The **Bloomsbury Handbook** of
POSTHUMANISM

Edited by **Mads Rosendahl Thomsen** and **Jacob Wamberg**

THE BLOOMSBURY HANDBOOK OF POSTHUMANISM

Also available from Bloomsbury

The Bloomsbury Handbook of 21st-Century Feminist Theory, Edited by Robin Truth Goodman

The Bloomsbury Handbook of Electronic Literature, Edited by Joseph Tabbi

The Bloomsbury Handbook of Literary and Cultural Theory, Edited by Jeffrey R. Di Leo

Forthcoming

The Bloomsbury Handbook of Contemporary American Poetry, Edited by Craig Svonkin and Steven Gould Axelrod

THE BLOOMSBURY HANDBOOK OF POSTHUMANISM

Edited by

Mads Rosendahl Thomsen and Jacob Wamberg

BLOOMSBURY ACADEMIC
LONDON • NEW YORK • OXFORD • NEW DELHI • SYDNEY

CONTENTS

LIST OF FIGURES

CONTRIBUTORS

Nicholas Agar is a New Zealand philosopher at Victoria University of Wellington. He has written books on the ethics of human enhancement, including *Liberal Eugenics* (Blackwell, 2004), *Humanity's End* (MIT Press, 2010), and on the meaning of technological progress —*The Sceptical Optimist* (Oxford University Press, 2015). His latest book, *How to Be Human in the Digital Economy* (MIT Press, 2019), addresses the human consequences of the digital revolution.

Kelly I. Aliano received her PhD from the City University of New York Graduate Center. She is the author of *Theatre of the Ridiculous: A Critical History*, published by McFarland in 2018. She has presented at numerous conferences in the field of video game studies. She regularly collaborates with Dongshin Chang from CUNY Hunter about writing pedagogy in theater courses; they published a chapter in *New Directions in Teaching Theatre Arts* (2018) on the subject. She currently teaches at Long Island University's Post Campus in the Department of Theatre, Dance, and Arts Management.

Upendra Baxi is a legal scholar. He has been Professor of law in development at the University of Warwick, UK, since 1996. He has been the vice-chancellor of the University of Delhi (1990–4), prior to which he held the position of professor of law at the same university for twenty-three years (1973–96). He has also served as the vice-chancellor of the University of South Gujarat, Surat, India (1982–5). Books published by Baxi include *Human Rights in a Posthuman World* (Oxford University Press, 2007) and *The Future of Human Rights* (Oxford University Press, 2020, 3rd edition, forthcoming).

Jaqueline Berndt is Professor in Japanese Culture at Stockholm University. From 1991 to 2016, she worked at Japanese universities, teaching visual culture and popular media. Holding a first degree in Japanese Studies (1987) and a PhD in Aesthetics/Art Theory from Humboldt University Berlin (1991), she has been engaged in the emergent academic fields of comics studies and anime research. For publications, see https://jberndt.net.

Ivan Callus is Professor of English at the University of Malta, where he teaches courses in contemporary fiction and literary theory. In the field of posthumanism, his research includes *Cy-Borges: Memories of the Posthuman in the Work of Jorge Luis Borges* (Bucknell University Press, 2009) and *Posthumanist Shakespeares* (Palgrave Macmillan, 2012), both of which were co-edited with Stefan Herbrechter, as well as special issues co-edited for the journals *Subjectivity* and *European Journal of English Studies*. In addition, he has published various book chapters and articles on the same theme, the latter in journals like *Angelaki*, *Comparative Critical Studies*, *Forum for Modern Language Studies*, *Parallax*, *Subject Matters*, and *Word and Text*. He is one of the founding directors of the Critical Posthumanism

Network (criticalposthumanism.net) and the founding co-editor of the journal *CounterText*, launched with Edinburgh University Press in 2015.

Sarah Chan is a Chancellor's Fellow at the Usher Institute for Population Health Sciences and Informatics, University of Edinburgh. She graduated from the University of Melbourne with the degrees of LLB and BSc (Hons) and spent some years as a laboratory scientist in the field of molecular biology before moving to work in science policy and bioethics. She received an MA in Health Care Ethics and Law and a PhD in Bioethics from the University of Manchester, where she was a Research Fellow in Bioethics from 2005 to 2015, first at the Centre for Social Ethics and Policy and from 2008 at the Institute for Science Ethics and Innovation, where she was Deputy Director. Sarah joined the University of Edinburgh in August 2015. Her research interests and publications cover areas including the ethics of stem cell and embryo research and reproductive medicine, gene therapy and genetic modification, human enhancement, animal ethics, and research ethics.

David Chandler is Professor of International Relations at the University of Westminster. His recent books include *Ontopolitics in the Anthropocene: An Introduction to Mapping, Sensing and Hacking* (Routledge, 2018), *The Neoliberal Subject: Resilience, Adaptation and Vulnerability* (with Julian Reid) (Rowman & Littlefield, 2016), and *Resilience: The Governance of Complexity* (Routledge, 2014).

Rick Dolphijn is Associate Professor at the Faculty of Humanities, Utrecht University, and an Honorary Professor at the University of Hong Kong. His research focuses on theories of art and culture. His recent books include *New Materialism: Interviews and Cartographies* (with Iris van der Tuin (Open Humanities Press, 2012)), *Philosophy after Nature* (2015 edited, with Rosi Braidotti), and *Michel Serres and the Crises of the Contemporary* (2019 edited). He is a PI in the HERA project FOOD2GATHER (2019–22).

