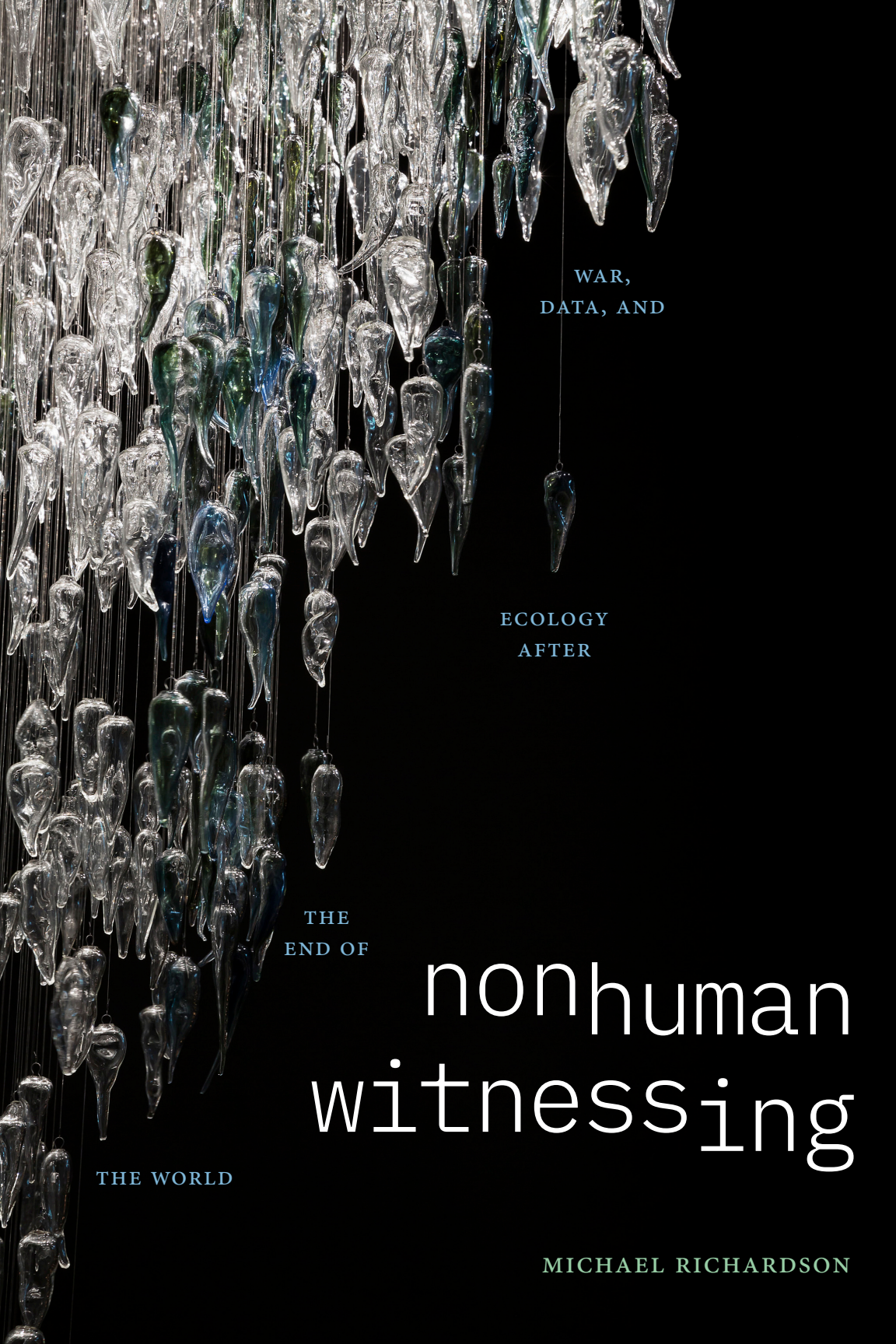


THE END OF THE WORLD

ECOLOGY AFTER

WAR, DATA, AND

nonhuman witnessing

MICHAEL RICHARDSON

NON-
HUMAN

WITNESS-
ING

Thought
in the Act

a series
edited by

Erin
Manning

& Brian
Massumi

DUKE
UNIVERSITY
PRESS

DURHAM
& LONDON

2024

WAR,
DATA, AND

ECOLOGY
AFTER

nonhuman witnessing

THE
END OF

THE WORLD

MICHAEL
RICHARDSON

Printed in the United States of
America on acid-free paper ∞
PROJECT EDITOR: MICHAEL TRUDEAU
DESIGNED BY AIMEE C. HARRISON
TYPESET IN MINION PRO AND IBM PLEX MONO
BY WESTCHESTER PUBLISHING SERVICES

Library of Congress Cataloging-in-Publication Data
Names: Richardson, Michael, [date] author.
Title: Nonhuman witnessing : war, data, and ecology after the end of the world / Michael Richardson.
Other titles: Thought in the act.
Description: Durham : Duke University Press, 2024. | Series: Thought in the act | Includes bibliographical references and index.
Identifiers: LCCN 2023015594 (print)
LCCN 2023015595 (ebook)
ISBN 9781478025641 (paperback)
ISBN 9781478020905 (hardcover)
ISBN 9781478027782 (ebook)
Subjects: LCSH: Mass media—Social aspects. | Mass media—Political aspects. | Mass media and technology. | Mass media—Influence. | Information society. | Communication and technology. | Evidence. | Witnesses. | BISAC: SOCIAL SCIENCE / Privacy & Surveillance (see also POLITICAL SCIENCE / Privacy & Surveillance) | SOCIAL SCIENCE / Media Studies.
Classification: LCC P96.S65 R534 2024 (print) | LCC P96.S65 (ebook) | DDC 302.2—DC23/ENG/20231103
LC record available at https://lccn.loc.gov/2023015594
LC ebook record available at https://lccn.loc.gov/2023015595

Cover art: Yhonnie Scarce, *Thunder Raining Poison*, 2015. Blown-glass yams, stainless steel, reinforced wire, dimensions variable. Installation view at Tarnanthi Festival 2015, Art Gallery of South Australia. Photography: Janelle Low. Image courtesy of the artist and THIS IS NO FANTASY, Melbourne.

for adrian
and sacha—

may you witness
many worlds

CONTENTS

ACKNOWLEDGMENTS

I ACKNOWLEDGE THE UNCEDED SOVEREIGNTY of the Bidjigal and Gadigal people of the Eora Nation on whose lands this book was written. From tens of thousands of years before the settler invasion through today, their knowledge, culture, and customs have protected and nurtured this land, and will continue to do so long into the future. Always was, always will be.

This book responds to a pervading sense of crisis. Its writing began in earnest with the Sydney air thick with bushfire smoke and these words of acknowledgment are typed in the wake of catastrophic flooding and with yet another pandemic wave surging. I was fortunate enough to hold an Australian Research Council Discovery Early Career Research Award from 2019 to 2021 (DE190100486), a research fellowship that spared me the intensity and labor of teaching through the first two years of the COVID-19 pandemic, although not the upheavals, lost jobs, merged faculties, and other stresses of my place of work in those years. That was and remains an immense privilege, one not afforded to the many academics forced to eke out research time under the strain of unsustainable teaching and administration loads.

If this book began anywhere, it was with two questions asked a year apart on separate visits to Freie Universität, Berlin. The first was from Jonas Bens, who asked whether drones might become nonhuman witnesses. The second

came after delivering a paper that began to answer that question, when Jan Slaby asked whether the paper would become a book. I am grateful to both Jonas and Jan, but their questions would not have been possible without an invitation from Kerstin Schankweiler to visit Berlin in 2017 for the inspiring Image Testimonies: Witnessing in Times of Social Media symposium and again a year later as a visiting fellow at the Affective Societies Collaborative Research Centre. My deepest appreciation to Kerstin, who has since become my coauthor, coeditor, and friend.

I benefited immensely from the chance to share ideas and words that would become this book at conferences, often on more than one occasion, including 4s, Crossroads in Cultural Studies, Deleuze Studies, Cultural Studies Association of Australasia, the Australasian Society for Continental Philosophy, International Communication Association, the Aesthetics of Drone Warfare, Digital Intimacies, the Australian Sociological Association, World of Drones, Data Futures, Drones in Society, Witnessing and Worlds beyond the Human, and the worlding experience of the Affect WTF and Capacious AIMS conferences organized by the shimmering Greg Seigworth. Thank you also to the many people who invited me to speak on drones, witnessing, and related matters. Kerstin Schankweiler for Image Testimonies at Freie Universität; Elizabeth Stephens for Future Affects at University of Queensland; Kerstin Schankweiler and Tobias Wendl for the art history colloquium at Freie Universität; Lyria Bennett-Moses, Danielle Hynes, and Niamh Stephenson for the Data Injustices Roundtable at UNSW; Vered Maimon at Tel Aviv University; Catherine Rhodes at the Cambridge University's Centre for Existential Risk; Lilie Chouliaraki at the London School of Economics; Carolyn Pedwell and Vince Miller at University of Kent; Shela Sheikh at Goldsmiths; Jonas Wittelman at the Schaufler Lab at TU Dresden; Naoko Abe, Justine Humphry, and Chris Cheshire for Mobile Robotics in Public Space at the University of Sydney; Kerstin Schankweiler (again!) at TU Dresden; Lindsay Kelley for UNFILED at UNSW; Timothy Gregory and Jeremy Moses for the Weapons, Wounds, War seminar series at Auckland University; and Andrew Brooks for the seminar series in my home department at UNSW Sydney. Those prompts to think through theories, themes, and case studies and the generous engagement of the audiences at those talks with the limits and potentials of my thinking made for a much stronger book.

Earlier versions of parts of this book were also published in academic journals but have since been revised extensively. I am immensely grateful to

the editors and peer reviewers who guided these texts at a formative stage. Parts of chapter 1 draw from "How to Witness a Drone Strike," *Digital War* (2022), published in a special issue edited by Olga Boichak and Andrew Hoskins. What would eventually become sections of chapter 3 appeared in "Climate Trauma, or the Affects of the Catastrophe to Come," *Environmental Humanities* 10:1 (2018). An earlier version of chapter 4 was published as "Radical Absence: Encountering Traumatic Affect in Digitally Mediated Disappearance," *Cultural Studies* 32:1 (2018), in a special issue on media and affect edited by Sarah Cefai.

I am doubly (if not triply) thankful to Sarah Cefai, who orchestrated my visit to Goldsmiths in 2020, on the cusp of the pandemic, which led to conversations that pushed me to resolve some thorny questions with Joanna Zylinska, Matt Fuller, Chris Woods, Ariel Caine, Eyal Weizman, Susan Schuppli, Shela Sheikh, and Sarah herself.

Conversations large and small, online and off, with a host of interlocutors contributed in large and subtle ways to the ideas in this book or helped cheerlead it into existence. Thank you Adrian Mackenzie, Amy Gaeta, Andrew Yip, Anthony McCosker, Ayesha Jehangir, Baden Pailthorpe, Boram Jeong, Carolyn Pedwell, Casey Boyle, Chad Shomura, Charlotte Farrell, Chris Agius, Chris O'Neill, Chrstine Parker, Crystal Abidin, Declan Kuch, Donovan Schaefer, Edgar Gomez Cruz, Elke Schwarz, Emma Jane, Emma Quilty, Fleur Johns, Gilbert Caluya, Hagit Keysar, Hannah Buck, Heather Horst, Hussein Abbass, Jake Goldenfein, James Parker, Janet Chan, Jathan Sadowski, Jennifer Terry, Jenny Rice, Jodi Brooks, Joel Stern, Joseph DeLappe, Joseph Pugliese, Jussi Parikka, Karin Sellberg, Kat Higgins, Kathrin Maurer, Kathryn Brimblecombe-Fox, Kynan Tan, Larissa Hjorth, Liam Grealy, Lilie Chouliaraki, Lisa Slater, Louise Ravelli, Lyria Bennett-Moses, Mark Andrejevic, Matthew Arthur, Mel Gregg, Michael Balfour, Michal Givoni, Michele Barker, Milissa Dietz, Monique Mann, Nathaniel Rivers, Ned Rossiter, Niamh Stephenson, Nisha Shah, Olga Boichak, Omar Al-Ghazzy, Paul Frosh, Poppy de Souza, Rachel Morley, Rowan Wilken, Sarah Truman, Sonia Qadir, Sukhmani Khorana, Tess Lea, Tim Neale, Tom Sear, Verena Staub, Willy Blomme, Xan Chacko, Yanai Toister, and all those that I have inevitably forgotten. Some of the most rewarding conversations took place with participants in the Drone Cultures symposium that changed incarnation from in-person to online over the course of 2020 and via the Drone Futures seminar series that I ran online through the first year of the pandemic. Special thanks to Ronak Kapadia, Antoine Bousquet, Jairus Grove, J. D. Schnepf,

Kate Chandler, Mahwish Chishty, Thomas Stubblefield, Caren Kaplan, and Alex Edney-Browne. Your presentations and conversations (many of which have continued) all shed new light.

Coauthors and collaborators on other projects also helped me to work through this one. I am immensely grateful to the legends J. D. Schnepf, Beryl Pong, Adam Fish, Heather Ford, Kerstin Schankweiler, Amit Pinchevski, Magdalena Zolkos, Madelene Veber, Anna Jackman, Kyla Allison, and Andrew Brooks.

At UNSW, I'm lucky to work with many wonderful academic and professional colleagues in the School of the Arts and Media, especially my coconspirators in the Media Futures Hub. One of great joys of academic life has been learning from my graduate students Simon Taylor, Meng Xia, Asal Mahmoodi, Theresa Pham, Rachel Rowe, Bron Miller, Kyla Allison, Maddie Hichens, Katariina Rahikainen, and Maryam Alavi Nia.

