poetic strata of the text is invoked through air and the “breathing” landscape: “Beneath the exedra, Silverwood. The trees breathe and I inhale the forest from its living underside. *Respirare mi hai tolto la parola di bocca* (You took the words right out of my mouth).”⁷ This passage conflates air with language, light, the woods, animal and insect life, and my postcolonial identity. There are also inflections, here, of the work of Juhani Pallasmaa whose book *The Eyes of the Skin* offers up revelatory ways in which to think through images of light and the great shadows and chiaroscuro effects of ancient architecture in particular, whose form might accord with a breathing out, or breathing in, of air in spatial terms: a “deep breathing in of shadow and light.”⁸

While there is a grounded feeling of lived experience and naturalism as I describe the walk I take from Albury, Surrey, to Guildford Cathedral, the writing also highlights the imaginary and mystic correspondences of air, which permit a kind of thinking beyond the material world. This chapter will examine what is at stake, creatively and critically, when air is embedded as signifier or philosophical *modus operandi* in creative writing. What is revealed and what is concealed, and to what extent does this inform the kind of “fictional activism” I write now, so long after eighteen years’ teaching and researching haptic phenomenology? Moreover, the chapter will also consider pedagogical approaches to the discipline in the context of air and breath studies across the arts. Drawing on my own creative-critical practice, alongside the feminist and postcolonial writings of Noreen Masud (*A Flat Place*, 2023) and Dalia Neis (*Zephyrian Spools: [An Essay, A Wind]*, 2020), the argument put forward will examine the role of the mystic, the transcendental, and the material world in the post-pandemic era, searching for new methodological ways to think

through air, breath, subjectivity, and the politics of writing the body in the contemporary world.

Interdisciplinarity is key and one of the most important factors relevant to the way I write. Rather than moving from one discipline to another, my creative practice is an intertwinement of both visual and linguistic forms of thinking through air and breath. Indeed, the field of breath studies, in particular, has identified its interdisciplinary correspondences and the significance of its potential to reach across “borders”: “The interdisciplinarian is best equipped to walk inside (and alongside) the lands of breathlessness, translating across border-lands wherever possible as she moves.”⁹ Adopting the form of the Aboriginal “songline,” the team of researchers who led the “Life of Breath” Wellcome Trust research project described their work as an interdisciplinary exploration of breath which required renewed attentiveness to their individual fields of study through the generative lens of the breathing body. While I have written extensively about moving image and lens-based media, literature presents the idea of breath in multiple ways. There is a rich history, a constellation of breaths, from William Shakespeare’s line in *Romeo and Juliet* (“How art thou out of breath, when thou hast breath / To say to me that thou art out of breath?”) to Samuel Beckett’s *Breath* and the experimental work of Neis in *Zephyrian Spools: (An Essay, A Wind)*.¹⁰ A breath is also the space between the reader and the text, a markedness which is shared and gives form as well as, in some cases, a theme. Think of it like a generator of intimacy, of physicality as well as emotion, a quietness, a calm, or a clash—a held breath is also a relief when it is exhaled. The Gothic novel would not be the same without the ghosting of life, a rime of glitter, almost, between the living and the dead. In literary fiction, we are often invited to think about embodiment and how our lives are constructed through identity and the bodies we inhabit; in Mona Arshi’s *Somebody Loves You*, her protagonist Ruby retreats into silence as a way of coping with her mother’s mental illness. We can feel Ruby’s breath throughout Arshi’s story, opening and then closing her mouth again as a rejection of language. In Elizabeth-Jane Burnett’s *The Grassing: A Geological Memoir*, she writes of her deep connection to the Devonian farmland where she grew up and its mercurial enfolding within her own sense of self and her other inheritance, her mother’s Kenyan heritage; the land “breathes” as nature and the elements dance together in her prose.

Critical Reflections

Such a writing through air fosters a new conceptualization of space and the environment which taps into thinking around the mapping of territory, the natural world, and landscape; pre-existing models of psychogeography and cartographies of space become radically altered when air is privileged here, as signifier or motif. Challenging the trope of the Baudelairean flâneur or wanderer, and the imperialistic gaze of patriarchal society, Neis’s writing embodies a form of auto-fiction, a genre which blends memoir with fictional

elements for the purpose of magical realism and a broader symbolism, rendered through the thematic chasing of the wind. Neis sets off, in the guise of an autobiographical quest for knowledge and mystical transcendence. She grapples with films, ideas about films, myths, local histories, and family stories as she moves from the landscape of cinema to England's moors. The tone is also multiple, from poetic to stream of consciousness; there are transcriptions of conversations and notes of all kinds (fieldnotes and otherwise).