Francesca Ferrando is Adjunct Assistant Professor of Philosophy at NYU-Liberal Studies, New York University, USA. A leading voice in the field of Posthuman Studies and founder of the NY Posthuman Research Group, she has been the recipient of numerous honors and recognitions, including the Sainati prize with the acknowledgment of the president of Italy. Her monograph *Philosophical Posthumanism* (Bloomsbury) was released in 2019. In the history of TED talks, she was the first speaker to give a talk on the topic of the posthuman. US magazine *Origins* named her among the 100 people making change in the world. More info: www.theposthuman.org.

Rayvon D. Fouché is the Director of the American Studies Program and Professor in the School of Interdisciplinary Studies at Purdue University. His work explores the multiple intersections between cultural representation, racial identification, and technological design. He has authored or edited *Black Inventors in the Age of Segregation* (Johns Hopkins University Press, 2003), *Appropriating Technology: Vernacular Science and Social Power* (University of Minnesota Press, 2004), *Technology Studies* (Sage Publications, 2008), the fourth edition of the *Handbook of Science & Technology Studies* (MIT Press, 2016), and

Game Changer: The Technoscientific Revolution in Sports (Johns Hopkins University Press, 2017). Most recently, he was the inaugural Arthur Mollela Distinguished Fellow at the Smithsonian Institution's Lemelson Center for the Study of Invention and Innovation.

Steve Fuller is Auguste Comte Professor of Social Epistemology in the Department of Sociology at the University of Warwick, UK. Originally trained in history and philosophy of science, Fuller is best known for his foundational work in the field of "social epistemology," which is the name of a quarterly journal that he founded in 1987 as well as the first of his twenty-five books. From 2011 to 2014, he published a trilogy relating to the idea of a "post-" or "trans-" human future, all published with Palgrave Macmillan under the rubric of "Humanity 2.0." His most recent books are *Post-Truth: Knowledge as a Power Game* (Anthem, 2018) and *Nietzschean Meditations: Untimely Thoughts at the Dawn of the Transhuman Era* (Schwabe, 2019). His works have been translated into thirty languages. He was awarded a D.Litt. by the University of Warwick in 2007 for sustained lifelong contributions to scholarship. He is also a Fellow of the Royal Society of Arts, the UK Academy of Social Sciences, and the European Academy of Sciences and Arts.

Hans Ulrich Gumbrecht is the Albert Guérard Professor in Literature Emeritus at Stanford University. In 2020, his most recent book will appear under the title '*Prose of the World*': Denis Diderot and the Periphery of Enlightenment at Stanford University Press [German translation forthcoming at Suhrkamp Verlag, Portuguese translation at UNESP, Spanish translation at Universidad Iberoamericana]. Gumbrecht's translation into German of Baltasar Gracían's "Oráculo Manual," the first since Arthur Schopenhauer's, will appear in September 2020. The book *Stadium Crowds* will appear in 2020 at Stanford University Press [German edition at Vittorio Klostermann Verlag, Portuguese edition at UNESP].

Cathrine Hasse is Professor in learning and technology and research program leader of the program Future Technologies, Culture and Learning at DPU, Aarhus University, and an honorary professor in techno-anthropology at Aalborg University. Her educational background is in Communication Studies (master of arts) and Anthropology (cand.scient.anth. and PhD) from Copenhagen University in Denmark. Her training as an anthropologist has been specialized in cultural anthropology and she has an extensive knowledge of learning theory—especially in cultural psychology—and is versed in postphenomenological philosophy of technology as well as new materialist feminist science studies. Hasse is the author of two single-authored books in English (*An Anthropology of Learning* (Springer, 2015) and *Posthumanist Learning* (Routledge, 2020)) apart from many international peer-reviewed articles and anthologies on learning, technology, concept formation, and robots in real-life settings.

Ursula K. Heise is the Marcia H. Howard Chair in Literary Studies at the Department of English and the Institute of the Environment and Sustainability at UCLA. She is a 2011 Guggenheim Fellow and former President of ASLE (Association for the Study of Literature and the Environment). Her research and teaching focus on contemporary literature and the environmental humanities; environmental literature, arts, and cultures in the Americas,

Western Europe, and Japan; literature and science; science fiction; and narrative theory. Her books include *Chronoschisms: Time, Narrative, and Postmodernism* (Cambridge University Press, 1997), *Sense of Place and Sense of Planet: The Environmental Imagination of the Global* (Oxford University Press, 2008), and *Imagining Extinction: The Cultural Meanings of Endangered Species* (University of Chicago Press, 2016), which won the 2017 book prize of the British Society for Literature and Science. She is editor of the series Natures, Cultures, and the Environment with Palgrave, co-editor of the series Literature and Contemporary Thought with Routledge, and co-editor of the Routledge Companion to the Environmental Humanities (Routledge, 2017). She is also a co-founder of UCLA's Lab for Environmental Narrative Strategies (LENS) and producer and writer of Urban Ark Los Angeles, a documentary created as a collaboration of LENS with the public television station KCET-Link.