Remarkable comrades in academic life have enriched my world. Deepest thanks to Anna Gibbs, who set me on the path; Meera Atkinson, my first academic partner in crime; Magdalena Zolkos, for introducing me to affect; Andrew Murphie, for opening the worlds of media; Stephanie Springgay, for wise guidance and late-night bourbon; Rebecca Adelman, for finding joys in email; Elizabeth Stephens, for lifting up others, me included; Ramaswami Harindrinath, for getting me hired (and much more); Helen Groth, for generous mentoring; Tessa Lunney, for laughs and lunches and always remembering; Nick Richardson, for unconditional cheerleading; Collin Chua, for knowing what to read; Caren Kaplan, for solidarity and wisdom; Anna Munster, for the creative energy and collaborative enthusiasm; Tanja Dreher, for believing that change is possible; Thao Phan, for the unerring capacity to ask the right questions; and Greg Seigworth, for endless capaciousness.

Special thanks to the artists who generously gave permission to include their work: Kathryn Brimblecombe-Fox, Baden Pailthorpe, Kynan Tan, Edward Burtynsky, Grayson Cooke, Mahwish Chishty, and Yhonnie Scarce, whose stunning *Thunder Raining Poison* appears on the cover. Particular thanks to Noor Behram for his striking photograph (figure 1.3), used here under fair use guidelines and (I hope) in allegiance with the politics of his work.

A book is nothing without readers, and the writing of this one is indebted to the time, insight, critique, and support of some remarkable ones. The Book Proposal Club of Astrida Neimanis and Lindsay Kelley helped build the framework and find the book a home at Duke. Greg Seigworth, Nathan Snaza, and Tanja Dreher read early, lumpy drafts of the introduction and made it so much stronger through their generous attention to its unformed

thoughts and suggestions of further reading. Anna Munster read chapter 3 and homed in on its weakest points with unerring precision, which helped strengthen that chapter greatly.

Research underpinning this book—and especially chapters 1 and 3—was enormously assisted by Madelene Veber, who has worked with me over the last four years and is, among other things, brilliant, indispensable, astute, and creative. I've no doubt that Madelene will soon be writing acknowledgments of her own.

For so many reasons, I am forever in debt to Andrew Brooks and Astrid Lorange, staunchest pals and wisest of readers. Both read the manuscript top to bottom and provided such thoughtful feedback and incisive edits. But more, your fierce politics, love of thought and poetry and language, your convivial joy in snacks, and your friendship have meant everything. Love you. GFFs.

Two anonymous reviewers read both the proposal and eventual manuscript. Their generous, critical, and constructive engagement with the project at proposal stage had a transformative effect on the argument, framework, and analysis. Without them, this book would be much poorer, or not a book at all. All flaws that remain are mine alone. Thank you.

Brian Massumi and Erin Manning believed in this book from the first loose description at a Montreal café in the dead of winter. Brian's work led me to fall for affect theory, for radical empiricism and process philosophy, and for the relationality in all things, and you were both so welcoming to a clueless graduate student at the Into the Diagram workshop in 2011. I am truly honored to be published in your series, alongside so many brilliant others.

At Duke University Press, I am immeasurably thankful to Courtney Berger, whose editorial wisdom and unfailingly warm support for the book made all the difference, editorial assistants Sandra Korn and Laura Jaramillo, and Aimee Harrison for the stunning cover design. As all authors know, a huge amount of unsung work goes into making a book and getting it to readers. Thank you, Michael Trudeau, James Moore, Emily Lawrence, Chad Royal, and the rest of the production and marketing crew for your effort, enthusiasm, attention, and care. Big thanks to Cathy Hannabach and Morgan Genevieve Blue from Ideas on Fire for stellar work producing a rich index.

The Thread—Na'ama, Phil, Astrid, Andrew, Nick, Annie, Zoe—your solidarity, wisdom, humor, advice, and love are beyond measure.

To name all the family and friends who nurtured this book and its author is an impossible task. You know who you are. Mum—you taught me to love learning and to seek justice. Dad—you showed me how to pursue the exact

and true. Daniel—I only wish you were nearer so that we could share more joys together.

Finally, my deepest thanks and love go to Zoe, Adrian, and Sacha. There is no one like you, Zoe Horn, so smart, creative, caring, loving, and funny. You keep me on track, you put things in perspective, you teach me again every day what matters most, and you always believe. Adrian and Sacha, this book is for you, for everything you've taught me, and for the desperate need to make new worlds to live and love within.

INTRODUCTION

nonhuman witnessing

AT 6:15 A.M., FEBRUARY 21, 2010, on a deserted stretch of road in the Uruzgan Province of Afghanistan, a convoy of three vehicles slowed to a halt and figures spilled out, clumping and milling as dawn light filtered through the mountains. Captured by the Multi-Spectral Targeting System (MSTS) slung below the nose of the loitering MQ-1 Predator, imagery of the convoy streamed across military networks to screens in the United States and Afghanistan. On the screens, engines and people glowed white against the gray-black landscape as indistinct heat signatures bled into one another in the strange aesthetic of forward-looking infrared (FLIR). Image and control data flowed through the network, moving between different devices, infrastructures, and protocols. Connected by a ku-band satellite link to Ramstein Air Base in Germany, the Predator's data then traveled down optical fiber cable under the Atlantic to the Ground Control Station at Creech Air Force Base outside Las Vegas, Nevada, to image analyst "screeners" in Florida, to command posts and ground stations across the globe, and to an encrypted server farm for archiving, where the video and its accompanying metadata would be logged, recorded, and held for future analysis. Years later, these time-stamped pixel arrays of ones and zeros likely became part of the vast video archive used to train machine learning algorithms to replace the labor

of image analysts, a project initiated in partnership with Google and other tech giants in a sign of strengthening ties between the architects of algorithmic enclosure and those of increasingly autonomous warfare.

On that pale morning, one place the video feed failed to reach was the US Special Forces unit conducting an operation against a local Taliban leader in nearby Khod. Afghanistan's weak communications infrastructure and a reliance on satellite bandwidth meant that the imagery never made it to the ground, despite being subject to much debate as it was examined by screeners, operators, and commanders. Conducted by radio and military internet relay chat (mIRC) across discontinuous networks within the operational apparatus, the debate over what the images showed angled ever more inexorably toward violence as the affective surge toward action cohered with the indistinction of the drone's mediations. Alongside the MSTS, the Predator was equipped with GILGAMESH, a sophisticated eavesdropping system capable of blanket signal interception of nearby cellphones. Like the image screeners, analysts combing its data oriented their interpretation toward perceiving the convoy as a node within an enemy network. On the ground, two dozen men, women, and children spread prayer rugs on the dirt, while military personnel on the other side of the planet argued over how to read the varied morphologies produced by the sensor-network-feed. Framed with military discourse, these uncertain bodies were swiftly fixed as "military-aged males" and thus subject to potential elimination.

Prayers complete, the three vehicles continued along the road, veering away from the Special Forces at Khod in what one of the drone crew interpreted as a "flanking" maneuver. The lurking Predator carried only a single missile, so two Kiowa attack helicopters were scrambled into position and a little after 9 a.m., the convoy hit a treeless stretch of road. Guided by the drone's laser targeting system, two AGM-114 Hellfire missiles launched from the Kiowa helicopters and struck the first and third cars, explosive charges in each detonating to fragment the shell casing. Metal and flesh tore apart and fused together. Bodies were everywhere, whole and in pieces. Nasim, a mechanic who survived the blast, later recalled wrecked vehicles, a headless corpse, another body cut in half. On the full-color video feed that the crew switched to after the strike, pixels re-presented themselves as women and, eventually, as children. Later, the Pentagon claimed sixteen dead, including three children; villagers said twenty-three, including two boys named Daoud and Murtaza. A swiftly ordered US Department of Defense investigation traced the tangled lines of communication, the processes of mediation, and the failures of vision and transmission. Its report ran over two thousand

pages. When eventually released under a Freedom of Information request filed by the American Civil Liberties Union, the report provided rare insight into the secretive inner workings of drone warfare. Much attention was paid to the transcript of communications between the Predator crew and ground command. Later used to frame both journalistic and scholarly accounts, the transcript distilled the hubris, faith in technology, and tendency toward violence that animates remote war. More than a decade later, the event and its mediations and remediations remain a critical aperture into the drone apparatus.[1]

In all of this, who—or what—bears witness? Human witnesses abound: the victims and survivors, whose flesh and words bear the scars and carry the lived truth of hellfire from above; the pilot and sensor operator, the commanders, military lawyers, image analysts; the military investigators; the documentarians and journalists who will tell the story of what happened, and their audiences across the world; perhaps even the scholars, myself among them, who turn to this moment to help make sense of remote war. Yet what of our nonhuman counterparts? There is the ground soaked in blood, the roadway buckled by the explosive force of two warheads and blackened by fire, and the dirt and stone of the roadside in a land wracked by war, and the carbon-rich atmosphere through which the missile and signals travel, another in the countless processes contributing to the ecological catastrophe that consumes the planet. There is the drone itself, not only the aerial vehicle and its payload of sensors capturing light across the spectrum but its signals relays, and the complex network of technologies, processes, and practices that make up the apparatus. And there are, too, the algorithmic tools for snooping cellphones and scouring video; the data centers sucking power for cooling and expelling heat for stack upon stack of rack-mounted computers; the undersea cables that carry military and civilian data alike. If we extend the assemblage further, we arrive at lithium mines and orbital satellites, image datasets and environmental sensors, cellphone manufacturers and cloud services.

In most accounts of witnessing, much of this would be excluded altogether, relegated to the status of evidence, or assigned the role of intermediary, dependent upon a human expert or interpreter. *Nonhuman Witnessing* refuses that relegation and instead deepens and widens the scope of witnessing to include the nonhuman. Opening witnessing to the nonhuman provides deeper, more finely tuned understandings of events for us humans. But this book goes further, arguing that nonhuman witnessing enables the communicative relations necessary for an alternative and pluriversal politics,

founded on the capacity of nonhuman entities of all kinds to witness and through that witnessing compose new ethicopolitical forms. Human witnessing is no longer up to the task of producing the knowledge and forms of relations necessary to overcome the catastrophic crises within which we find ourselves. Only through an embrace of nonhuman witnessing can we humans, if indeed we are still or ever were human, reckon with the world-destroying crises of war, data, and ecology that now envelop us.

NONHUMAN WITNESSING

Witnessing is fundamental to cultures, communities, and polities because it pushes events onto the stage of justice, helps determine significance and truth, contributes to the making of shared knowledge, anchors political subjectivity, and produces responsibility. Necessarily relational, witnessing forges an intensive connection between witness and event, a registering of something happening that forms an address and insists upon a response. Not just any encounter, witnessing exceeds itself and calls others into relation with it. This is why witnessing co-constitutes epistemic and moral communities, and even political subjectivity itself. Witnessing pushes sense-making to grapple with traumas that refuse comprehension. Witnessing responds to violence in all its elusive and terrible forms, but also to wonder, beauty, and even banality. Witnessing precedes what comes to be deemed truth and gifts authority to collective memory, but it also depends on the permeability and fluidity of individual and collective subjectivities.

Witnessing and testimony are found in different guises in court rooms, church halls, human rights tribunals, fiction and poetry, media reports, scientific laboratories, and countless other places. Small wonder, then, that witnessing figures centrally in academic thought, from philosophies of ethics and political theory to media, literary, religious and science and technology studies, to name but a few fields attentive to its normative effects, its constitutive processes, and its historical specificities. Far from a static concept or set of practices, witnessing itself has transformed throughout Western history, taking on new forms and dynamics alongside and in response to changes in technology, politics, sociality, and religion. As both theory and practice, witnessing has proven pervasive and durable, as well as malleable and exploitable. But in an era of interlocking crises of technoscientific war, ecological catastrophe, and algorithmic enclosure, both the theory and practice of witnessing need to reckon far more deeply with the nonhuman.

Nonhuman Witnessing is about what happens when the frame of what counts as witnessing expands, how more-than-human epistemic communities might form, and what this might mean for subjectivity, the nature of justice, and the struggle for more just worlds. I develop nonhuman witnessing as an analytical concept that brings nonhuman entities and phenomena into the space of witnessing and accords them an agency otherwise denied or limited by witnessing theory to date. This strategic gesture makes room for excluded knowledges, subjectivities, and experiences within a wider framework of cosmopolitical justice. It does so through an analysis of technologies, ecologies, events, bodies, materialities, and texts situated in crises of military, algorithmic, and ecological violence. While witnessing can certainly occur separate from violence, this book focuses predominantly on instances of state and corporate violence that occur across a variety of scales, speeds, temporalities, and intensities. This book understands violence as purposive harm inflicted on people, animals, environments, and the ecological relations that make life and nonlife inextricable from one another. Violence thus determines the possibility, capacity, and nature of life for humans and nonhumans alike. This instrumentality means that violence is distinct from mere force and cannot be neatly equated to destruction or death in general. In the way I use it here, *violence* captures environmental, ecological, structural, technological, affective, discursive, and infrastructural forms of instrumental harm, as well as the directly corporeal and material forms that are most obvious and widely accepted. One of my central propositions, then, is that nonhuman witnessing brings more excessive and elusive violence into the frame of witnessing in ways that human witnessing cannot.