Neis's title refers to the spooling of film, raw footage manipulated during the analogue processes of editing which comes undone and is loosened through language in her essay; the wind as spool is a concept at the heart of Neis's thinking, as a metaphor for wildness and agency, resistant to any kind of patriarchal order or systemic structure which might seek to subvert or appropriate feminine "wildness." As Ruth Novaczek observes, Neis develops a whirlwind of an essay: "*Zephyrian Spools* mixes autobiography, psychogeography, film history, phenomenology and mysticism in a tumultuous essay on the wind and cinema."¹¹ The subject of the wind raises fundamental questions concerning the mystical and transcendental power of air and its rootedness in various belief systems and embodied practices, and its conflation with the outer world, the cosmos, and the environs we live in. Neis draws on mythologies of the occult and folklore to invoke and celebrate queer identity and otherness. In one particular passage, Neis reflects on "The Helm," the only named wind in the British Isles: "A whirling vortex, known as the 'Helm Cloud' sits on top of Cross Fell's summit. ... A 'White Helm' signals that the wind will erupt with a ferocious force for an unspecified amount of time; this force could vary from up to three hours, to three days, or three weeks."¹² This passage, then, intersects and evolves with the language Neis adopts in her poetry and the presentation of this work in the form of circular spools and drifts, analyses of the wind in cinema, and her encounter with a scholar-mystic through chapters entitled "The Magic Stone" and "The Cardinal Points." The prose begins to embody the movement of the wind as it moves and scatters into various subsections, imaginary films, and poetic interludes, constructing a formalism and textual rigor which playfully invokes the wind. While the wind has been the focus of other experimental and poetic writing,¹³ Neis's interdisciplinary approach uniquely engenders various, powerful modes of queer subjectivity and phenomenological experience.

In my own work, the environment of air is implicated within a philosophical discourse, as well as concerns about rural habitation and health. The issue of clean air strikes me as I move from London to rural England (Surrey Hills, Berkshire, Hampshire, Devon) and contemplate the images of pastoral relics, seemingly timeless landscapes, which the act of walking affords in close-up detail. The air is also connected to the elemental environs which emerge through sections of fictional activism in *Shalimar*, loosely auto-fiction which, like Neis's book, offers up moments of transformation and hope through a deep, feminist connection to the lived environment. For example, one chapter

positions the reader in the body and mind of my grandmother, a half-Burmese woman, as she climbs the Blarney Stone in Ireland, feeling the wind on her face and her breath against the rocks: "Still. A tangled word on her tongue. Breath against the flatness. Drifts of wind settle into the stone."¹⁴ In another chapter set in Devon, ten years after my father's death, I walk with my children through a barley field and watch the wind move through its oscillating lines below the sky. It is a movement through air itself. Indeed, implied by the subheading which refers to "Place and Migration" is my investment in forms of navigation, orientation, and exploration. In other words, more intimate geographies. Imagine Madame Scudéry's seventeenth-century French map of an imaginary land, a "Carte du tendre" (a map of tender, or tenderness). My map is both real and abstract, expressed through my reflections on journeying into Deep England, moving out of our family home, and through narratives, impressions, and "field notes" which form a way towards a new "orientation" of identity. Like Neis, my mapping is oriented towards a feminist conception of place and "home."¹⁵

While Neis cultivates an experimental approach to air, the work of Masud in her book *A Flat Place* demonstrates how empty landscapes are intricately bound up with complex feeling and habits, rituals, and the politics of queer and postcolonial identity. Masud's book is not so much about air or wind as the emptiness of flattened spaces which may be viewed or walked through, and their intense conflation with her inner life and feeling through the world. In interview, Masud speaks of the strangeness of flat landscapes and its connection to trauma, how the latter filters every aspect of the way she responds to the world, including flat landscapes.¹⁶