Søren Holm is Professor of Bioethics at the University of Manchester and part-time professor of Medical Ethics at the University of Oslo. He has a research interest in the connection between often implied assumptions about philosophical anthropology and foundational medical concepts such as health and illness and ethical argument. He has written extensively about the goals of medicine and about the implied anthropology of trans- and posthumanism.

Iwona Janicka is an Early Career Innovation Fellow in the Institute of Advanced Study at the University of Warwick, UK. Previously, she held a British Academy Postdoctoral Fellowship at Warwick (2015–18), alongside various visiting fellowships, including with the Hannover Institute for Philosophical Research (Germany) and the Posthuman Aesthetics research group at Aarhus University (Denmark). As a Gates Scholar, she completed her PhD in French at the University of Cambridge, Trinity Hall, in 2014. Her monograph, *Theorizing Contemporary Anarchism. Solidarity, Mimesis and Radical Social Change* (Bloomsbury Academic, 2017), considers the concept of universality and social transformation in contemporary philosophy.

Holly Flint Jones is Associate Professor of English at the University of Alabama in Huntsville. Her teaching and research interests include twentieth- and twenty-first-century ethnic American literature as well as issues relating to race, citizenship, and technology. She has previously co-authored an article with Nicholaos Jones, titled "Race as Technology: From Posthuman Cyborg to Human Industry" (Ilha Desterro, 2017). Her other single-authored publications have engaged the representation and function race in literature, specifically the works of Toni Morrison, J.M. Coetzee, Ernesto Quiñonez, and Fatima Mernissi.

Nicholaos Jones is Professor of Philosophy at the University of Alabama in Huntsville. His research interests range widely and focus most often on understanding explanatory strategies from the biological sciences, metaphysical aspects of East Asian philosophical traditions, to issues at the intersection of ethics and technology. His publications have appeared in journals such as *British Journal for the Philosophy of Science, British Journal for the History of*

Philosophy, Philosophy East and West, and *Journal of Defense Modeling and Simulation.* His work with Holly Flint Jones examines implications of conceptualizing racialization as a technology.

Edward King is Senior Lecturer in the School of Modern Languages at the University of Bristol. His research explores contemporary cultures of digital connectivity, with a particular focus on the use of multi-modal and multi-media texts, from artists' books to comics, to expose and contest the shifting power dynamics of the digital age. He has published two monographs, *Science Fiction and Digital Technologies in Argentine and Brazilian Culture* (Palgrave, 2013) and *Virtual Orientalism in Brazilian Culture* (Palgrave, 2015), as well as a book which was co-authored with Joanna Page, *Posthumanism and the Graphic Novel in Latin America* (UCL Press, 2017).

Karin Kukkonen is Professor in Comparative Literature at the University of Oslo. Her research interests lie in eighteenth-century literature, cognitive narratology, and the history of poetics. She has published *A Prehistory of Cognitive Poetics: Neoclassicism and the Novel* (Oxford University Press, 2017) and *4E Cognition and Eighteenth-Century Fiction: How the Novel Found Its Feet* (Oxford University Press, 2019) on these topics. *Probability Designs: Literature and Predictive Processing* (Oxford University Press) is forthcoming. At the University of Oslo, Kukkonen convenes the interdisciplinary research and teaching initiative Literature, Cognition and Emotions (2019–23). In 2019, she was awarded the first University of Oslo Younger Researchers' Prize.

Pernille Leth-Espensen is a postdoctoral fellow in the section for Art History at the School of Communication and Culture, Aarhus University. Her PhD thesis, *Art, Hermeneutics, and Technoscience* (2013), discusses art-science projects and bioart from a perspective of philosophy of technology and science. Her research interests furthermore include artworks that thematize technological mediation of time. Recent publications: 'Kunst og cellekultur' (*Periskop,* 2019), 'Komplekse kropslige tidsligheder' (*Passepartout,* 2019), 'Som at læse Braille med en meget lille finger' (*Periskop,* 2017), 'Celler til salg' (*K&K,* 2017), 'Levende skulpturer' (*Biozoom,* 2016), and 'The Microscope as a Musical Instrument', in: Camilla Skovbjerg Paldam and Jacob Wamberg (eds.), *Art, Technology and Nature: Renaissance to Postmodernity* (2015).

Patricia MacCormack is Professor of Continental Philosophy at Anglia Ruskin University Cambridge. She has published extensively on philosophy, feminism, queer and monster theory, animal abolitionist activism, ethics, art, and horror cinema. She is the author of *Cinesexuality* (Routledge, 2008) and *Posthuman Ethics* (Routledge, 2012) and the editor of *The Animal Catalyst* (Bloomsbury, 2014), *Deleuze and the Animal* (EUP, 2017), *Deleuze and the Schizoanalysis of Cinema* (Continuum, 2008), and *Ecosophical Aesthetics* (Bloomsbury, 2018). Her new book is *The Ahuman Manifesto: Activisms for the End of the Anthropocene* (Bloomsbury, 2020).