What this book proposes is bold: to unknot witnessing, weave it anew as inescapably entangled with the nonhuman, and within the warp and weft of that weaving find a renewed political potential for witnessing after the end of the world. My argument is that understanding witnessing as bound up with nonhuman entities and processes provides new and potentially transformative modes of relating to collective crisis and the role of the human within it. For many on this planet, crisis is neither a new experience nor an exceptional event but rather forms the condition under which life is lived. The book takes as its starting point the presumption that contemporary crises of war, algorithmic enclosure, and ecology are inseparable from the enduring catastrophe of settler colonialism, whether in their connection to extractive industries, colonial militarisms, techniques of control developed in settler states, or the regimes of seeing, knowing, and being that underpin the European modernity that has spread unevenly, violently, and with varying

degrees of success across the planet. World-ending crises are all too familiar for First Nations people, who live in what Potawatomi scholar and activist Kyle Whyte calls "ancestral dystopias," or present conditions that would once have been apocalyptic futures.[2] But I also want to emphasize that the subject of History—the figure that enacts and is produced by such structures of violence and control—is neither an accident nor a universal figure. Sylvia Wynter calls this figure Man, the Western bourgeois figure "which overrepresents itself as if it were the human itself."[3] This imposed image of the human as Christian and middle class first emerged in the Renaissance, only to be amended in biological terms by the sciences of the nineteenth century.[4] As I will argue later in this introduction, it is precisely this figure of Man that is the unexamined subject of witnessing. *Nonhuman Witnessing* argues that this dangerous fiction of Man the Witness cannot hold under the dual pressures of existential catastrophe and its own violent contradictions.

The two terms of the main title thus signal the core theoretical interventions and tensions of the book. By putting witnessing and the nonhuman in conversation with each other, I aim to dismantle the humanist frame within which witnessing has been understood until now. This revisioning of witnessing contributes to the larger critical and political project of interrogating fundamental assumptions within the Western tradition and its project of domination. It also speaks to the necessity of building new methods and modes of knowing that can grapple with the injurious impacts of algorithmic enclosure, technowar, and anthropogenic climate change at a time when the illusion of a cohesive world cannot hold. In doing so, *Nonhuman Witnessing* aims to be as generative as it is critical: it is a work of thought in action that seeks new ways of making theory and building concepts.

As an analytic concept, nonhuman witnessing describes the varied material, technical, media-specific and situated relations through which ethicopolitical knowledge, responsibilities and forms are produced in ways that can include but neither require nor privilege human actors. As I define and elaborate the concept, nonhuman witnessing rests on a vitalist conception of existence that understands technics, affects, and materialities as registering and communicating experience in forms that can be deemed witnessing in their own right, prior to and distinct from any semiotic translation or interpretation. In this, I am indebted to philosophies of radical empiricism that stress the movement and relationality through which existence takes shape and meaning. My own intellectual roots are in the processual vitalism of Gilles Deleuze, and particularly its incarnation in the heterogenous field that has come to be known as affect theory. More specifically, my approach to

relationality borrows from Brian Massumi's theorizing of affect as intensities of relation between bodies and worlds, whether human or non, corporeal or technical, dominant or fugitive.[5] Parallel to the emphasis throughout on relationality, this book also approaches nonhuman witnessing with a debt to media and cultural studies approaches to media and mediation, as well as witnessing more specifically.

Yet this book is also indebted to encounters with First Nations cosmo-epistemologies that understand animals, plants, rocks, sky, water, and land as forms of life with inherent—rather than granted—rights, agencies, and relations. Academic scholarship all too easily and often adopts an extractivist approach to such knowledges. As an uninvited settler living and working on the unceded land of the Bidjigal and Gadigal peoples of the Eora Nation, in what is now called Sydney, Australia, I engage with these knowledges in a spirit of study without laying claim to traditions that aren't mine. I want to think and inquire with these knowledges, exploring their resonances with the processual empiricism that anchors my own scholarly standpoint. My aim is to show how the exclusion of the nonhuman from witnessing derives from a distinct and narrow approach to both agency and knowledge, a limitation that is endemic to the dominant strain of European philosophy that insists so intently on the discrete and unitary over the relational and emergent.

Nonhuman witnessing elevates the status of the other-than-human in bearing witness, refiguring witnessing as the entanglement of human and nonhuman entities in the making of knowledge claims. In the air strike that killed twenty-three civilians in Uruzgan, Afghanistan, claims to knowledge about what was happening on the ground were animated within the military apparatus by the interdependencies of media technics, environmental conditions, and discursive practices. Violence registers as datalogical and informational before it is kinetic and lethal: witnessing the event of violence cannot be isolated to the drone operators or survivors or the infrared sensors, but rather must be known through the registering of those complex relations within and between human and nonhuman entities. Nonhuman witnessing can be identified in ecological, biological, geological, and even chemical manifestations, but also in technical and aesthetic forms, such as drone sensor assemblages and machine learning algorithms. This means that nonhuman witnessing is inseparable from place, time, media, context, and the other human and nonhuman bodies through and alongside which it takes place. Against the singular world of the scientific or juridical witness inherited from the Enlightenment, nonhuman witnessing coheres with what Mario Blaser and Marisol de la Cadena call a "a world of many worlds."[6] This is, then, one

meaning of the temporality of this book's title: a theory of witnessing for a world of many worlds, after the end of the illusion that there is only one.

One consequence is that nonhuman witnessing is rife with practical and conceptual tensions. The very proposition contains within it the irresolvable paradox of identifying a mode of witnessing that must necessarily exceed the capacity to "know" inherited from Western epistemologies. Pursuing witnessing as a relational process, rather than locating it in either the figure of the witness or the act or object of testimony, raises the problem of which encounters constitute witnessing. Where, in other words, is the demarcation between mere registering and the witnessing of an event's occurrence? How is the status of witnessing bestowed and under what criteria? Tempting as it might be to reconcile such tensions or produce checklists of qualification, seeking to do so risks flattening nonhuman witnessing such that it loses purchase on the specificity of media, materials, ecologies, technics, and contexts. Nor is nonhuman witnessing necessarily virtuous. Just as the soldier can witness his own slaughter of innocents, so too the algorithmic witness to drone strikes or environmental violence can be understood as a witness-perpetrator. As with all witnessing, there is no inherent justice to nonhuman witnessing. The task at hand is to ask how nonhuman witnessing pries open conceptual and practical space within how we humans do politics, ethics, and aesthetics.

As a theory of ethical, political, and epistemic formation, nonhuman witnessing responds to a twofold crisis in witnessing itself. Its humanist form cannot reckon with the scale, complexity, intensity, and unknowability of technoscientific war, algorithmic enclosure, and planetary ecological catastrophe. Nor can witnessing hold in the wake of the disruption of "the human" by ecological, technological, and critical-theoretical change, not least under the pressure of critiques by Black and First Nations scholarship. Faced with this crisis of witnessing, we are left with a choice: to reserve witnessing for human contexts and find new concepts to address and respond to new crises, or, as this book argues, reconceive witnessing as entangled with the nonhuman by attending to registrations and relations in the stuff of existence and experience. Precisely because witnessing is so crucial to human—and especially Western—knowledge and politics, there is a strategic imperative to revising its vocabulary to analyze, strengthen, and generate transversal relations with the nonhuman that are ethical, political, and communicative, rather than simply informational or transactional.

This book, then, pursues what nonhuman witnessing *is*, but also what nonhuman witnessing *does* as a concept for crafting knowledge out of which

a more just politics might be formed and fought for. Rather than provide a detached and abstract theory, it examines the media-specificity of nonhuman witnessing across a motley archive: the temporal and spatial scales of planetary crisis, the traces of nuclear testing on First Nations land, digital infrastructures that produce traumas in the everyday, deepfakes, scientific imaging that probes beyond the spectrum of the human sensorium, algorithmic investigative tools, the unprecedented surveillance system that is the global climate monitoring regime, and remote warfare enacted through increasingly autonomous drones. It combines close analyses of events, technologies, and ecologies with cultural studies readings of political and creative texts. From poetry to video to sculpture to fiction, creative works play a critical role in this book because they allow me to pursue nonhuman witnessing into speculative domains in which aesthetics and worlds relate to one another in strange, unexpected ways. This approach aims to show both the media dynamics and cultural consequences of nonhuman witnessing. In doing so, nonhuman witnessing emerges as a relational theory for understanding and responding to entangled crises, one that attends to complexity and difference even as it works across divergent domains and dizzying scales.

Rather than stitching together a grand theory, these sites reveal the necessity of capacious, open, situated, and flexible approaches to nonhuman witnessing. What this book pursues are the resonances, overlaps, and unexpected convergences in the kinds of grounded attachments and imaginaries that undo the narrow frame of the human within which witnessing has been understood for too long. This is why I am so insistent throughout on the gerund form of *witnessing* rather than *witness* as either noun or verb. My principal concern is not the figure of the witness as such, although both human and nonhuman witnesses play vital roles in its drama. Nor is this book overtly focused on the forms that testimony can take, although testimonies of many kinds occupy its pages. Nor is it about evidence and its forensic articulation, although such terms are never far away. Rather, I am interested in witnessing as a relational process, as a vital mode of world-making that encompasses both human and non.

In doing so, the book is as attentive as I could make it to differences of capability and process, as well as circumstance. A mountain and a person possess asymmetric capabilities, with one, for instance, able to endure across eons and the other able to marshal linguistic resources that facilitate communication with other people. Pushed to its most speculative ends, nonhuman witnessing might well extend into forms of witnessing that exclude and

elude the human entirely. It may well be that witnessing to which we are not party is happening all the time, but of much greater significance are those instances of nonhuman witnessing that seem to be addressed in some way to the human—and through that address insist on both our response and responsibility.

Each chapter is organized around a double meaning: the witnessing of violence, as well as the violence that can be done by witnessing; the witnessing performed by algorithms, as well as the need to witness what algorithms do; witnessing of more-than-human ecologies, as well as ecologies of witnessing; the witnessing of absence, as well as the absence of witnessing. These doublings perform the relational dynamics of nonhuman witnessing itself, reflecting its working as both a critical concept and an emergent phenomenon. But each chapter also elaborates a distinct operative concept for understanding the processual modalities of nonhuman witnessing. Chapter 1, "Witnessing Violence," critiques the violence of increasingly autonomous warfare as it is mediated through technology, bodies, and environments, elaborating the notion of *violent mediation* as constitutive of martial life. Chapter 2, "Witnessing Algorithms," pursues machine learning algorithms that produce techno-affective milieus of witnessing, articulating an account of the *machinic affects* that animate relations within and between technics, bodies, and ecologies. Chapter 3, "Witnessing Ecologies," attends to naturecultures under the strain of climate catastrophe and nuclear war, conceptualizing a distinct form of *ecological trauma* that ruptures vital relations between human and nonhuman. Chapter 4, "Witnessing Absence," conjoins the sites of war, algorithm, and ecology to examine the traumatic absences that circulate in the quotidian of digital media, developing the concept of *radical absence* to show how nonhuman witnessing makes absence intensively present through nonhuman infrastructures.

Each of these analytic concepts—violent mediation, machinic affect, ecological trauma, and radical absence—explicate aspects of the processual dynamics of nonhuman witnessing. But while they intersect with one another in many ways, they don't snap neatly together to provide a unified theory of nonhuman witnessing. These concepts instead name the relational processes that constitute nonhuman witnessing across different contexts. Not all nonhuman witnessing entails violent mediation or radical absence, for example, but the former plays a crucial role in war while the latter is vital to understanding how nonhuman witnessing functions in digital cultures. Throughout the book, I show how these dynamics converge and diverge in productive tension with one another, marshalling varied constellations of

them as they obtain to distinct sites of analysis. In the coda, I pull together the conceptual threads of the book to outline in explicit terms how nonhuman witnessing enables a more pluriversal politics that foregrounds communicative justice for more-than-human entities and ecologies.

Upending the long history in theory and philosophy of reserving witnessing for the human subject, I argue that witnessing is and always has been nonhuman. Our contemporary conjuncture makes this much easier to see, precisely because so much of Western ontology and epistemology has been thrown into crisis. If crises of autonomous war, algorithmic enclosure, and environmental catastrophe are indeed converging in the contemporary moment, it is surely in no small part because their roots reach so deep into the historical ground of militarism, capitalism, and settler colonialism. Nonhuman witnessing thus provides purchase on unfolding catastrophic futures, but also on the catastrophes of the past—and on the potential for radical hope, historical acts of resistance, and the making and remaking of more just worlds.

THIS MESS WE'RE IN

Amazon.com is an avatar for the interlocking crises of algorithmic enclosure, ecological catastrophe, and autonomous warfare. Its recommender algorithms and automated warehouses combine with autonomously managed global logistics systems to crowd out small producers and retailers. Its drivers and warehouse workers are tracked with biometric sensors, directed in their movements by algorithmic overseers, expected to meet precisely defined performance metrics, and kept in precarity by zero-hour contracts and just-in-time rostering, their bodies damaged by the dictatorial rule of algorithmic management systems. Its smart-home system, Alexa, provides voice-activated access to Amazon's systems, even as it datafies the fabric of daily life. More profitable even than its e-commerce operations and as vital to the infrastructure of the internet as Google, its Amazon Web Services cloud computing platform powers everything from document storage to facial recognition and is the single biggest service provider to the US military.

All this comes at an astonishing cost to the planet. Amazon's logistics systems alone produce 51.17 million metric tons of carbon, while its AWS data centers produce roughly the same amount of carbon as nine coal-fired plants.[7] Like most smart devices, Alexa relies on lithium and rare earth metals mined at devastating cost to local ecologies and to Indigenous

communities, such as the Atacan in Chile.[8] Whether mining users for data or land for lithium, Amazon is ruthlessly extractive, the high-tech successor to the colonial enterprises that coproduced racial capitalism.[9] It has both infiltrated and diverted countless facets of life, and its founder dreams of extending that rapaciousness to the stars. Yet for all this, Amazon still retains much of the veneer of techno-utopian solutionism: a frictionless future of goods, data, and currency flowing through global infrastructures in which human labor is obscured, if not erased from view altogether. The vision of a transcendent future built on material waste and human sweat far more than on computation and abstraction.