The key thing here is that the empty and flat landscapes do not "heal" or break apart the tension Masud might feel, but rather, perhaps, offer up some sense of being held, safely, in a very complex and certainly not indefinite way; the airy environment of openness, emptiness, and the space it provides is also a corollary for language, which cannot fully engender such a feeling but nevertheless holds it, makes a space for it, in its absence. The experience of a flat landscape presents, to Masud, a relationality that is attached, somehow, to a moment of relief, and that sensation constantly shifts and expands, or contracts. As Masud writes of the experience of visiting Orkney with her mother, the ancient histories of Britain's landscapes and their mythology become swept up in her psychic "feeling" for flatness, the subjective merging with the objective and the queer, the othering of the unknown: "The Stones of Stenness were even older than Stonehenge. ... Little wisps of sheep wool had caught in the cracks and scars of the rock: they fluttered in the wind."¹⁷ As the sheep wool flutters in the wind, Masud draws attention to the mystical and spectral qualities of the landscapes she walks through; the stones are strange objects untethered to any specific meaning—which she tries to preserve here, I sense, to foster an openness to the subjective experience of this place, shared with her mother, as intersubjective, shared, and as fragile as the stone

she describes. There is also a parallel between Masud's visuality in her writing, her embodied perception of objects, the elements and an orientation to place, and the way Neis draws her readers into a dialogue with the wind and its queer unfolding of space. Masud points out the significance of Sara Ahmed's thinking, in interview, and reminds us of the relevance of orientation: "Ahmed's writing—*The Promise of Happiness* and *Queer Phenomenology* in particular—is very important to me. Her work shows us that queerness is a direction of travel, a way of being orientated—or, crucially, not orientated—towards things or people."¹⁸ For Neis, this kind of queer orientation is precisely embodied by the wind.

The future direction of my work draws together new strands which examine lived experience, technology, and the impact of climate change on the elemental world; broadly speaking, a manifesto for thinking through the implications of the pandemic and, in particular, the rise of screen interfaces and remote working. This work examines the fundamental shift away from shared space and the compression of space and time through digital interfaces, which tends to leave us rootless and "outside" of our bodies. In the below passage from my memoir, *Possessions* (forthcoming), I contemplate the effects of technology on my body:

Gravity is the weight of my hands on the keyboard. The tips of my fingers and the veins on my knuckles. I can levitate between the keyboard and the screen. I can be the thin space between the dust and the glass. ... I can summon a spinning palace of winds, but first I must exhale. Wind carries itself. Wind is an alchemical becoming.¹⁹

This work will flesh out a new approach to the spectral and mystic properties of air, and its implication in how we navigate digital worlds and technology that severs our links to the natural world—the world outside, for sure, and also the space between us, the very precious role of community and kinship in such uncertain times.

Conclusion

As Irigaray has reminded us through the project of much of her work, air is fundamental and it is the interstitial, "in-between" space we need to safeguard and foster, above all; it is the element we share with the living world as we endeavor to understand what it means to be alive in the age of the Anthropocene. This head and heart bound connection to air, perhaps somewhat utopian in its conception, exists in my writing as well as the writing of Neis and Masud, as shown here. Storytelling with air in mind, from the wind to the mists gathering on great mountain ranges, the flowering spores of lichen, and stagnant water filled with algal blooms, might help to restore some sort of vital connection to the environments we live within. Air has its own maps: stories yet to be told.