Andy Miah, PhD (@andymiah), is Chair of Science Communication & Future Media, at the

University of Salford, Manchester. He is renowned for his research investigating the ethical implications of emerging technologies, and has focused his recent inquiries on matters pertaining to the biodigital interface, drones, and human enhancement. Professor Miah is a Board member of the Science and Industry Museum in Manchester and has worked on numerous international projects investigating the ethics of transhumanist technologies. He was previously an International Visiting Scholar at The Hastings Center and is a frequent media commentator on the future of humanity.

David T. Mitchell is a scholar, editor, history and film exhibition curator, and filmmaker in the field of disability studies. His books include the monographs *Narrative Prosthesis: Discourses of Disability* (University of Michigan Press, 2000), *Cultural Locations of Disability* (University of Chicago Press, 2005), *The Biopolitics of Disability: Neoliberalism, Ablenationalism, and Peripheral Embodiment* (University of Michigan Press, 2015), and the collections *The Body and Physical Difference: Discourses of Disability* (University of Michigan Press, 1997), *A History of Disability in Primary Sources*, volume 5 of *The Encyclopedia of Disability*, and *The Matter of Disability* (Sage Publications, 2005). He curated *The Chicago Disability History Exhibit* (Vietnam Veterans Memorial Museum, 2006) and assembled the programs for the Screening Disability Film Festival (Chicago, 2006) as well as the DisArt Independent Film Festival (Grand Rapids, MI, 2015). His four award-winning films include *Vital Signs: Crip Culture Talks Back* (1995), *A World without Bodies* (2002), *Self Preservation: The Art of Riva Lehrer* (1995), and *Disability Takes on the Arts* (1996). He is currently working on a new book and feature-length documentary film on disability and the Holocaust tentatively titled *Disposable Humanity*.

Pramod K. Nayar teaches in the Department of English at the University of Hyderabad, India. Pramod K. Nayar's latest books include *Ecoprecarity: Vulnerable Lives in Literature and Culture* (Routledge, 2019), *Human Rights and Literature: Writing Rights (Palgrave Macmillian, 2016), Brand Postcolonial: "Third World" Texts and the Global* (De Gruyter Open, 2018), *Posthumanism*, (Polity Press, 2014) among others. His essays have appeared, most recently, in the *Routledge Handbook of Celebrity Studies* (Routlegde, 2018), *the Palgrave Companion to Posthumanism in Film and Television* (Palgrave Macmillian, 2015), and in journals such as *a/b: Auto/Biography studies*, *Biography*, *Narrative*, *Image and Text*, *Journal of Postcolonial Writing*, and others.

David Roden teaches at the Open University, UK. His published work has addressed the relationship between deconstruction and analytic philosophy, philosophical naturalism, the metaphysics of sound, and posthumanism. He contributed the essay "The Disconnection Thesis" to the Springer Frontiers volume *The Singularity Hypothesis: A Scientific and Philosophical Assessment* (Springer, 2013). His book *Posthuman Life: Philosophy at the Edge of the Human* (Routledge, 2014) considers the metaphysical, epistemological, and ethical implications of the existence of posthumans: powerful nonhuman agents produced by human-instigated technological processes. Other representative publications include "Radical Quotation and Real Repetition" in *Ratio*: *An International Journal of Analytic Philosophy*

(Blackwell Publishing, 2004); "Nature's Dark Domain: An Argument for a Naturalized Phenomenology (Cambridge University Press, 2013)" in the Royal Institute of Philosophy Supplement, *Phenomenology and Naturalism* (2013); "Sonic Arts and the Nature of Sonic Events" in *Review of Philosophy and Psychology* (Springer, 2009).

Johanna Seibt is Professor of Philosophy at the Department for Philosophy and the History of Ideas at Aarhus University, Denmark. Her current research interests are in process ontology and philosophy of technology with focus on the ontology of social robotics. She is the director of the *Research Unit for Robophilosophy*, and founder and main (co-)organizer of the biennial *Robophilosohy Conference Series*. She is co-editor of *Robophilosophy—Philosophy of, for, and by Social* Robotics (MIT Press, forthcoming) and of *Sociality and Normativity for Robots—Philosophical Perspectives* (Springer, 2017); her work is published in philosophical journals but also, in interdisciplinary collaborations, in the journals of Human-Robot Interaction Research. As PI of a large interdisciplinary research team, she is currently working out the method of "Integrative Social Robotics," where Humanities expertise contributes to the development of responsible (i.e., culturally sustainable) social robotics applications.

Sharon L. Snyder's career includes a range of work as an author, artist, activist, and filmmaker. Her books include *Narrative Prosthesis: Disability and the Dependencies of Discourse* (University of Michigan Press, 2000); *Cultural Locations of Disability* (University of Chicago Press, 2005); and *The Biopolitics of Disability: Neoliberalism, Ablenationalism, and Peripheral Embodiment* (University of Michigan Press, 2015). She has also edited three collections: *The Body and Physical Difference: Discourses of Disability* (University of Michigan Press, 1997); *A History of Disability in Primary Sources*, volume 5 of *The Encyclopedia of Disability*; *The Matter of Disability* (Sage Publications, 2005). as well as authored more than thirty-five journal articles and chapters. She has curated a museum exhibit on disability history at the National Vietnam Veterans Memorial Museum, curated disability film and arts programming for festivals and conferences, and created four award-winning documentary films: *Vital Signs: Crip Culture Talks Back* (1995), *A World without Bodies* (2002), *Self Preservation: The Art of Riva Lehrer* (2005), and *Disability Takes on the Arts* (2006).