To state the obvious: Amazon is neither the architect nor the sole beneficiary of the "modern world system of 'racial capitalism' dependent on slavery, violence, imperialism, and genocide," as Robin D. G. Kelley describes the current global regime.[10] Nor is it the only exemplar of the convergence of crises to which this book is addressed. Since the turn of the millennium and the attacks of 9/11, war and military technologies have undergone dramatic transformations, led by the United States but now sweeping across the globe. Remotely piloted aerial systems, or drones, moved from the margins to become instruments of killing and transform military strategy. Today, autonomous and semiautonomous drones are used by more than one hundred nations for surveillance and by a growing subset for lethal violence, backed by artificial intelligence systems powered by machine learning neural networks that undertake real-time analysis of impossibly large streams of remote sensor and other data. Remote vehicles are used on and above every type of terrain, as well as underwater and underground. Algorithmic selection and targeting systems for drones and other weapons platforms are already here, with fully autonomous weapons systems already emergent, held back less by technical capacity than by military, political, and public unease with the notion of removing human decision making from the act of killing. These changes have, as Jeremy Packer and Joshua Reeves point out, transformed "enemy epistemology and enemy production" in line with specific media logics of "sensation, perception, reason, and comprehension tied to a given medialogical environment."[11] The media-technological production of enemies and knowledge about those enemies is itself inextricable from the determination that certain populations must be controlled or can be killed, whether via the debilitating biopolitics that Jasbir Puar calls "the right to maim" or in the necropolitics of remote warfare with which I opened this book.[12] Consequently, their martial media technics must be read within the context of enduring colonialism.

This martial transformation has been part and parcel of the wider enclosure of life within computational systems and communications technologies, whether at the macroscale of public health databases, citizen registers, and biometric surveillance, or at the personal level with the ubiquitous presence of social media and smartphones across the planet. Logics of surveillance and control that have crept into every dimension of social, political, and economic life are also deeply entwined with histories of anti-Black racism, and the methods of domination applied during and after slavery in the Americas, as Simone Browne persuasively shows.[13] Indebted to wartime initiatives of the 1940s, decades of Cold War arms racing and antagonistic cultural politics that legitimated significant military spending in the United States, and active partnerships between the Defense Advanced Research Projects Agency (DARPA) and what would become Silicon Valley, today's communications technologies also bear the legacy of cybernetics and the effort to craft "infrastructures of sensing and knowing," as Orit Halpern puts it.[14] At the 1970 World Exposition in Osaka, experimental multimedia environments were built to demonstrate the potential for actualizing cybernetic systems in urban architecture and planning. Reflecting on the influence of Expo '70, Yuriko Furuhata argues that "regulatory mechanisms of policing and surveillance, modeled as multimedia systems and aided by networked communications, form a much darker and somber counterpart to the types of artistic multimedia environments that emerged in the 1960s."[15] Japanese architects, theorists, and multimedia artists played a crucial role in this dynamic, inheriting and responding to a different colonial legacy of violence and control.

Algorithmic technologies are now embedded in everything from Amazon's purchase recommendations to the creation of art, from the mining of personal and population data to the provision of welfare services to the structuring of knowledge itself via the search results of Google. But what Paul Edwards calls the "closed world" of Cold War computation also laid the infrastructural foundations for the "vast machine" of atmospheric monitoring that allowed anthropogenic climate change to become more visible and better understood, even as it became both contested and irreversible.[16] Today, ecosystems reel from hotter summers, extreme weather events, failing crops, rising migration, ocean acidification, and atmospheric pollution, to name but a handful of the more striking effects. Whether marked in the geology of the planet or in the biosphere, the sheer scale of ecological crisis (which is really a set of interlocking crises) is its own catastrophe, leading to denials of scientific knowledge, failures of politics, and global paralysis around meaningful response.

Each alone would be more than enough to end countless worlds, but these three crises are also intensifying and accelerating, fueling and fueled by the insatiable expansion of racial capitalism. Advances in machine learning have supercharged both algorithmic enclosure and autonomous warfare. Reliance on mass computing in everything from image recognition to bitcoin mining has combined with an exponential expansion in digital data stored in servers and trafficked across networks to produce a huge carbon footprint for computation. Built into the bedrock of the civilian internet as the host of everything from ebooks to presidential election campaigns to banking, those infrastructures have a massive environmental impact in heat generated and fossil fuel consumed.[17] Those same fossil fuels, of course, power the energy appetite of the US military, the world's largest carbon polluter. Institutionally, economically, and ecologically, Amazon and its ilk are deeply integrated with military apparatuses, especially in the United States where big tech provides everything from enterprise software to cloud storage to strategic guidance through bodies such as the Defense Innovation Board, chaired by ex–Google boss Eric Schmidt. Equivalent dynamics operate at every level, whether in the shared reliance on remote sensors by militarized drones, urban surveillance, and environmental monitoring, or the centrality of extraction to climate change, military industries, and the mining of data.

Despite this tight bind between technology, war, and climate change, ever-more innovation is proposed as the only solution by self-interested luminaries such as Bill Gates. In the most basic material sense, these crises of war, data, and climate and the system of racial capitalism they maintain and depend on are drawing down the finite resources of the planet. Taken together, they are both product and perpetrator of violence, whether structural or infrastructural, environmental or military, algorithmic or interpersonal, kinetic or slow.[18] The very existence of such lists speak to both the ubiquity and variety of violence today and its intimacy with crisis as the condition of life for much of the planet. The explanatory force of nonhuman witnessing resides in part in its capacity to register and communicate those forms of violence that might otherwise be rendered invisible.

Galvanizing the language of crisis, as I have done so far, is not without risk. As Whyte argues, claims of crisis—of food, resources, space, security—have been frequently used to justify colonialism, both in the larger sense of the settler enterprise and in specific instances such as the corporatization of tribal governance in the United States as a response to an "emergency" of poverty.[19] For Whyte, "crisis epistemologies" produce problematic politics that over-

ride First Nations concerns, such as in the appropriation of tribal lands for wind farms and other renewable initiatives in response to the exigencies of the climate crisis. Such epistemologies depend on a conception of crisis as aberrant and abnormal, a rupture that must be tamed and contained so that the normal order of things can be restored. Rather than a break from order, crisis is better understood as a condition of existence. "Crisis is not rupture, it is fragmentation," writes Henrik Vigh, "a state of somatic, social or existential incoherence." As such, crisis is "not a short-term explosive situation but a much more durable and persistent circumstance."[20] It is not an event, but the condition and context of life. Lauren Berlant calls this "crisis ordinariness," in which "crisis is not exceptional to history or consciousness but a process embedded in the ordinary that unfolds in stories about navigating what's overwhelming."[21] Thinking about crisis in this way does not require an abandonment of the notion of rupture. But crisis as condition does demand that we see rupture, trauma, violence, dispossession, precarity, and vulnerability as at once pervasive and unevenly distributed. Crisis doesn't punctuate time, so much as shape its passage, lacking any distinct beginning or end, enfolding past and future.

Crisis also enfolds and consumes events, entangles bodies, intensifies the contexts of their occurrence, and cuts through forms of connection to impose new (dis)orders. Andrew Murphie calls this catastrophic multiplicity "a complex storm of feeling, of aspects of world feeling each other in intense, unexpected and constantly mutating ways."[22] Catastrophic multiplicity intensifies, bewilders, and numbs feeling, which makes thinking with and through problems difficult, if not impossible.[23] Knowledge-making as a collective endeavor becomes fraught and frayed. This generalized crisis environment provides fertile conditions for states to harness ontopower, the power to bring into being. Because ontopower targets life as it stirs into activity, it is a form of power that both exceeds and precedes the human. Massumi describes it as the "power to incite and orient emergence that institutes itself into the pores of the world where life is just stirring, on the verge of being what it will become, as yet barely there."[24] Ontopower operates at the processual level of becoming itself. Deploying technoscientific apparatuses of war and governance, states and other actors seek to harness ontopower in attempts to preemptively control the future, as in the drone strike ordered in response to the algorithmic analysis of phone calls and patterns of movement that produce a "signature" deserving of eradication. But in doing so, ontopower also produces crises that themselves escape control, through its continual

animation of the forces of state violence, environmental extraction, and algorithmic control. In this sense, ontopower does not replace biopower or necropower but rather operates in concert with them

If I have drawn so many examples from martial contexts, this is because *Nonhuman Witnessing* finds its way into data and climate through war. Like the political theorist Jairus Grove, I take the view that war is a form of life as much as it is a means of death: terrible, ruinous, and endlessly destructive, yet also generative and creative. Applied to geopolitics and indeed to everything from racism to capitalism, "war is not a metaphor; it is the intensive fabric of relations" that form this historical era.[25] What is needed is analysis "characterized by inhuman encounters and deep relational processes across geographical scales rather than a form of political thinking that relies on discreteness, causality, and an exceptional notion of human agency."[26] Also like Grove, I am committed to decentering human actors, but not doing away with human responsibility for the vast assemblages that continue to cause so much damage. As concept, practice, and phenomena, nonhuman witnessing brings such encounters, processes, and scales into conjunction with the relational formation of knowledge and subjectivity. But it does so through committed attention to the processes of mediation that animate and bind together crises of war, data, and climate.

Lively, temporal, and always in flux, mediation is never foreclosed or limited in its potential. Media studies scholarship has much to say on mediation. Sean Cubitt calls it the "effervescent commonality of human, technical, and natural processes."[27] For Sarah Kember and Joanna Zylinska, mediation is crucial to "understanding and articulating our being, becoming with, the technological world, our emergence and ways of intra-acting with it, as well as the acts and processes of temporarily stabilizing the world into media, agents, relations, and networks."[28] In this sense, mediation is always relational, but it is also necessarily nonhuman: even the witness who speaks their testimony entails the mediation of air so that wavelengths of sound can carry from lips to ears. This vitalist understanding of mediation requires an expansive understanding of media forms, one that sees everything from clouds to USB drives to the planet itself as media.[29] In keeping with the crucial work of feminist scholars, this approach to mediation is avowedly material. As Cubitt argues, "Media are finite, in the sense both that, as matter, they are inevitably tied to physics, especially the dimension of time; and that their constituent elements—matter and energy, information and entropy, time and space, but especially the first pair—are finite resources in the closed system of planet Earth."[30] Crises of war, algorithm and ecology are thus also crises

of media: of an accelerating consumption that only exacerbates all other crises. In the face of just such a trajectory, Cubitt calls for a renewed and more differentially attuned mode of communication, one that resists the tendency to extract information from nature but not speak back to it. Something like this might be found in the radical empiricist tradition, which Chris Russill argues offers an alternative intellectual history to communication theory via William James, John Dewey, and George Herbert Mead that embraces indeterminacy, incommensurability, and difference.[31] Nonhuman witnessing describes a critical concept and relational practice of a distinct mode of communication, one constituted by an address that demands response but still embraces opacity. It is a transversal opening onto the workings of violence, experiences of precarity, and the shattering of epistemologies; an aperture through which communication might take place in ways that are necessary for care and justice in the aftermath of ended and ending worlds.

AFTER THE END OF THE WORLD

Words that would become this introduction were first written amid bushfires that ravaged Australia in the summer of 2019 and then labored over in the long years of the pandemic. Throughout that summer of smoke and ash, the sun glowed pale red and the density of particulate matter made the air hazardous to breathe. More than a billion animals died, thousands of homes were lost, countless habitats erased. Across traditional and social media, in corridor conversations and at dinner parties, all the talk was about apocalypse, climate change, the failure of normal politics to do much of anything at all. As the pandemic took hold in early 2020 and then wore on through the years, life here began to come undone, but the fabric never tore so deeply, so devastatingly, as it did across much of the globe. With Australia's borders closed for well over year, the sense of an ending world was impossible to escape, even without the massive loss of life experienced in so many places and borne so disproportionately by the already vulnerable and precarious. The very networks of travel and trade that expanded "the world" to fill "the globe" were now a threat to its continuation. What worlds would remain in the aftermath?

Living and working on unceded and sovereign Aboriginal lands, I am enmeshed in ended and ending worlds. Colonial expansion ended the worlds of First Nations peoples in Australia long ago, beginning with the arrival of Captain James Cook in 1770 and eighteen years later with the landing of

the First Fleet at Botany Bay, just a few bends of the coast south of my own home. The lines of my own family are bound up with that dispossession, if not at the point of a gun then through the construction of buildings, founding of museums, plying of trade, and service in the military. As my forebears settled this land and built lives and families, the Traditional Owners experienced massacre, epidemic, dispossession, incarceration, starvation, and the stealing of children and the breaking of kinship formations.[32] That ending of worlds continues today, even as Aboriginal people endure and resist in powerful, inspiring, and even beautiful ways. Preoccupations with an apocalypse that is yet to come have a bitter irony in a place where First Nations have spent two-and-a-half centuries surviving the end of the world, struggling for new and old ways of living in this place that always was and always will be Aboriginal land.

After the end of the world: it is a temporality both commonplace and strange. In Western popular culture, apocalypse has been in the air and on the screen and page: zombies running amok, asteroid strikes, AI takeovers, bioengineered crashes, alien invasions. Metaphors of late capitalism, or climate change, or global migration, these end-times imaginaries are no longer the preserve of niche subcultures or millenarian religions but at the heart of the most profitable, most mainstream forms of popular culture. But the estrangement felt from these imaginings, the lure of catharsis in the fictional experience of the end of the world, relies on being situated in relation to a specific telling of history. As Whyte points out, "The hardships many non-Indigenous people dread most of the climate crisis are ones that Indigenous peoples have endured already due to different forms of colonialism: ecosystem collapse, species loss, economic crash, drastic relocation, and cultural disintegration."[33] In this sense, the temporal location in the title of the book—*After the End of the World*—describes a shifting, situated temporality that hinges on *whose world* has ended, to what purpose, and by what hands. As Nick Estes so succinctly makes clear in describing the impact of the Pick-Sloan Dam on the Oceti Sakowin peoples of Dakota in the early twentieth century, "taking away land and water also took away the possibility of a viable future."[34] Now, that ending of worlds has come to the world enders, the colonizers and empire builders who imagined into being a singular, global world and made it so with the rifle, the slave ship, the ledger, and the plantation. Now, de la Cadena and Blaser write, there "is a new condition: now the colonizers are as threatened as the worlds they displaced and destroyed when they took over what they called terra nullius."[35] And yet ending worlds don't always fully end and can be reseeded, as the resilience and endurance of First Nations peoples across the planet makes clear.