Notes

- 1 Davina Quinlivan, *Shalimar: A Story of Place and Migration* (Beaminster: Little Toller Books, 2022), 62.
- 2 Tatiana Konrad, ed., *Imagining Air: Cultural Axiology and the Politics of Invisibility* (Exeter: University of Exeter Press, 2023); see also, for example, Evelyn O'Malley and Chloe Kathleen Preedy, "Editorial: On Air," *Performance Research* 26, no. 7 (2022): 1–6.
- 3 Davina Quinlivan, introduction to *Riptide* 15 (2023): 1–3.
- 4 See Jean-Thomas Tremblay, *Breathing Aesthetics* (Durham, NC: Duke University Press, 2022); Chloe Kathleen Preedy, *Aerial Environments on the Early Modern Stage: Theatres of the Air, 1576–1609* (Oxford: Oxford University Press, 2022).
- 5 Davina Quinlivan, "Aurality, Embodiment and Subjectivity: Theorising the Female Voice in Spike Jones' *Her* (2014)," in *Locating the Voice in Film: Critical Approaches and Global Practices*, ed. Sarah Wright and Tom Whittaker (Oxford: Oxford University Press, 2016); Davina Quinlivan, "How Queer Cinema Might Feel: Haptic Sound in Derek Jarman's *Blue* and Isaac Julien's *True North*," *Music, Sound and the Moving Image* 9, no. 1 (2015): 63–77.
- 6 While *The Place of Breath in Cinema* is a phenomenological inquiry into cinema and haptic discourse, positing a new model of haptic aurality and embodied film experience, it also opened up questions of healing and the ethics of film experience which were at the centre of my second monograph and my engagement with the psychoanalytic thought of Melanie Klein in *Filming the Body in Crisis: Trauma, Healing and Hopefulness* (Basingstoke: Palgrave, 2015); Davina Quinlivan, *The Place of Breath in Cinema* (Edinburgh: Edinburgh University Press, 2012); Davina Quinlivan, "The Breathing Body in Movement," in *Undutiful Daughters: New Directions in Feminist Thought*, ed. Henriette Gunkel, Chrysanthi Nigianni, and Fanny Söderbäck (Basingstoke: Palgrave, 2012), 101–11; Davina Quinlivan, "Whispering on the Threshold of the Flesh: The Breathing Body, Silence and Embodied Shame in Marina de Van's *Dans ma peau* (2002)," in *Guilt and Shame: Essays in French Literature, Thought and Visual Culture*, ed. Jenny Chamarette and Jennifer Higgins (Oxford: Peter Lang, 2010), 177–87; Davina Quinlivan, "Breath Control: The Sound and Sight of Respiration as Hyperrealist Corporeality in *Breaking the Waves*," in *Realism and the Audio-Visual Media*, ed. Lucia Nagib and Cecilia De Mello (Hampshire: Palgrave Macmillan, 2009), 152–62. See also "Lungs and Breath, Air and Matter," accessed November 18, 2024, <https://screenculture.wp.st-andrews.ac.uk/2020/07/09/themed-playlist-lungs-and-breath-air-and-matter/>; "The Place of Breath in Cinema: 10 Years On", <https://eupublishingblog.com/2022/11/15/the-place-of-breath-in-cinema-10-years-on/>.
- 7 Quinlivan, *Shalimar*, 61.
- 8 Juhani Pallasmaa, *The Eyes of the Skin: Architecture and the Senses* (New York: Wiley, 2012), 51.
- 9 Alice Malpass et al., "Disrupted Breath, Songlines of Breathlessness: An Interdisciplinary Response," *Medical Humanities* 45, no. 3 (2019): 294.
- 10 William Shakespeare, "Excerpt from *Romeo and Juliet*, Act II, Scene 5," accessed November 18, 2024, <https://www.bremertonschools.org/cms/lib/WA01001541/Centricity/Domain/221/ACTIIScene5.docx.pdf>.

- 11 Ruth Novaczek, accessed November 18, 2024, <https://www.knivesforksandspoonspress.co.uk/product-page/zephyrian-spoons-by-dalia-neis-136-pages>.
- 12 Dalia Neis, *Zephyrian Spools: (An Essay, A Wind)* (Newton-le-Willows: Knives Forks and Spoons Press, 2020), 65.
- 13 For example, see Jeremy Bendik-Kamer, *The Wind: An Unruly Chaos* (California: Punctum Press, 2018); Geoffrey Winch, *Velocities and Drifts of Wind* (Guildford: Dempsie and Windie, 2020).
- 14 Quinlivan, *Shalimar*, 46.
- 15 For further reflection on this kind of mapping, it is useful to take a look at my commissioned poem for the residency I undertook with Literature Works in 2023, entitled “The Map Maker’s Daughters,” accessed November 18, 2024, <https://quaywords.org.uk/davina-quinlivan-map-makers-daughters/>.
- 16 See Noreen Masud, in interview with The Women’s Prize for Non-Fiction, accessed November 18, 2024, <https://womensprize.com/in-conversation-with-noreen-masud/>.
- 17 See Noreen Masud, “A Flat Place” (extract), *Granta*, accessed November 18, 2024, <https://granta.com/a-flat-place/>.
- 18 Masud, in interview with The Women’s Prize for Non-Fiction.
- 19 These words form some of the basis of a chapter in my forthcoming memoir, *Possessions* (Richmond, UK: September Publishing, 2025).