Stefan Lorenz Sorgner is a philosophy professor at John Cabot University in Rome and is director and co-founder of the Beyond Humanism Network, Fellow at the Institute for Ethics and Emerging Technologies (IEET), Research Fellow at the Ewha Institute for the Humanities at Ewha Womans University in Seoul and Visiting Fellow at the Ethics Centre of the Friedrich-Schiller-University in Jena. He is editor of more than 10 essay collections and author of the following monographs: *Metaphysics without Truth* (Marquette University Press, 2007), Menschenwürde nach Nietzsche (WBG, 2010), Transhumanismus (Herder, 2016; English translation by the Penn State University Press 2020, entitled On Transhumanism), Schöner neuer Mensch (Nicolai, 2018), Übermensch (Schwabe, 2019). In addition, he is Editor-in-Chief and Founding Editor of the Journal of Posthuman Studies (a double-blind

peer review journal, published by Penn State University Press since 2017). Furthermore, he is in great demand as a speaker in all parts of the world (World Humanities Forum, Global Solutions Taipei Workshop, Biennale Arte Venezia, TEDx) and a regular contact person of national and international journalists and media representatives (Die Zeit, Cicero, Der Standard; Die Presse am Sonntag). www.sorgner.de.

Mads Rosendahl Thomsen is Professor of Comparative Literature at Aarhus University, Denmark. He is the author of *Mapping World Literature: International Canonization and Transnational Literature* (Bloomsbury Academic, 2008), *The New Human in Literature: Posthuman Visions of Changes in Body, Mind and Society* (Bloomsbury Academic, 2013), a co-author with Stefan Helgesson of *Literature and the World* (Routledge, 2019), and the editor of several books, including *World Literature: A Reader* (Routledge, 2012), *The Posthuman Condition: Ethics, Aesthetics and Politics of Biotechnological Challenges* (Aarhus Universitetsforlag, 2012), *Danish Literature as World Literature* (Bloomsbury Academic, 2017), and *Literature: An Introduction to Theory and Analysis* (Bloomsbury Academic, 2017). He has published in the fields of literary historiography, modernist literature, world literature, canonization, and historical representations of the posthuman. He is a member of the Academia Europaea (2010–), the advisory board of the Institute for World Literature (2010–13, 2018–22), and of the executive committee of the International Comparative Literature Association (2016–22).

Pieter Vermeulen is Associate Professor of American and Comparative Literature at the University of Leuven, Belgium. He is the author of *Romanticism after the Holocaust* (Bloomsbury, 2010) and *Contemporary Literature and the End of the Novel: Creature, Affect, Form* (Palgrave Macmillan, 2015), and a co-editor of, most recently, *Institutions of World Literature: Writing, Translation, Markets* (with Stefan Helgesson; Routledge, 2015), *Memory Unbound: Tracing the Dynamics of Memory Studies* (with Lucy Bond and Stef Craps; Berghahn Books, 2017), and a double special issue of *LIT: Literature Interpretation Theory* on contemporary literature and/as archive (with Tom Chadwick; Routledge, 2019–20). He has just finished writing a critical introduction on literature and the Anthropocene for Routledge.

Jacob Wamberg is Professor of Art History, dr.phil., at Aarhus University. He works on an evolutionistic theory of the visual arts, especially in relation to world-making, technology, and biosemiotics. His present focus is posthuman aspects of avant-garde art. He is the author of *Landscape as World Picture: Tracing Cultural Evolution in Images* (Aarhus University Press, 2009, two volumes), and he has edited the anthologies *Art & Alchemy* (Museum Tusculanum Press, 2006), *Totalitarian Art and Modernity* (Aarhus University Press, 2010, with Mikkel Bolt Rasmussen), *The Posthuman Condition: Ethics, Aesthetics and Politics of Biotechnological Challenges* (Aarhus University Press, 2012, with Kasper Lippert-Rasmussen and Mads Rosendahl Thomsen), and *Art, Technology and Nature: Renaissance to Postmodernity* (Ashgate Publishing, 2015, with Camilla Skovbjerg Paldam).

Alexander Wilson is a Canadian researcher with the Institute of Research and Innovation,

Centre Pompidou, Paris (France). He is the author of *Aesthesis and Perceptronium: On the Entanglement of Sensation, Cognition, and Matter* (University of Minnesota Press, 2019). From 2015 to 2018, he held a post-doctoral research position in Communication and Culture at Aarhus University (Denmark), where he examined the logical and material conditions of cognition in regard to technogenesis, technological pessimism/optimism, the digitalization and automation of contemporary life, and the specter of the posthuman. He formerly held an assistant professorship at Concordia University, Montreal (Canada). He is currently based in Berlin (Germany).