Naming this era is no simple matter because to name the problem is also to diagnosis it. Since its popularization by the atmospheric biochemist Paul Crutzen and ecologist Eugene Stoermer in a short article from 2000, the term *Anthropocene* has been widely adopted.[36] While the label is useful because it registers the impact of colonialism and industry on the planet's biological and geological systems, it also risks universalizing and misdiagnosing the problem by naming an undifferentiated Anthropos as the causal agent.[37] In this it serves an ideological function: flattening responsibility onto the human in the broadest sense both hides the histories of extraction, pollution, and violence through which the planet has been transformed and obscures the grossly unequal distribution of the spoils. Critics rightly argue that the term *Anthropocene* risks occluding the originary violence of settler colonialism, without which our era of petrocarbons, plastics, terraforming, species loss, and ocean death might never have been possible at all. Alternatives now abound, many of which attempt to name precisely distinct causal agents: Capitalocene, Plantationocene, Eurocene.[38] For me, deploying the term *Anthropocene* is a necessary strategic decision despite its limitations. Sticking with the Anthropocene allows me to center the Anthropos, understood as the form of Man that has driven colonial and capitalist expansion and, crucially, laid claim to the normative figure of the witness.[39] Conceived in this way, the Anthropocene and Man are co-constitutive. Countering the idea that the Anthropocene begins with the Industrial Revolution or nuclear bomb, Heather Davis and Métis scholar Zoe S. Todd argue that "placing the golden spike at 1610, or from the beginning of the colonial period, names the problem of colonialism as responsible for contemporary environmental crisis."[40] Known as the Columbian Exchange, 1610 marks both the moment when the exchange of biomatter between Europe and the Americas reshaped ecosystems and when carbon dioxide levels dropped in the geologic layer as a consequence of colonial genocide. Dating the Anthropocene in this way ties it both conceptually and historically to Man, and to the ending of worlds that is such an essential dimension of settler colonialism and racial capitalism.

Situating this book after the end of the world is thus a conceptual claim, as well as a historical one: *the world* has long since lost any claim to describe the totality of being. In its place are countless worlds without claim to universality or unity. One of the ways in which the end of the world finds hope is in recognizing that *the world* has always been multiple, a pluriverse produced by the world-making power of countless knowledge systems. Such a multiplicity enables what Kathleen Stewart calls *worldings*, or the "intimate,

compositional process of dwelling in spaces that bears, gestures, gestates, worlds."[41] Reflecting on war and its aftermaths, Caren Kaplan writes of the "disturbance of conventions of distance and proximity, the presence of many pasts and places in what we try to think of as the here and now" that make "modernity's everyday aftermaths—the undeclared wars that grieve not only the present absences but the absent presents—not so much a matter of ghosts as multiple worlds that a singular worldview cannot accommodate."[42] The unruly intensities and haunting disruptions of these martial aftermaths are just as evident in the wake of ecological violence, technological enclosure, and colonial dispossession: time, place, space, experience and thought all resist linearity, refuse organization, unsettle the unfolding of life.[43] As a form of worlding after the end of the world, nonhuman witnessing is one means of building a communicative politics that begins with ecological relations and the inherent agencies of nonhuman things, animals, and places.[44]

WITNESSING AND THE NONHUMAN

As crises expand, intensify, and intersect, the capacity of witnessing and testimony to respond has been amplified, multiplied, and diversified by the adoption of new (and sometimes old) technologies, techniques, practices, knowledges, and theories. Open-source investigations led by agencies such as Bellingcat, Airwars, and Forensic Architecture have shown how crowdsourcing, computational tools, 3D modeling, data analysis, remote sensors, and other technologies and methodologies can be combined with situated testimonies to generate alternative accounts of state and corporate violence. Satellites and drones provide human rights and environmental monitors with rich data that extends and exceeds the perceptual capacity of humans in scale, vantage point, and visibility across a much wider band of the light spectrum. Smartphones and social networks bring a far wider array of voices and images to public attention, shaking the epistemic dominance of traditional media institutions. Cheaper and more accessible sensing technologies have enabled citizen-led projects to monitor local ecologies. Growing recognition within the scientific community about the communicative capacity of plants and ecologies more broadly resonates with the push by First Nations activists to have nonhuman entities recognized by state law, such as the successful attribution of sentience to the Whanganui River in New Zealand following more than a century of struggle by local Māori tribes, led by the Ngāti Hāua. Artists, poets, activists, and creative practitioners of all stripes

now engage with technics, ecologies, and politics in a testimonial mode that entangles human and nonhuman actors.

Nonhuman Witnessing conceptualizes and theorizes these developments, both as a means of making sense of these changes in situ and to connect them into a larger project of reckoning with crisis, violence, and trauma. It joins a growing body of critical interventions into the connections between aesthetics, witnessing, and forensics, prominent among them the legal, artistic, and theoretical works of Eyal Weizman and his research agency Forensic Architecture, located at Goldsmiths, University of London. Weizman's *Forensic Architecture* theorizes the application of architectural techniques of siting, sensing, mapping, modeling, and analyzing to the task of uncovering and communicating "violence at the threshold of detectability."[45] Attending to material architectures, media objects, and situated testimonies, forensic architecture is an operative concept that provides a method for investigation. How that method articulates with wider transformations is the subject of Weizman and Matthew Fuller's *Investigative Aesthetics*, which explores how resistant investigations assemble aesthetically to produce what they call an "investigative commons" to challenge state- and court-sanctioned knowledge production and counter the post-truth "anti-epistemologies" of misinformation and disinformation that have undermined trust in shared realities.[46] Aesthetics in their terms comprises both sensing and sense-making, and, as such, is not exclusively human but rather found across all entities in their relational milieus, as I explore in more detail in chapters 1, 2, and 3, including with a close reading of the Forensic Architecture project *Triple Chaser*.

More closely attuned to the questions of witnessing that occupy this book, Susan Schuppli's *Material Witness* combines reflections on her artistic practice and work with Forensic Architecture, which draws on archival and ethnographic research to develop an account of how matter can obtain standing as a witness within public fora such as war crimes tribunals. Her material witnesses are "nonhuman entities and machinic ecologies that archive their complex interactions with the world, producing ontological transformations and informatic dispositions that can be forensically decoded and reassembled back into a history."[47] Material witnesses can express themselves through a technical sensibility rather than speech per se, but "matter becomes a material witness only when the complex histories entangled within objects are unfolded, transformed into legible formats, and offered up for public consideration and debate."[48] Material witnesses appear throughout this book, but particularly in chapter 3 when I turn to the material traces of nuclear testing and their mediation through art.

While Schuppli, Weizman, and Fuller ground their analysis in their own investigative practices in and beyond the academy, Pugliese's *Biopolitics of the More-Than-Human* shares this book's imperative to develop an apparatus for critiquing contemporary warfare and the ruin it does to bodies and ecologies. Discontented with existing practices of evidentiary analysis, Pugliese calls for a "forensic ecology" that can "examine the physical remains, in particular, of more-than-human entities left in the aftermath of the violence and destruction unleashed in militarized zones of occupation."[49] This is resonant with the investigation of drone warfare and its violent mediations in chapter 1, particularly in thinking through the entanglements of technics, bodies, and ecologies.

Witnessing is also an important subfield of inquiry within media studies, producing nuanced empirical and theoretical accounts of distinctive modes and practices of witnessing and testimony. In an influential essay, John Durham Peters defines witnessing as "responsibility to the event" and points out that media must wrestle with the "ground of doubt and distrust" that distance adds to the "veracity gap" inherent to the relay of any testimony.[50] Building on this conception, Paul Frosh and Amit Pinchevski propose the concept of "media witnessing," or "witnessing performed in, by and through media" as essential to contemporary world-making.[51] Media witnessing, Lilie Chouliaraki argues, is a fraught proposition, veering easily into spectatorship as distant audiences are presented with atrocity to which they have few or no avenues of response.[52] New witnessing practices emerged in concert with new media technologies, producing what media studies scholars have variously called mobile witnessing, citizen-camera witnessing, crowd-sourced evidence, digital witnessing, witnessing databases, and data witnessing.[53] These practices have enabled affected individuals and communities to narrate crises in culturally distinctive ways and to self-represent their witnessing, even if they have also produced new expert and intermediary functions for human rights organizations.[54] Throughout *Nonhuman Witnessing*, this research provides valuable insights into distinct witnessing practices related to my lines of inquiry, but also serves as a springboard for thinking past the limits of the human in ways that I hope will in turn be generative for scholarship in media studies.

The works highlighted in the preceding pages share with mine a commitment to interrogating the shibboleths of testimony, evidence, and their relation to politics, technology, and justice. But there are also critical departures. Where Weizman elucidates an existing practice of forensic architecture, this book theorizes a more expansive, ontoepistemological

reconception of witnessing as an encounter with and response to violence. Where Fuller and Weizman focus on the theory and process of investigation as a mechanism for assembling aesthetics, this book attends to how the sensing and sense-making of aesthetics produces a witnessing relation that is not dependent upon an investigative team, method, or apparatus. Where Schuppli insists on contestation within public fora as a condition for material witnessing, my approach to nonhuman witnessing insists on witnessing as an experiential relation that can produce contestation but is not dependent on it for its existence or even politics. Where Pugliese centers the law and its enmeshment with military power and colonial structures, my concern is with processes distinct from the juridical domain, and that fail to appear or cohere within legal frames. Where media studies research delves into the complex ensembles of media and human that produce distinct forms of witnessing, it reserves ethical and political standing for human witnesses, intermediaries, and audiences and leaves nonhuman agencies largely out of frame. In short, *Nonhuman Witnessing* contributes to an active project within critical thought in which debates over key concepts remain vibrant. And while the forms of violence and modes of intervention with which all these works are concerned are largely new, they are also embedded in a long history of transformation in the forms and practices of witnessing, who counts as a witness, and how shared knowledge is produced.

In the earliest foundations of the Western legal tradition in Athens and Rome, the wounded body was considered the most reliable witness, which meant torture was central to legal proceedings. Who could be tortured in the name of truth was a matter of importance: the enslaved were often the subject of torture to provoke truthful testimony, not the powerful and propertied.[55] Witnessing was borne on the body up until the Enlightenment, when the law of proof emerged in conjunction with the ocular revolution of the Renaissance and the humanist conception of the dignity of Man.[56] In 1846 the United Kingdom abolished the law of the deodand, a relic of old English jurisprudence that held that an object in motion that has killed a human must be held to account. Consequently, writes Su Ballard, "where once they were able to take responsibility for the harm they have caused, now objects are just another group of silenced witnesses."[57] This sentencing of the memory of objects to evidence accompanied the modern juridical witness taking familiar form: structured by norms, ordered in narrative, and verified by accompanying evidence.[58]

The figure of the witness thus becomes synonymous with Man, which meant certain bodies were again excluded: the enslaved, Indigenous and

Black people, and, often, women and the unpropertied. Unable to become witnesses before the law due to explicit rule or fear of retaliation, their flesh could be made to speak through violent punishment. Hortense Spillers calls the flesh that "zero degree of social conceptualization," left behind in the "theft of the body" that occurred in transatlantic slavery and Indigenous dispossession: "a willful and violent (and unimaginable from this distance) severing of the captive body from its motive will, its active desire."[59] Without will or body, the enslaved and First Nations were rendered illegible to the law as persons, figured as property or inhuman objects. As the philosophical underpinning of imperial and settler colonialism, Man depended on the construction of Black Africans as the ultimate other, the slave, and the assimilation of all dark skinned peoples into the category of "native" as the negative inversion of the imagined normal human.[60] As such, they were also denied witnessing before the law, refused the right to attest to the violence done to them.[61] Thus the humanist figure of the witness fused new notions of the individual, unitary subject of rights and responsibilities with existing regimes of humanity and inhumanity. But it also carried the legacies of monotheistic religion, in which the figure of the witness claims intimacy with the divine.[62] While the testimony of preachers figures prominently in American religious culture, the martyr or blood witness is rooted in the early years of Christianity and carries through—if in radically different ways—to the present in the dead of Auschwitz and the suicide bombers of ISIS.

But the Enlightenment and its rearticulation of Man also produced a new and divergent form of witnessing, one that emerged in the eighteenth and especially into the nineteenth century as markedly free from overt ties to violence and law. With the invention of the scientific method and the establishment of practices of experimentation and observation, science and scientists both invented and claimed mastery over the natural world through the production of knowledge about it. As Lorraine Daston and Peter Galison catalog, the emergence of a new "epistemic virtue" of scientific objectivity was a complex process related to transformations in perspective, understandings of self, and much more.[63] Within this framework, the scientist bears witness, and it is upon their testimony that knowledge builds. Hypothesis, experiment, record, replication, verification, peer review, and scholarly publication built normative guard rails to ensure objectivity, like the swearing of an oath in court.[64] But the scientific witness depended on a host of erasures. Women were excluded, as was embodiment, in the invention of an affectless and cultureless objectivity.[65] Haraway writes that this "gentleman-witness" becomes "the legitimate and authorized ventriloquist for the object world,

adding nothing from his mere opinions, from his biasing embodiment."[66] By constructing expert knowledge divorced from opinion and transcendent authority alike, the scientist—by default white and male—became endowed with "the remarkable power to establish facts. He bears witness: he is objective; he guarantees the clarity and purity of objects."[67] This is the figure of the witness capable of the "God-trick" of scientific rationality, which claims an objective, ahistorical, and unbiased viewpoint on the world.[68] This modest witness wins his authority through the performative disavowal of power, and in doing so entrenches science—new though it is—as the authoritative mode of apprehending the world. Against the rich multiplicity of worlds that jostled and warred with one another, this new science and its modest witnesses remade the world as a singular, knowable thing, conquered by colonialism and made profitable by capitalism.