Index

References to figures and photographs appear in *italic* type; and the letter ‘n’ indicates a chapter-end note.

- 5G 116, 126–30
60th Venice Biennial 140–1
127 Hours (Boyle) 124
1928 United Fruit Massacre 139–40,
141, 142, 155 *see also* Banana
Massacre
- active dust 147, 148, 152
aerial toxicants 19
aerobic beings 4, 22
aerosols xiii, 9, 25, 45, 55–6 *see also*
biological aerosols; particulates
“aesthetics of breathing” 102
agile governance 75, 76
air: chemical perspectives 6; conspiracies
129; destruction and
transformation 85; geopolitical
borders 60–1; head and heart
connection 171; as “literal contact
zone” 84; material issue 63–4;
means for connectivity 125;
power and harm 27–8; scientific
perspectives 2
“Air and Environmental Health in
the (Post-)COVID-19 World”
project 1
airborne plastics 18, 28–30
airborne viruses *see* COVID-19
air pollution 17–18, 23, 39, 71 *see also*
pollution
- air pressure 109
air quality 23, 27–8, 38–9, 45–6, 62
air quality indexes (AQI) 38, 45,
72, 75
Ambergris Trilogy, The (VanderMeer) 87
Anthropocene epoch 4, 24, 84
anthropogenic carbon emissions 18
anthropogenic-induced environmental
changes 83–5
anthropology of smells 150
anthropomorphic utopia of trees 43
anti-5G conspiracy theorists 116,
126–30
anti-Black violence and trauma 152–3
anti-colonial episodes of resistance
145–6
aquatic bodies 22–3
argon 10, 60–1, 76, 107–9, 112
Arrival (film) 103, 105–7
auto-fiction 168–9, 169–70
- Banana Massacre (Ciénaga, Colombia
1928) 139–40, 141, 142, 155 *see*
also 1928 United Fruit Massacre
bananas: advertising campaigns 135–6;
and capitalism 143–4; and CLD
156–7; as human corpses 139,
142; human vertebral columns
150; inter-materiality 141
“Big Burn” 1910 41

- biological aerosols 10, 84 *see also*
aerosols; COVID-19
- Bloom* (Oppel) 84, 85, 87–8, 89–92,
93–4, 95–7
- Blue* (film) 166
- Bopape, Dineo Seshee Raisibe 138–9,
144–57, 145, 146, 149, 152, 156
- “Born in the first light of the morning
[moswara’marapo]” exhibition
(Bopape) 144
- Boy in the Tower* (Ho-Yen) 84, 85,
87–92, 95–7
- Braiding Sweetgrass* (Kimmerer) 76
- breathing: as a collective endeavor 102;
cultural and aesthetic practice 26;
decomposing bananas 154;
duality of environ and self 166; as
material 6; social and political
implications 25
- breath studies 167–8
- capitalism 65, 140–4, 151, 154–5
- Carlson, Dale, *The Plant People* 84, 85,
87–93, 95–7
- Carson, Rachel xii, 89
- Cavendish* (slave ship) 142–3
- Cercle d’Art des Travailleurs de
Plantation Congolaise 140–1
- charcoal 147
- charcoal briquets 58n26
- Chiang, Ted 102–15; estranging air
109–11; “Exhalation” 107–13;
oxygen bodies 111–13; “Story
of Your Life” 104–5. *See also*
Arrival (Denis Villeneuve’s
adaptation)
- “Chiquita Banana” advertisement 135–7
- clean air 6, 26–7, 38–9, 44–5, 75, 169
- clear-cutting 49, 50, 53
- climate change 63–73; atmospheric
effects 149–51; “atmospheric
re(lation)ality” 84–5; domination
and superiority 69; and elemental
aesthetics 149; new logics 66–7;
proactive and reactive responses 74;
social justice 66–7; as a
teacher 75–6
- climate crisis 68, 70–1, 149, 151
- climate justice 61, 70, 74
- climate refugees 72–3
- CO₂ emissions 45
- coal 41–2
- cognitive estrangement 120, 121
- Cold War 97
- colonialism 69, 148–9, 151
- coming-of-age narratives 85, 87, 93, 97
- conspiracy theories 126–30
- conspiratio* (“breathing together”) 129
- contemporary young adult fiction
83–101; botanical invasions 92–4,
97; contagious plant life 89–92;
microbiological plant horror
86–9; pollen, pollution, and
parental abandonment 94–7
- controlled burns 43–4, 48, 55 *see also*
prescribed burns
- COVID-19 126–30 *see also* biological
aerosols
- creative writing 166–8
- The Day of the Triffids* (Wyndham) 87
- decarbonization 63, 64, 76
- digital immediacy 122–5
- dystopian future scenarios 96–7
- elemental aesthetics 149
- elemental approaches xii, 3
- energy transition 63
- the Enlightenment 67
- environmental racism xiv
- environmental violence 19–23
- equality 18–19
- estranging air 109–11
- “Exhalation” (Chiang) 103, 107–13,
113n8
- fire as a protective tool 43
- firebombs 41
- firefighters 41, 53–4