ACKNOWLEDGMENTS

Introduction

MADS ROSENDAHL THOMSEN AND JACOB WAMBERG

Posthumanism has become an umbrella term for numerous recent analyses of our world and its prospects for future development. Despite a range of often dizzyingly diverse sub-positions, its common denominator is a break with a pervasive, if often unacknowledged, assumption: that humanity is somehow separate from the rest of the universe and constitutes a center for orientation—a basic set of measures, values, and points of views—from which no judgment can escape, whether pertaining to science, philosophy, politics, or everyday practices. To be sure, some theories breaking with this human exceptionalism are often referred to as post-anthropocentric, but here we take the perhaps bold step of seeing posthumanism and postanthropcentrism as basically synonymous, choosing posthumanism as the governing term. Although obviously facilitated by the secularized Western cultures that emphatically positioned the human individual as the center of everything—from democratic politics, to the epistemologies of science, to subjectivist aesthetics—the exceptionalist thinking with which this encompassing posthumanism breaks harks back to ancient humanism and the monotheistic religions, in which God appeared as the superhuman male who appropriately created "man" in his own image.

A dramatic blow was dealt to human exceptionalism, and its basis in patriarchal hierarchies, when Darwin ([1859] 1860) determined that humans are only a late product of a multi-million-year-old natural evolution—a shock that has deepened with the later clarification that *Homo sapiens* is an accidental outlet of a whole delta of primate predecessors. Strangely enough, only recently have the logical futuristic consequences of this thinking been pursued: the question of what sorts of beings will follow—indeed be generated by—humans. The so-called posthuman, a central member of the group of theoretical notions crowding under the posthumanist umbrella, implies that in the next evolutionary step, the specialty of human culture, technology, will outdistance natural selection as the prime driver of genesis. Today, there are multiple reasons for taking up the challenge of this line of thinking, which already on the level of technology dissolves human exceptionalism with regard to both its centrality and status as evolutionary endpoint. Thus, these aspects of posthumanism are deeply involved in pursuing ethical and political concerns raised by

technology, and also are a major source of inspiration for a variety of arts such as bioart, robotic art, and transmedial science fiction.

Increasingly, however, the posthuman and its blatantly utopian theoretical matrix, transhumanism, have been joined by a range of other theoretical positions that we also choose to present here (although again some researchers would prefer "postanthropocentrism" as guiding term). Indeed, one of the most divisive questions in this expanded field of posthumanism has emerged between the "properly" posthuman—that is, the possibility of technology-aided development that would result in cyborgs, genetically altered humans, or even an artificial intelligence that wholly outstrips humans—and, on the other hand, a less specific post-anthropocentric understanding of the world that stretches from theorizing on the Anthropocene to diverse branches of new materialism, such as speculative realism and a generalized vitalism. The editors of this volume find that these other fields are too important to be ignored, although there are numerous examples of criticism from which the acknowledgment of diverging perspectives is lacking. Put bluntly, the transhumanist perspective may often be reduced to "as long as an improved human is achieved, the rest hardly matters," while at times, criticism from scholars focusing on the Anthropocene seems to hold that "humans change everything, except themselves." But do we really have to choose between body-centered optimism and environment-directed pessimism? Both sides matter, and indeed become more relevant by challenging each other.

We want this book to encompass the dissensus in the field, rather than smooth away questions that may be uncomfortable or not universally shared. There are many positions within posthumanism: it is possible to be post-anthropocentric without referring to the posthuman condition, just as it is possible to be anti-humanist while acknowledging the Anthropocene. Similarly, it is possible to promote the use of technology for the better of humankind while regarding climate change as the most important contemporary challenge.

Whether or not you are a techno-optimist, it would be an understatement to say that technological development has been rapid in the past century. Nanotechnology, biotechnology, information technology, and cognitive science (the so-called NBIC) are just a few examples of what was not available at the end of the nineteenth century, at least not in a form that we can recognize today. Such innovations have an impact on daily lives and the globe, and they contribute to shaping our intellectual outlook, as they should. However, that does not mean that posthumanism could not have come into being without a world whose human-developed technology accelerated so rapidly. In a global perspective, we find especially in many pre-industrial cultural traditions a less pronounced degree, or total absence, of human exceptionalism that confirm Cary Wolfe's statement that posthumanism comes both before and after humanism (2010: xv–xvi).

The dramatic development of a more fluid understanding of gender in the past decades is one of the clearest examples of movements that, in hindsight, may be construed as posthumanist, although not primarily driven by technological considerations. Although the questions of how to define gender, and legislate accordingly, make for an ongoing debate, it is nevertheless obvious that the binary division into male and female has been thoroughly contested, both biologically in for example the recognition of intersex individuals, and psychologically and culturally, in the recognition of a spectrum of genders. In many respects,

what has been remarkable in this process is that corporate and public institutions have been ahead of the general public's perspective, making it possible to declare one's gender in more than two ways, or to abstain entirely from being gendered. Many countries now make allowances for not declaring oneself male or female in official documents, for example, in passports, thereby providing a significant sign of a departure from a mode of thinking of humanity that was largely uncontested a few decades ago.

Still, the increasing impact technology exerts on the world, and even on the conditions for thinking and conceptualizing, cannot be ignored. It seems, for instance, almost ironic to note that at the same time that we more or less universally recognize human rights, and counter racist agendas with solid biological observations about a shared humanity, the very construct of human unity that supports such principles is under pressure due to technological developments. Although this unity is maintained more by moral and legal constraints than by technical capacities, there is reason to worry that humanity may split into a myriad of incompatible beings due to technological developments prolonging lives or turning bodies into cyborgian hybrids.