If modern science heightens the power of Man the Witness, then the roughly concurrent emergence of print and then technical media amplifies and extends that authority in time and space, even as it enables new forms and practices of nonhuman witnessing. Media technology had always been bound up with witnessing—consider Moses, who descends from Mount Sinai with the word of God engraved in stone—but the advent of modern communications made bearing witness a form of informational sociality around which shared truths form. No longer a matter for courts, churches, and laboratories alone, witnessing through the printing press, telegraph, and radio imagined nations into being and rendered distant events immediate. No surprise, then, that media studies has had so much to say about witnessing. For John Ellis, television had an even more profound effect on witnessing by placing the viewer in the position of the witness.[69] Mass media made witnessing, as Frosh and Pinchevski put it, a "generalized mode of relating to the world."[70] But this proliferation of media witnessing amplified the "veracity gap" that must be bridged to grant the media narrative its authority as truth, as John Durham Peters explains.[71] Liveness, that new quality of televisual media, stood in as truth's guarantor: How could what is unfolding now before one's very eyes be anything but truth? Yet liveness is no guarantor of the complete picture or the reliability of the witness, nor even—as I will show in chapter 2's examination of deepfake technologies—of the existence of the witness. Liveness, like all media coverage of suffering and violence, can produce spectatorship that dispels action rather than spurs it, presenting mere seeing as sufficient response.[72] Still, media witnessing is often not intended to spark action; its purpose is to bind communities around shared understandings of events, such as the world-shattering nature of the 9/11

attacks for America and much of the West, or the extended intractability of the COVID-19 pandemic. Increasingly, this binding takes place not only through the consumption of images, but also through actively participating in their production and circulation.

In both science and media, witnessing serves as a sociotechnical apparatus that refracts experiment into authority, reportage into truth, science and broadcasting into power.[73] In the twentieth century, a shift took place from transcendental knowledge, continuous media, and analogue technologies to mathematical grids and models, discrete media, and statistical technologies.[74] In *The Practice of Light*, Cubitt argues that the emergence of technical media requires and constitutes a transformation in the processes through which (especially visual) media are produced *and* the underlying epistemic framework.[75] Enumeration, probability, and statistical inference and analysis take hold, backed by mathematical theories of information and markets. With the arrival of the postwar datalogical turn and the claims to potential omniscience that flow from a seeming infinitude of information, the "communicative objectivity" of the cybernetic revolution documented by Halpern began to bind both science and governance ever more tightly to networked systems and screen interfaces. Networked computation applied to a datafied world produced a new kind of observer, one who followed the rules of the new cybernetic order but saw the world through increasingly inhuman modalities of perception.[76] The witness as cyborg, harnessing and harnessed to new technologies of vision began to shape how data was presented and deployed.[77] But it also signaled a deeper infiltration and extension of human perception and action via machine. This technological transformation laid the foundation for smartphones, drones, remote sensors, and even artificial intelligence to become instruments of witnessing, even as they transform the relationship between witnessing and the ground truth against which it is so often measured.[78]

What these changes in media and mediation make clear is that witnessing is a relational process that probes, exposes, and undoes the limits of representational modes of knowing and being.[79] Rather than reinstantiating the authority of the unitary subject or even of language, contemporary witnessing exposes the primacy of relations between bodies, events, environments, worlds, and objects, even if they are obscured, denied, disavowed, or absent. While testimony might take the form of language or a fixed image, the experience of witnessing is always affective, occurring in the encounters through which bodies and worlds emerge within and alongside one another. Witnessing, writes Kelly Oliver, is "the heart of the circulation of energy

that connects us, and obligates us, to each other."[80] But now witnessing must reckon with the unravelling of the ontological and epistemological grounds of knowledge by radical theory on the one hand and the interlocking crises of the contemporary world on the other.

In an evocative, searching essay on the relation between testimony and the witness, Michal Givoni writes that rather than an age of testimony, "ours is an era of becoming a witness, a time in which individuals are called, in greater numbers and intensity and at a growing rate, to fashion themselves as witnesses, while their witness position is never guaranteed and their mode of witnessing is questioned."[81] If becoming-witness is the task set for the human, then what of the agencies that make up more-than-human worlds? If we shift the angle with which we approach witnessing and the human, the scene might be different: Could we not think of witnessing as yet another pressure applied to the human, another dissolving agent working to undo the narrowly inscribed figure of knowing and being that has both enabled remarkable advancement but also done terrible, enduring, and world-ending violence? Or, to put this differently, what if it is not only today's insistent presence of the nonhuman that demands a new understanding of witnessing, but that witnessing carries within itself an unrevealed history, a constitutive nonhumanity?

This choice to bring witnessing into conjunction with the "nonhuman" rather than the more-than-, post-, in- or even de-human was not easily arrived at. For me, nonhuman emphasizes distinction and difference from the human, but retains its necessarily entangled relation to the human and thus asserts the necessity of keeping the human in the frame.[82] As Richard Grusin observes, "The human has always coevolved, coexisted and collaborated with the nonhuman," and, as such, "the human is characterized precisely by this indistinction from the nonhuman."[83] The human is, in this sense, constitutively dependent on complex relations with the nonhuman. This relationality is central to moving to conceptualize nonhuman witnessing, since witnessing itself is a relational practice. But I also find the nonhuman beneficial because it implies no time before, after, or beyond the human.[84] "Nonhuman" thus avoids the potential to read *post*human as an uncritical desire to move "beyond the human," as Zakkiyah Iman Jackson puts it, which can be an impossible endeavor for those never fully afforded the category of human to begin with, and who might not now wish to receive it, even if only in passing.[85] As Karen Barad points out, attending to the nonhuman "calls into question the givenness of the differential categories of 'human' and 'nonhuman,' examining the practices through which these differential

boundaries are stabilized and destabilized."[86] As such, Dana Luciano and Mel Y. Chen argue that "the nonhuman turn marks, for many critics, not a venture 'beyond' the human but a new mode of critical realism, a recognition that the nature of 'reality' itself is changing as power moves away from the individual." Doing so has material consequences.[87] For Shela Sheikh, "where care for both human and nonhuman life is at stake, witness collectivities necessarily entail an expansion beyond the category of the human."[88] This questioning of categories, boundaries, and differences is not only a matter of language, but of the affects, materialities, and mediations of forces, bodies, meanings, experiences, energies, and ecologies.

In this light, *nonhuman* should not be read as a dismissal of the related terms outlined here, nor as a disavowal of the species we call human as a key locus for the struggle for justice. Established practices of witnessing have stratified distinctions between human and the non through an inability to give materiality and relationality their due. Zylinska argues that "embracing nonhuman vision as both a concept and a mode of being in the world will allow humans to see beyond the humanist limitations of their current philosophies and worldview, to unsee themselves in their godlike positioning of both everywhere and nowhere, and to become reanchored and reattached again."[89] As I conceive it, nonhuman witnessing is both a particular form of perception and something else besides, a communicative form shaped by the materiality and affectivity of the world as medium: an ethicopolitical mode of relation for grounding anew how meaning comes to matter in the making and remaking of worlds. Nonhuman witnessing is not an ahistorical or transcendental concept, but rather the naming of a set of interconnected practices and processes of witnessing bound up with evolving epistemic frameworks and forms of mediation.

Nonhuman witnessing is not a free-floating concept but an injunction to the human to become with and alongside the non in far more attentive and attuned ways. Cubitt argues that fundamentally transformed practices of communication offer "the possibility of changing the conduct of relations between human beings and nature, and between both of them and the technologies that so profoundly and multifariously mediate between them."[90] Nonhuman witnessing is thus a historical process, one that has—I would contend—always operated in conjunction with human ethics, politics, and meaning-making but that manifests in new forms, practices, intensities, and dynamics as epistemes and media technics change through time. Nonhuman witnessing in the contemporary conjuncture is thus a response to Man the Witness, but exploits, escapes, and exists beyond the dominance of technical media. Tracing its

occurrence in instances as diverse as edge computing weapons targeting and glass-blown art, this book shows how nonhuman witnessing addresses power as process, not solely biopower or necropower, but the ontopower that brings becoming within its ambit. As a modality that operates across multiple levels of sense-, truth- and world-making, opening witnessing to the nonhuman takes up the task of producing new communicative aesthetics, ecologies, and politics in the face of violence and its traumatic aftermaths.

WITNESSING TRAUMA, WITNESSING VIOLENCE

To testify is, in the most basic sense, to insist that something be remembered by someone or something other than the witness. Memory is shared across species, technics, and materials: it is human and animal recall, but also information stored in computation, ammonites fossilized in stone, scars on gumtrees after summer fires. Its politics must be forged; its collectivity brought into being. One means of making memory collective is witnessing. Memorials to wars past bear witness, and statues of slave owners, Confederate generals, and colonial "heroes" remind us of the violence that can be entailed in being called to witness and remember under the normative rule of empire.[91] Memory itself is not normative, but rather attains its ethical or moral weight through its marshalling to cultural or political ends. Witnessing, by contrast, is an ethicopolitical process: it is always and already on the brink of becoming-political, even if its politics remain latent or geared very far from justice. Witnessing orients toward the future, even if it reaches back into the past. This book, then, is not "about" memory, even if memory and its uncertainties feature often. Instead, I am interested in the registering of experience that precedes memory, and of the intimate relation between this witnessing and the violence and trauma to which it so often responds.

For trauma studies in the humanities, the witness to trauma—and to historical trauma and atrocity in particular—lives with the violent event written on and through the body, such that the past is in fact never past at all. Fragments of experience cling to the present and refuse to become memory, continuing as lived remnants of violence. Testimony exposes the failure of language, the stuttering of representation, and the shattering of experience at the heart of trauma.[92] Testimony is thus vital and necessary, even as it cannot ever provide a full accounting of trauma, nor be enough on its own to work through the traumatic event and reconstitute the subject. This is part of why trauma theory has had such influence on literary, film, and cultural theory: art

addresses those incidents of history that refuse comprehension, seeking to overcome the collapse of meaning through aesthetic and imaginative force.

In this sense, trauma theory is unabashedly anthropocentric. It might not celebrate a classical humanism, but it is dedicated to the human (in)capacity to speak in the face of that which refuses or resists speech: those traumatic events that most demand voice are also exactly those that refuse representation.[93] If the relation between testimony and traumatic event is necessarily fractured, then how can the witness testify to historical facts? How can history even be written?[94] This fragmenting of the connection between writing or speech and the event throws testimony into crisis: witnessing becomes precisely the urgent task of pursuing the event that will not give itself up to knowing, whose full scope and meaning always eludes the grasp.[95] This necessary failure of witnessing within trauma theory marks the failure of the human: witnessing signals the limit point of what the human can know of itself and what it can become.[96] Trauma can never appear as itself to the knowing subject, it can never be known and rendered speakable. Consequently, the human itself is always bound by this failure to reckon with the traumatic. Witnessing cannot exceed or extend beyond the human because it is constitutive of an incapacity for the human to be fully human in the face of trauma. Positioning both trauma and testimony as operating on the line between human and less-than-human, as trauma theory does, implies that the nonhuman cannot be accorded either trauma or testimony. If witnessing enacts the paradox of the human failure to be fully human, what room is there for the animal, the plant, the stone scorched by exploding fragments of a Hellfire missile? Yet trauma escapes the confines of the subject. It can be climatic, atmospheric, collective, and it can be transmitted between people and across generations. As chapters 3 and 4 argue, trauma can be both affective and ecological. Trauma continually exceeds the human subject, which means that reading the failure of witnessing as a falling short of the human cannot hold. This very proposition is an obscured anthropocentrism that predetermines what witnessing can be.

But all this discussion of testimony and trauma implies an original violence. While trauma and witnessing are often yoked together by theory, relations between violence and witnessing are often assumed, unstated, or unresolved. In part, this is because violence itself is a slippery concept: pervasive, elusive, varied, and resistant to neat formulations. But it is also because witnessing and violence converge and diverge, coming together in some contexts but not at all or only thinly in others. Consider the difference between witnessing police killings and witnessing a volcanic eruption. Both might involve the destruction of life, but only one constitutes violence as such.

Hannah Arendt makes this distinction clear. "Violence," she writes, "is distinguished by its instrumental character," whereas force describes "the energy released by physical or social movements."[97] If violence is instrumental, it is also relational. It might well be that violence is intrinsic to being a body. "The body implies mortality, vulnerability, agency: the skin and the flesh expose us to the gaze of others," observes Judith Butler, "but also to touch, and to violence, and bodies put us at risk of becoming the agency and instrument of all these as well."[98]

But violence can be structural, as well as direct and immediate, "exerted systematically—that is, indirectly—by everyone who belongs to a certain social order," as Paul Farmer observes.[99] Structural violence resists neat ascriptions of blame or responsibility. Its effects are diffuse yet deeply harmful, enabling oppression and working to maintain existing hierarchies of wealth and power.[100] Capitalism and colonialism are forms of structural violence, even if they can also manifest in more kinetic, martial, and immediate forms. This is why Patrick Wolfe describes settler colonialism as a structure, not an event.[101] But other forms of distributed violence feature in this book: symbolic, discursive, infrastructural, environmental, and algorithmic violence, for example. Lacking an obvious originating agent, such violence takes place through institutions, linguistic exclusions, technocratic programs, extractive industries, and other such assemblages, often harnessed to state and corporate power but at times filtered through more ambiguous actors.[102]

Violence is not only distributed, but also differentially experienced. As Saidiya Hartman, Hortense Spillers, and other scholars of slavery and Black life teach us, violence strips away the body and exposes the flesh to injury, often in diffuse and difficult-to-detect ways that permeate the quotidian.[103] Racial violence exemplifies this dynamic because it coalesces the capriciousness of law, the exclusionary force of Man, and the harnessing of relation to produce subjects not governed by the law. Writing on the killing of people of color in Brazil's favelas, Denise Ferreira da Silva argues that "raciality immediately justifies the state's decision to kill" because such "bodies and the territories they inhabit always-already signify violence."[104] Violence exposes the vulnerability of the body, but it distributes that vulnerability in radically unequal ways. To say, then, that the body is defined by its vulnerability to violence makes a necessarily political claim about who gets to possess a body to encase their flesh. This is a question rooted in the Enlightenment conception of the subject, the figure of Man that Wynter ties to European colonial expansion. Binding witnessing to the human means that who witnesses is

always contested ground—and witnessing itself can be complicit in the legitimation of violence. After all, can the figure denied humanity bear witness if witnessing belongs to the human? Preceding the body, flesh marked by violence offers a way outside of Man, a fugitive witnessing enabled through the generativity of flesh that refuses to give up its vitality and seeks solidarity, resistance, and joy.