- Firefighters United for Safety, Ethics,
 and Ecology (FUSEE) 53–4
 fire permeability 54
 fire risks 53, 54
 fire smoke 43, 72–3
 fire suppression 42–3
 firewood for home heating 42, 54
 Flint, Michigan 4
 FLORA ars+natura, Bogotá 143,
 159n20
 forest reserves 40–1
 forests: ecological history 43; fire risks
 53, 54; fuel contagion 49; intense
 fires 49; low-intensity, regular
 fires 43; as our friends 43;
 political conflicts 53; thinning
 48–53; World War II 41 *see also*
 wildfires
 Fu-Go balloons 41

 Gates, Bill 126–7, 130
The Girl with All the Gifts (Carey) 87

The Happening (film) 87
 Heptapod B alien language (“Story of
 Your Life”) 104, 105, 107, 112
 home heating with wood 42 *see also*
 woodstoves
 household pollutants 27
 Ho-Yen, Polly, *Boy in the Tower* 84, 85,
 87–92, 95–7
 hydrogen 64
 hyperconnectivity 130

 Indigenous people 43–4, 69
 industrial forests 49–51
 industrial heartlands 62
 industrial logging 47–8
 industrial pollution xiii
 inhaling 17, 27, 30
 intentional burns *see* prescribed burns
Invasion of the Body Snatchers (film) 87
 invisibility of air 5, 17, 18
 invisibility of breath 26

 invisibility of viruses 5
 invisible dangers 84

 “Kepone” (pesticide) 156 *see also*
 pesticides

 Lane County Air Protection
 Authority 55
The Last of Us (video game) 87
Lerole: footnotes (Bopape) 139, 144–57,
 145, 146, 149, 152, 156
 “Life of Breath” research project 168

*Mabu, mubu, mmu, sa_ _ke lerole, (sa, lerole
 ke _ _)* (Bopape) 147, 153
 Marikana massacre 2012 148
 materiality of air 3–7; capitalist
 destruction 137–8; contested
 space 29; interconnectedness 75;
 overlooked 24–5; physical and
 emotional crises 26–7; and
 planetary health 5–6; porous
 nature of air 7; shaped by
 narratives 130
Melancholia (film) 124
 microbiological menaces 84, 94, 97
 microbiological plant horror 85–9, 97–8
 microplastics 18
 multiculturalism 69
Musa paradisiaca (Restrepo) 139–44,
 140, 143, 154, 157, 159n20
Musa x paradisiaca (banana plant)
 139, 155

 national parks 40–1
 natural gas 45, 46
 “natural” smells 150
 “nature” and “Nature” 137
 nature-strikes-back narratives 86
 Netherlands pavilion, 60th Venice
 Biennial 140–1
 non-ionizing electromagnetic
 radiation 130
 nonliving objects 23