Posthumanist thinking is ambitious in its pursuit of finding better ways of dealing with our hypercomplex world. Some posthumanist writers have been criticized, for example, Bruno Latour by Alan Sokal, for being unscientific or opaque in their insistence on pursuing new roads to make sense of the world, a criticism that may not always be unfounded, but also ignores that with the ambition to break away from traditional humanist schemata come struggles of finding new languages that better capture the changed roles of humans in the biosphere. At the end of the day, there is an immense responsibility weighing down on the only globally political creature of the Earth. After all, at least 98 percent of the mass of land-based vertebrate life is either human, or their pets or livestock. That it is within our reach to recreate otherwise extinct species only adds to this responsibility, and in turn, the level of reflection in a time when the concerns of posthumanism are also at the forefront of societal debates.

Even if this handbook is organized around topics, reading through the chapters reveals a number of posthumanist critics who reappear and tend to be lumped together, even if most of them are not restricted to single positions, and a few of them actually avoid the use of the notion posthumanism or related terms. Sometimes referred to as "critical posthumanists," authors such as Donna Haraway (2016a), N. Katherine Hayles (1999), and Rosi Braidotti (2012) have been fascinated by the prospect of the technologically modified body, but consistently tend to interdisciplinary perspectives that, in their later writings, let biological life come more pervasively to the fore, whether as the Chthulucene (Haraway 2016b), nonconscious cognition (Hayles 2017), or the self-organizing life of *zoe* (Braidotti 2012). Some critics, for example Cary Wolfe (2010), Timothy Morton (2016), and Ursula K. Heise (2016), have supplemented their principal posthumanist or post-anthropocentric theorizing with more focused contributions to ecocriticism. In striking contrast to critical posthumanism, transhumanism still emerges as the branch of posthumanism that insists on technological progress, with Nick Bostrom as the best-known academic figure, along with a number of more independent writers and activists such as Ray Kurzweil (2005), Max More and Natasha Vita-More (2013). This is the line of thinking that received highly critical, neo-

humanist resistance from social scientist Francis Fukuyama (2002), who thereby, paradoxically, made posthumanism more mainstream in academia.

Then there are new materialist critics, such as Bruno Latour (2007) and Karen Barad (2006), whose work has been seminal in developing decentered models for action—actor-network theory (ANT) and the notion of intra-action, respectively; lately, the former has even tried to supplement ANT by an intense questioning of our situation in the Anthropocene (Latour 2017 [2015]). Even when representing highly diverse positions, from relationalism to object ontology, other new materialist philosophers, such as Jane Bennett (2010) and Graham Harman (2016), have been most consequential in their sheer insistence on the importance of materiality in the attempt to steer away from the human-centered perspective. In any case, the diversity of sources that are drawn upon shows that field-specific knowledge—of a branch of ethics, of art history, of certain technologies—is extremely important to raising the level of inquiry, once the field has been defined. Often, the devil is in the details of the many concrete questions and dilemmas that have emerged. The effects social robots have on humans, for instance, cannot be deduced abstractly but needs studies that cut across anthropology, psychology, and philosophy. Similarly, it is the gray areas in the use of new medicines that are revealing rather than the clear-cut examples of what to use and not to use.

THE STRUCTURE OF THIS BOOK

The Bloomsbury Handbook of Posthumanism is divided into four sections that cover the essential topics of the vast and varied field of posthumanism. The first section, "Paradigms and Transformations," frames posthumanism in relation to a number of guiding concepts, beginning with humanism and continuing through other pivotal perspectives, such as the Anthropocene, transhumanism, and the ahuman. The second section, "Ethics," surveys a number of fields that give rise to new ethical considerations in an era of post-anthropocentric thought and technological development. From relations with nonhumans to the question of the unity of humanity and human rights, the questions of rights, opportunities, and identity appear quite different than they used to not too long ago, when cyborgs, artificial intelligence, and selection of fertilized eggs based on genetic analysis were at best a vision in science fiction and not part of a pressing reality. The following section, "Technology," gives a broad, if selective, view of technologies that already have, and may be projected as having, a profound influence on the human condition. Finally, "Aesthetics" takes up the many ways that different forms of art and popular culture have either responded to aspects of posthumanism, or projected new developments. In contemporary art, the jury is still out on its predictive powers, but in hindsight there are numerous examples of how the human fictitious imaginary has taken part in shaping human futures.

PARADIGMS AND TRANSFORMATIONS

In this opening section, we intend to outline some of the main posthumanist movements, and which sorts of developmental paths they establish as prototypical and react against. Obviously, humanism is an archetypical target, and so in Hans Ulrich Gumbrecht's opening

chapter we explore those educational ideals and ethical concerns, together with that "distance of the everyday from coherent mythologies or religions" that humanism already presented in its first appearance, in Greco-Roman times. Although it always promoted Ciceronian philanthropy, in its heyday in the nineteenth century, humanism was legitimized by those contingent aspects of the emancipated human spirit that were left out of Descartes' more universalizing description of this inward side of the human, the *res cogitans*. Nevertheless, as is further elaborated in Karin Kukkonen's chapter, "The Self and Subjectivity: Why the Enlightenment Is Relevant for Posthumanism," the narratives that structure this contingency, from collective to personal histories, were already splintering in the eighteenth century, when several of posthumanism's core concerns, such as the entanglement of self and environment, shared animal and human experience, and subjectivity in a mediated and technologized age, were becoming central concerns. For that reason, Stefan Sorgner's chapter "Transhumanism" may characterize this ultra-progressionist movement as "humanism on steroids," and emphasize its basis in a combination of empirical naturalism and rational logic of the enlightenment kind, which later gives transhumanism a stronghold in Anglo-American analytical philosophy.