Violence, in other words, is a malleable phenomenon. In war, it can be mechanized and automated, but also intensely intimate. It can unfold slowly, as in the degradation of bodies exposed to radiation or the collapse of environments polluted by toxic. "Violence unfolds on different scales, over different durations, and at different speeds," writes Weizman. "It manifests itself in the instantaneous, eruptive force of the incident, evolves in patterns and repetitions across built-up areas, and then manifests itself in the slower, incremental degradation of large territories along extended timescales."[105] Nor are those forms, modalities, intensities, and speeds separate from one another. Violence flows between states. Buzzing in the sky above, the drone generates fear and abiding anxiety, a kind of diffuse and atmospheric violence, even as its surveillance systems engage in the violence of datafication, transforming the textures of life into metadata. And then, when a target is acquired and a missile launched, violence becomes horrifyingly kinetic. People living under drones in Afghanistan, Yemen, Gaza, or Ukraine witness this violence, as do members of the military apparatus from operators to intelligence analysts to authorizing officers. But when violence is so inseparable from environments and technoscientific systems, there is much that testimonies of the nonhuman can offer. For all the moral force that resides in human rights testimony and the humanitarian witness, the entanglement of the nonhuman in violence suggests the need for nonhuman witnessing as fundamental to healing and repair for human, nonhuman, and the worlds we share.

Oliver's generative attempt at disentangling trauma, violence, and witnessing offers a way through this knot. Writing against the notion that social struggles are struggles for recognition of difference, Oliver develops a theory of the relational formation of subjectivity that turns on the ethicopolitical imperative of witnessing. Drawing on a Levinasian ethic that privileges the other over the self, Oliver argues that "the speaking subject is a subject by virtue of address-ability and response-ability."[106] Both address-ability and response-ability are at the heart of witnessing, and so witnessing is "the basis for all subjectivity; and oppression and subordination work to destroy the possibility of witnessing and thereby undermine subjectivity."[107] The inversion

here is crucial: witnessing is not simply a response to violence, but what violence destroys. "While trauma undermines subjectivity and witnessing restores it," she writes, "the process of witnessing is not reduced to the testimony to trauma."[108] Trauma cannot be the foundation of subjectivity because such a move could only engender an impoverished political life. Disaggregated from trauma, witnessing forges bonds that exceed any given situation or singular act of witnessing.

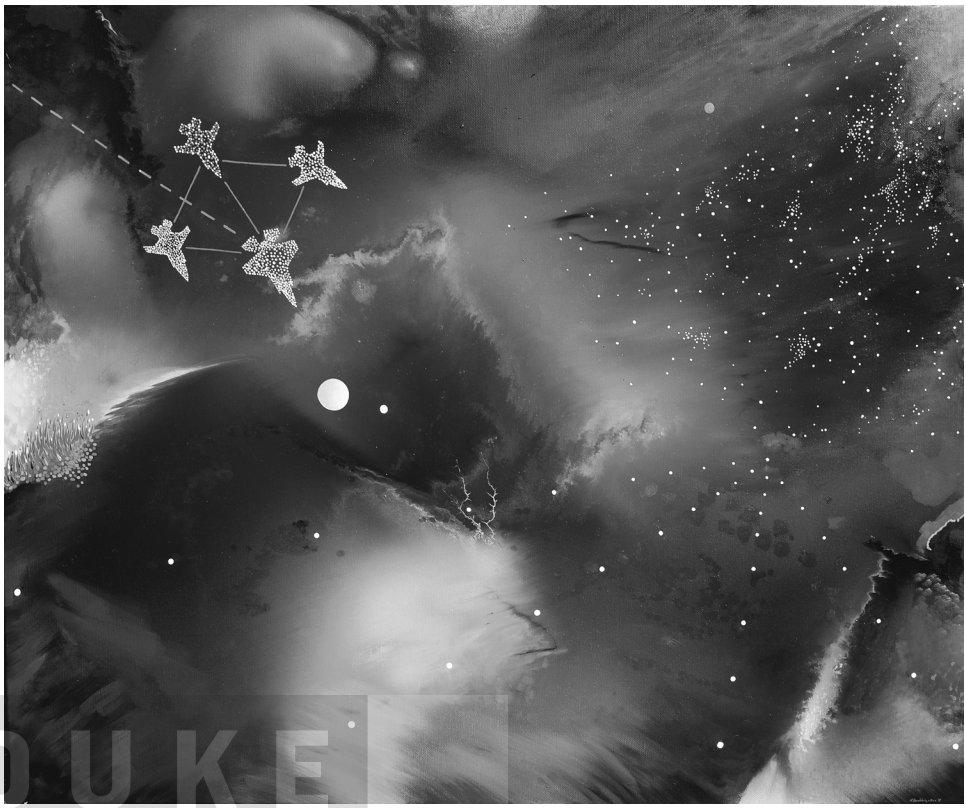
Witnessing is always an open-ended, recursive, and necessarily active process of becoming. But the important move that Oliver makes is to situate witnessing within a relational milieu, arguing that the self develops its capacity as an internal witness through being witnessed by the other and that is how subjectivity emerges from and with social relations. Working within a psychoanalytic framework, Oliver argues that witnessing is essential to working-through hostilities that stem from fear and anxiety over difference. This is a "profoundly ethical operation insofar as it forces us not only to acknowledge our relations and obligations to others" but to transform them.[109] Working-through connects witnessing to sociality and makes transformations—of love, of justice, of respect—possible. Unsurprisingly, Oliver's witnessing is unquestionably human: a process that involves "language and gestures" and an act of "love" in the face of the other and against the dehumanizing power of oppression and violence. Witnessing is intrinsically human such that human subjectivity itself is the "result of a continual process of witnessing."[110] Objects have no capacity to witness precisely because the object cannot speak or gesture.

Despite this avowed humanism, Oliver's account helps elucidate some of the interventions this book makes in thinking witnessing with the nonhuman. First, the rejection of a symbiotic relationship to trauma opens witnessing to world-making in ways that invite richer and more generative potential while not at all foreclosing the necessity of witnessing in response to trauma and violence. Second, the insistence on the relationality of witnessing as enacted through address and response provides a way into what witnessing might be if address and response involve nonhuman animals, machines, entities, and environments, and so on, as long as we understand both address and response outside their familiar anthropocentric frames. Third, the conception of relationality as fundamentally biosocial, affective, and energetic already contains within it a permeability that is almost ecological in its insistence on complexity and process. Fourth, the notion that witnessing forges relations that make working-through hostilities to difference possible offers a way of understanding the dynamism of witnessing and why it makes

transformation possible. Taken together, these four implications offer points of departure from the human witness and into the unruly domain of nonhuman witnessing.

In the painting *Theatre of War: Photons Do Not Care*, (figure I.1), Kathryn Brimblecombe-Fox depicts the machinic attempt to make planetary environments subject to martial enclosure. A cluster of drones, networked by fine red lines, looms over a pale dot in a field of rich blues and reds reminiscent of scientific visualizations of cosmic evolution. Viewing the painting, we reside in the cosmic distance, thrown far from any conceivable human perception of the Earth or its technologies of war. And yet the painting calls for us to attend

FIGURE I.1. *Theatre of War: Photons Do Not Care*, oil on linen 92 × 112 cm, Kathryn Brimblecombe-Fox, 2021. Courtesy of the artist.



to the planetary nature of military technologies, to their growing tendency to render space-time itself as a site of martial contest. Photons do not care: these massless particles are the raw stuff of the electromagnetic spectrum, transcending national boundaries, the human, and the planet itself. And yet they are also, increasingly, the site of military contestation and intervention, as autonomous and cyber warfare infuses all other forms of martial conflict. Military media, networked systems, and algorithmic assemblages all seek mastery, and in doing so tug us into an age in which the world as target has given way to the planet as an operative medium for targeting any point on or above its surface.[111] The hand of the artist is evident in the occasional unblended brush stroke of oil on linen, and in the uneven stippled dots arranged into the pixelated drones. These pixelated silhouettes of looming drones blur computational mediation with organic representation, human hand, and galactic scale. There is no escaping the human, the painting insists, no release into an existence without responsibility for the crises wrought in the name of economic growth, colonial expansion, state power, and military supremacy. The question is what will happen, down on that pale blue dot, toward survival and a new flourishing of life?

If crisis is the political and ecological condition within which much of the planet lives, the unraveling of the fantasy of a unified, cohesive, and knowable world offers some potential for more just and equitable futures. The enmeshed desire of states and other actors to both produce and control crisis—crisis as a modality of governance that allows for the abrogation of democratic and other responsibilities—is not solely about discourses, institutions, or even technologies that target individuals and populations, whether as biopolitical life-in-the-making or necropolitical death-in-waiting. Ontopower heightens the stakes of contemporary technopolitical power, enabling states and other actors to target the stirring of life within the bare activity of existence. Techniques of ontopower seek to direct being as it becomes, to harness emergence itself to the ends of the already dominant forces of production and control. Such are the promises of the algorithmic technologies of war, governance, culture, and ecology that this book explores, but so too is there the potential in resistant harnessing of technics and aesthetics, algorithmic and otherwise, to produce new modes of surviving with and living beyond the World of Man.

Addressing human responsibility for the existential crises within which we find ourselves—and reckoning with the radically unequal distribution of both responsibility and the effects of crisis—requires us to hold onto the human. But this holding onto the human must also undo the blind privilege,

the narrowness of vision, and the closed imagination that undergird an Anthropos that is bound to Man. Oliver writes that "being together is the chaotic adventure of subjectivity."[112] This book calls for witnessing as the foundation of a renewed becoming-together—becoming-environmental, becoming-machinic, becoming-imperceptible—that coheres not on human subjectivity but on the chaotic dance of life and nonlife.

NOTES

INTRODUCTION. NONHUMAN WITNESSING

1 Like many, I first encountered the horrifying strike of February 21, 2010, through the excerpts from the transcript that open Grégoire Chamayou's *Drone Theory*, but it also plays a similar role in journalist Andrew Cockburn's *Kill Chain* and in international relations scholar Lauren Wilcox's brilliant analysis of racializing and gendering in the drone apparatus. In writing this account I am deeply indebted to the remarkable work of Derek Gregory, particularly a series of posts on his Geographical Imaginations site titled "Under Afghan Skies." In my rendition, I have sought to attend to the points of contact between technoscientific systems, human actions, and the environment. Chamayou, *Drone Theory*; Cockburn, *Kill Chain*; Wilcox, "Embodying Algorithmic War."

2 Whyte, "Indigenous Science (Fiction) for the Anthropocene."

3 Wynter, "Unsettling the Coloniality of Being/Power/Truth/Freedom."

4 Wynter differentiates between an original Man1 arising from the Renaissance and a later Man2 reshaped by the colonial encounter with the Americas and Darwinian biology, but as the distinctions between these two positions are not central to my argument, I am using "Man" to encapsulate this overrepresentation as the human in more general terms.

5 I understand affect in the Spinozan tradition: as the bodily capacity to affect and be affected. Here, as elsewhere in my work, affect gels with a

capacious conception of what counts as a body: texts, plants, drones, swans, databases, publics and waters can all be bodies as readily as individuated humans. Bodies—human and non, multiple and individuated—are enabled and constrained by the relations in which they are webbed, the resources and capacities for change, connection, signification and more. Those relations are the stuff of affect. Affect is thus not an exclusively human mode of experience akin to emotion, but the relational dynamics of bodies situated in contexts, entrained within environments, assembled in machinic processes, and so on. As Massumi writes, "The body is as immediately abstract as it is concrete; its activity and expressivity extend, as on their underside, into an incorporeal, yet perfectly real, dimension of pressing potential." *Parables*, 31. Affect can be modulated, amplified, intensified and otherwise transformed by media: this is precisely what makes ubiquitous media so powerful. But affect can break, sheer, stretch, distend and rupture bonds between bodies as much as strengthen or intensify them. See Massumi, "Autonomy of Affect"; Gibbs, "Panic!"; Gibbs, "Contagious Feelings"; Angerer, *Ecology of Affect*; Schaefer, *Evolution of Affect Theory*; Gregg and Seigworth, *Affect Theory Reader*; Clough, *Affective Turn*; Deleuze, "Ethology."

6 De la Cadena and Blaser, *A World of Many Worlds*.

7 Amazon, "All In"; Greenpeace, "Clicking Clean Virginia."

8 Sherwood, "Inside Lithium Giant SQM's Struggle to Win Over Indigenous Communities in Chile's Atacama."

9 Gilmore, *Golden Gulag*; Robinson, *Black Marxism*.

10 Kelley, "Racial Capitalism."

11 Packer and Reeves, *Killer Apps*, 5. On the history of computation, screens, and enemy production, see also Geoghegan, "An Ecology of Operations."