- North America: settler colonial peoples
42; wildfires 39
novums 120, 124
- odors *see* smells
- oil pollution 21
- olfactory art 138, 144, 155
- Oppel, Kenneth, *Bloom* 84, 85, 87–8,
89–92, 93–4, 95–7
- Oregon Cascades fire (2020) 49, 53
- Oregon Coast Range 47, 48
- Pacific Northwest 47, 54–5
- particulates 9, 45, 54, 55–7, 75 *see also*
aerosols
- “pastoral” air 150
- pastoral myths 44–5
- pastoral relics 169
- patriarchal privilege 65, 66
- patriarchal rationalism 64–5
- Pennsylvania Fireplace 54–5
- pesticides 18, 89, 156 *see also* toxicants
- Petro-Mama* (Wilson) 62, 71–2, 75
- petrosubjects 73
- photosynthesis 22
- planetary health 6, 61, 63–4
- plant horror 86–7, 89–90, 98
- plant invasion narratives 85, 93–5
- The Plant People* (Carlson) 84, 85,
87–93, 95–7
- plastics 28–30
- pollution xiii, 4, 17–18, 63, 85 *see also*
air pollution
- polyester 28–9
- postmodernism 122
- prescribed burns 9, 44–5, 47, 53, 54 *see*
also controlled burns
- pristine premodern forest myth 44–5
- private timberlands 47–54
- public health films 5
- replanting trees 47–8
- resilient societies 70
- respiration 25 *see also* breathing
- Restrepo, José Alejandro 138–44, 140,
143, 148–51, 153, 154–7, 154,
159n20
- Romeo and Juliet* (Shakespeare) 168
- Ryman, Geoff, *Air* 116, 117–20, 123–7
- scents 150 *see also* smells
- science fiction (sf) 10–11, 102, 116
- sensorial experiences 141, 144
- Sbalimar* (Quinlivan) 165, 166, 167,
169–70
- slash piles 51–2, 51, 53
- slaves and slavery 142–3, 148, 152, 155
see also violence
- smells 5, 138, 141, 150
- smoke pollution 45 *see also* aerosols;
particulates; pollution
- social equity 111
- social justice 66–7
- soil (earth) 151–3
- Somebody Loves You* (Arshi) 168
- Stories of Your Life and Others*
(Chiang) 103
- “Story of Your Life” (Chiang) 103,
104–5, 112
- A Subtlety, or the Marvelous Sugar Baby*
(Walker) 140
- suffocation 25, 73, 98
- survival of the fittest 60, 67–8
- survival of the most adaptive 68
- Sydney plague 1900 5
- synthetic textiles and microfibers 28–9
- tear gas 27
- teenage body horror 92–4
- teenagers: agency 91, 97; empowerment
96; and the vegetal world 92
- thinning forests 48–53 *see also*
wildfires
- Thompson, Tade 116–20, 122–3,
125–7, 129
- tobacco 142–3
- toxicants 21, 23 *see also* pesticides
- trees: breathing 167; as our friends 43

- United Fruit Company 135–6, 140, 142
- United Self-Defense Forces of
Colombia (AUC) 136
- United States: Energy Policy and
Conservation Act 46; Forest
Service 41; National Security
Agency 136
- vegetal and human well-being 84–5
- vegetal matter and human flesh 141
- vegetal monsters 87
- vegetal states of being 89–92
- Venice Biennial 140–1
- violence: airborne plastics 28–9;
environmental degradation 18;
manipulation of air quality 27–8;
meanings 19–22; modern logics
67; and toxicants 23; vegetal
matter and human flesh 141 *see*
also slaves and slavery
- volatility of information flows 120–1
- von Trier, Lars 124
- Weyerhaeuser Company 53
- white supremacy 66, 67
- wildfires 38–41, 43, 47, 52–3, 72–3
see also forests; thinning forests
- wildland–urban interface (WUI)
52–3, 54
- wind 169
- witch hunts 65, 78n17
- woodfires 42, 54–5 *see also* controlled
burns; prescribed burns
- woodsmoke 42, 43
- woodstoves 42, 46–7, 54–5
- World War II 41
- The Wormwood Trilogy* (Tade
Thompson) 116–17, 129;
Rosewater 118–20, 123, 126, 127;
The Rosewater Insurrection 125–6;
The Rosewater Redemption 120,
122–3, 125–6
- writing through air 165, 167, 168
- Wuhan, China 128
- xenophobic fears 97
- xenosphere 118–20, 122–6
- YA microbiological plant
horror 85–9
- young adult (YA) fiction 84
- Zephyrian Spools* (Neis) 168, 169
- Zidane* (film) 166