12 Puar, *Right to Maim*; Mbembe, *Necropolitics*.

13 Browne, *Dark Matters*.

14 Halpern, *Beautiful Data*, 8.

15 Furuhata, "Multimedia Environments and Security Operations," 72.

16 Edwards, *A Vast Machine*; Edwards, *The Closed World*.

17 Hogan and Vonderau, "The Nature of Data Centers."

18 On infrastructural violence, see Khalili, *Sinews of War and Trade*; Cowen, *The Deadly Life of Logistics*; and Easterling, *Extrastatecraft*. On slow and structural violence, see Nixon, *Slow Violence*; Farmer, "Structural Violence." On algorithmic violence, see Bellanova et al., "Critique of Algorithmic Violence."

19 Whyte, "Against Crisis Epistemology."

20 Vigh, "Crisis and Chronicity," 10.

21 Berlant, *Cruel Optimism*, 10.

22 Murphie, "On Being Affected," 24.

23 Murphie, "On Being Affected," 20.

24 Massumi, *Ontopower*, vii–viii.

25 As such, "politics, colonialism, settlement, capitalism, ecological destruction, racism, and misogynies are not wars by other means—they are war." Grove, *Savage Ecology*, 61.

26 Grove, *Savage Ecology*, 10.

27 Cubitt, *Finite Media*, 3; and Cubitt, *The Practice of Light*.

28 Kember and Zylinska, *Life after New Media*, xv. On mediation as performative and lively enactment, see also Parks, *Rethinking Media Coverage*, 2.

29 Drawing on German and Canadian media theory, John Durham Peters defines media as "ensembles of natural and human elements" and "our infrastructures of being, the habitats and materials through which we act and are." Andrew Murphie argues that "we move into relations with media that quite literally move us/the world and with which we can move the world." Even the planet can be understood as a medium, argues Chris Russill, most clearly in the monitoring apparatuses of climate change and atmospheric military sensor networks. Peters, *The Marvellous Clouds*, 3, 15; Murphie, "World as Medium," 17; Russill, "Is the Earth a Medium?"; Russill, "Earth Imaging."

30 Cubitt, *Finite Media*, 7.

31 Russill, "The Road Not Taken."

32 Patrick Wolfe has written persuasively about the relationship between settler colonialism and genocide, arguing that "settler colonialism is inherently eliminatory but not invariably genocidal" in "Settler Colonialism and the Elimination of the Native," 388. Today, Aboriginal children are currently being removed from their families at even higher rates than they were in the 1950s, an era of systemic destruction of culture and peoples that made what became known as the Stolen Generation and for which the Australian government issued a formal apology in 2008. Cashless debit cards to control welfare benefits are being rolled out to Indigenous communities, many still living under permutations of the military occupation launched in 2007 by an ailing government looking to stoke anti-Indigenous resentment. Black deaths in custody have returned to their heights from the 1980s, while Aboriginal people are massively overrepresented in prisons and Indigenous women are far more likely to be subject to sexual violence.

33 Whyte, "Indigenous Science (Fiction) for the Anthropocene," 226.

34 Estes, *Our History Is the Future*, 135.

35 De la Cadena and Blaser, *A World of Many Worlds*, 12.

36 Although, as of writing, it has not yet been recognized by either the International Commission on Stratigraphy nor the International Union of Geological Sciences as a division of geologic time.

37 Demos, *Against the Anthropocene*, 85. For a detailed discussion of Crutzen and Stoermer's conception of the Anthropocene, see Grove, *Savage Ecology*, 36–40.

38 Moore, *Anthropocene or Capitalocene*?; Grove, *Savage Ecology*; Haraway, "Anthropocene, Capitalocene, Plantationocene, Chthulucene"; de la Cadena, "Uncommoning Nature."

39 Writing on what she calls "minimal ethics," Joanna Zylinska argues that the response demanded by the Anthropocene is "strongly post-anthropocentric . . . in the sense that it does not consider the human to be the dominant or the most important species, nor does it see the world as arranged solely for human use and benefit." Zylinska, *Minimal Ethics for the Anthropocene*, 20.

40 Davis and Todd, "On the Importance of a Date," 763. By contrast, see, for example, McNeill and Engelke, *The Great Acceleration*.

41 Stewart, "Atmospheric Attunements," 445.

42 Kaplan, *Aerial Aftermaths*, 17–18.

43 Or, as as Kathryn Yusoff points out, if the end of the world of apocalyptic imagining is the end of this colonialist and capitalist one for some, then it is also "the prerequisite for the possibility of imagining 'living and breathing again' for others." Yusoff, *A Billion Black Anthropocenes or None*, 13.

44 Rather than look outside the narrow frame of knowledges that helped get us into this mess—loosely grouped under the rubrics of the humanist tradition and Western scientific rationality—we are called to attend ever more earnestly to those very knowledges in the search for solutions to the damage they have wrought. See Snaza, "The Earth Is Not 'Ours' to Save," 339.

45 Weizman, *Forensic Architecture*.

46 Fuller and Weizman, *Investigative Aesthetics*.

47 Schuppli, *Material Witness*, 19.

48 Schuppli, *Material Witness*, 34.

49 Pugliese, *State Violence and the Execution of Law*, 14.

50 Peters, "Witnessing."

51 Frosh and Pinchevski, "Why Media Witnessing?," 1.

52 Chouliaraki, *The Spectatorship of Suffering*.

53 See, for example, Reading, "Mobile Witnessing"; Andén-Papadopoulos, "Citizen Camera-Witnessing"; Andén-Papadopoulos, "Crowd-Sourced Video"; Papailias, "Witnessing in the Age of the Database"; Chouliaraki, "Digital Witnessing in Conflict Zones"; Gray, "Data Witnessing."

54 Wu and Montgomery, "Witnessing in Crisis Contexts"; Rae, Holman, and Nethery, "Self-Represented Witnessing"; Ristovska, *Seeing Human Rights*.

55 For more on torture in ancient Greece and Rome, see Ballengee, *Wound and Witness*; DuBois, *Torture and Truth*; Peters, *Torture*.

56 On the religious roots of witnessing, see Peters, "Witnessing," 708. On the emergence of new legal norms, see Langbein, *Law of Proof*.

57 Ballard, "And They Are like Wild Beasts," 19. See also Bennett, *Vibrant Matter*, 8–10.

58 Langbein, *Law of Proof*.

59 Spillers, "Mama's Baby, Papa's Maybe," 69.

60 Dispossession, stigmatisation and deprivation of First Nations served "both to 'verify' the overrepresentation of Man as if it were the human, and to

legitimate the subordination of the world and well-being of the latter to those of the former." Wynter, "Unsettling the Coloniality of Being/Power/Truth/Freedom," 268.

61 Law, as Zakkiyah Jackson explains, "denies those it deems 'inhuman' access to speech and law, thereby producing the inhumanity it excludes," showing how the standard of the "human" witness is actually "fundamental to law's injustice for both people of color and animals." Jackson, "Animal," 675, 676.

62 Fassin, "The Humanitarian Politics of Testimony," 534, 541.

63 Daston and Galison, *Objectivity*.

64 On the relationship of science, testimony, and the production of knowledge in a classic vein, see Coady, *Testimony*. On the role of trust and social conformity, see Adler, "Testimony, Trust, Knowing"; and Hardwig, "The Role of Trust in Knowledge."

65 Daston and Galison, *Objectivity*.

66 Haraway, *Modest–Witness*, 24. In her book, Haraway proposes her own feminist modest witness who is suspicious, situated, knowing, ignorant, partial, and more.

67 Haraway, *Modest–Witness*, 24.

68 Haraway, "Situated Knowledges."

69 "Witnessing became a domestic act. . . . Television sealed the twentieth century's fate as the century of witness." Ellis in Peters, "Witnessing," 708.

70 Frosh and Pinchevski, "Why Media Witnessing?," 9.

71 Peters, "Witnessing."

72 Boltanski, *Distant Suffering*; Chouliaraki, *The Spectatorship of Suffering*; Kozol, *Distant Wars Visible*.

73 On the significance of witnessing and testimony to the a host of scholarly disciplines and institutional practices, see Wieviorka, *The Era of the Witness*; Felman and Laub, *Testimony*; Frosh and Pinchevski, *Media Witnessing*; Givoni, "Witnessing/Testimony"; Guerin and Hallas, *The Image and the Witness*.

74 The German media theorist Friedrich Kittler was the leading proponent of this argument, which I am drawing on here by way of Sean Cubitt. See Cubitt, *The Practice of Light*, 7–12.

75 For the distilled argument, see the introduction to Cubitt, *The Practice of Light*.

76 As Halpern puts it, there emerged "a new set of investments in process, communication, and circulation, now encoded into built environments, machines, and attention spans." See *Beautiful Data*, 84.

77 Gray, "Data Witnessing."

78 McCosker, "Drone Media"; McCosker, "Drone Vision"; Andén-Papadopoulos, "Citizen Camera-Witnessing"; Chouliaraki and al-Ghazzy, "Flesh Witnessing"; Gil-Fournier and Parikka, "Ground Truth to Fake Geographies."

79 The limits of representation in witnessing has been a significant theme in my own research, see Richardson, *Gestures of Testimony*; Richardson and

Schankweiler, "Affective Witnessing"; Richardson, "Drone's-Eye View." See also, Pinchevski, *Transmitted Wounds*; Ettinger, *The Matrixial Borderspace*.

80 Oliver, *Witnessing*, 195, 20.

81 Givoni, "Witnessing/Testimony," 165.

82 There are now many valuable interventions in how to rethink the human. Dana Luciano and Mel Y. Chen draw on queer theory to argue that the "inhuman"—or inhumanisms—"points to the violence that the category of the human contains within itself" by "resonating against the 'inhumane'" in "Has the Queer Ever Been Human?," 197. In alliance with this queer inhumanism, Julietta Singh calls for dehumanism, a "practice of recuperation, of stripping away the violent foundations (always structural and ideological) of colonial and neocolonial mastery that continue to render some being more human than others." Singh, *Unthinking Mastery*, 4. Like the earlier "antihumanism" of Louis Althusser and the critical Marxist tradition, the "de-" and "in-" signal a critical desire to undo the structures of knowledge-making and world-making of the humanities in their traditional form, but are not so geared toward the expansive account of agencies needed to think about witnessing outside the frame of the human altogether, which is why some prefer the "more-than-human" and "other-than-human." See Springgay and Truman, *Walking Methodologies*, 8–11; Pugliese, *Biopolitics of the More-Than-Human*.

83 Grusin, "Introduction," ix–x.

84 "Humanity and nonhumanity have always performed an intricate dance with each other. There was never a time when human agency was anything other than an interfolding network of humanity and nonhumanity; today this mingling has become harder to ignore." Bennett, *Vibrant Matter*, 31.

85 Race in general, and blackness in particular, "cannot be escaped but only disavowed or dissimulated in prevailing articulations of movement 'beyond the human.'" Jackson, "Outer Worlds," 216. One consequence of this thinking, as Tavia Nyong'o points out, is that "posthumanist theory has tended to present the decentering of the human as both salutary and largely innocent of history." Nyong'o, "Little Monsters," 266.

86 Barad, "Posthumanist Performativity," 809. Stacy Alaimo describes this as "trans-corporeality," or how "the human is always intermeshed with the more-than-human world." Alaimo, *Bodily Natures*, 17.

87 Luciano and Chen, "Has the Queer Ever Been Human?," 192.

88 Sheikh, "The Future of the Witness," 148.

89 Zylinska, *Nonhuman Photography*, 15.

90 Cubitt, *Finite Media*, 151.

91 Vivian, *Commonplace Witnessing*.

92 See, for example, Caruth, *Unclaimed Experience*; Felman and Laub, *Testimony*; Kaplan, *Trauma Culture*; Abraham and Torok, *Shell*.

93 Felman writes that "testimony seems to be composed of bits and pieces of a memory that has been overwhelmed by occurrences that have not settled

into understanding or remembrance, acts that cannot be constructed as knowledge nor assimilated into full cognition, events in excess of our frames of reference." Felman and Laub, *Testimony*, 5.

94 LaCapra, *Writing History*; LaCapra, *Representing*.

95 Felman and Laub, *Testimony*, 24.

96 Agamben, *Remnants*, 141.

97 Arendt, *On Violence*, 50, 51.

98 Butler, *Precarious Life*.

99 Farmer, "Structural Violence," 308. The term "structural violence" originates with peace and conflict studies founder Johan Galtung but has been elaborated and extended by Farmer and others, particularly in anthropology.

100 Das et al., *Violence and Subjectivity*.

101 Wolfe, "Settler Colonialism and the Elimination of the Native."

102 Michael Taussig's account of paramilitary violence in Colombia is a particularly vibrant and nuanced account of the latter. Taussig, *Law in a Lawless Land*.

103 Reflecting on her own refusal to revivify spectacles of tortured slaves, Saidiya Hartman pursues instead the "diffusion of terror and violence perpetrated under the rubric of pleasure, paternalism and property." Hartman, *Scenes of Subjection*, 4.

104 Da Silva, "No-Bodies," 214.

105 Weizman, *Forensic Architecture*, 117.

106 Oliver, *Witnessing*, 7.

107 Oliver, *Witnessing*, 7.

108 Oliver, *Witnessing*, 7.

109 Oliver, *Witnessing*, 68.

110 Oliver, *Witnessing*, 223.

111 See Chow, *Age of the World Target*; Bousquet, *The Eye of War*.

112 Oliver, *Witnessing*, 224.

CHAPTER ONE. WITNESSING VIOLENCE

1 As Pailthorpe's work attests, aesthetic interventions into drone warfare can possess an ambivalent relation to their subject matter. Stubblefield argues that once drone art is restated in relation to the operative logics and processes of networked war, "a more nuanced reading emerges, one in which the apparent passivity of this genre is not only a conscious response to the specific conditions of drone power, but in fact the means for reimagining its relations of violence," Stubblefield, *Drone Art*, 2. Further valuable commentaries on drone art can be found in Rhee, *The Robotic Imaginary*; Danchev, "Bug Splat"; Bräunert and Malone, *To See Without Being Seen*.

2 Cubitt, *Finite Media*, 4.

3 Cubitt, *The Practice of Light*, 8.