Humanist concerns for corporeal and mental autonomy do impose certain limits on how far down into the Enlightenment's bosom posthumanism's roots go. As is evident in Rick Dolphijn's chapter, "The Non-Human, Systems, and New Materialism," glimmers of the dissolution of Descartes' and Kant's notions of human exceptionalism already appear in the work of Marx, Freud, and Nietzsche, and this has been foregrounded by diverse posthumanist movements since the 1970s, for instance in Prigogine and Stengers' problematization of the nature-culture divide derived from systems and complexity theory, and in Gregory Bateson's extended ecological thinking, and its imprints in Manuel DeLanda and Rosi Braidotti, via Deleuze and Guattari. When we move into the Anthropocene (or "peak humanity") paradigm, analyzed in Pieter Vermeulen's chapter, a decisively pessimistic note is struck, in which posthuman turns into posthumous in the "world of wounds" that human technologies are now involuntarily spreading. Whatever sense of universality remains in this wasteland, which especially turns the global South into its victims, arises from a shared sense of a catastrophe.

Against this apocalyptic background, "The Ahuman" emerges as an almost healthy disgust with the human, which Patricia MacCormack links to everything from human reproduction to nationalism and other forms of violent exclusion. The goal of ahumanism—not knowing the world, and thinking through worlds in nonhuman ways, despite the impossibility of predicting those ways—unexpectedly borders on the perhaps most radical version of posthumanism, its speculative variant, analyzed in David Roden's chapter, "Posthumanism: Critical, Speculative, Biomorphic." In the radically unmeasured world striven for by Speculative Posthumanism, even critical posthumanist ethics directed at cyborgs or the open life of *zoe* emerge as obsolete humanist leftovers.

As may already be deduced from this brief overview, trekking around the theoretical terrain of posthumanist paradigms is an often bewildering and contradictory experience. Nevertheless, the final chapter of this section, Jacob Wamberg's "Rising Negentropy, Evolutionary Reboots, and Gaia as Attractor: Toward a Map of Contemporaneous

Posthumanist Positions," presents the thesis that to a large extent, this experience may be ascribed to the remnants of humanist dualism. In a syncretic fusion, a theoretical Anthropocene that fuses progress and regression, negentropy and entropy, into a notion of evolutionary reboot, the posthumanist positions may be construed as re-actualized evolutionary layers in a spatial contemporaneity.

ETHICS

Ethics bring a particularly unruly set of variables to the divergent posthumanist paradigms, and address concerns that include (post)human rights, regulating the limits of enhancement, and properly decentering the human in a broader ecological vision of equality among species. Ursula K. Heise's chapter, "Environmentalisms and Posthumanisms," unfolds the human subject positions that follow from different sorts of environmentalism, and how these affect questions of (post)human responsibility. Although we now tend to move away from older forms of environmentalism that separated human subjects from a wilderness whose virginal character was accordingly romanticized, a thorough decentering of the human in the natural environment may compound the dilemma of fleeting human responsibility. Matters become even more complicated when we attempt to translate ethical concerns into actual politics for nonhumans, for, as Iwona Janicka reminds us in the chapter "Nonhuman Politics and Its Practices," the term "politics" references that which nonhumans, by definition, do not possess: an institutional structure (*polis*) and the power of speech (*logos*). And outside the human sphere, social theory still lacks ideas about which entities may count when negotiating world-building, and how we may differentiate them. However, drawing on Latour in particular, Janicka believes that linking new materialism to anarchist practices, thereby generating an experimental politics of activism, could be a way forward.

Ethics also address questions of gender, a phenomenon that, as noted, has undergone a rapid transformation from a stable binary to a complex biosocial phenomenon. Posthuman fluid gender has effects on rights, reproduction, social order, and individual self-representation. In the chapter "Posthuman Feminist Ethics: *Unveiling Ontological Radical Healing*," Francesca Ferrando explores the question of what feminist, posthumanist ethics would entail, and how they may be positioned vis-à-vis the struggles for change in a broader Anthropocene landscape. If race, like gender, has become a contested category in posthuman cultures, race nevertheless lives on as an instrument of oppression. In "Race, Technology, and Posthumanism," Holly Flint Jones and Nicholaos Jones use the figure of the posthuman to criticize concepts of race, and in particular, the way that racialization may be seen as a mechanism used to control, and even enslave people.

When posthuman efforts to turn humans into cyborgs accelerate the diversification of *Homo sapiens* already taking place with respect to parameters such as gender and ethnicity, it is quite logical that a break with the idea of a unified humanity must follow. In the chapter "The Unity of Humanity," Steve Fuller examines a number of ways that such a branching out of humanity could take place, and have already historically been conceived, including religious and racial divisions. In leaving behind a unified humanity, Fuller observes two fundamental directions: "downwingers" *Infra-Foucault*, in which posthumans become

submerged in animality, and "upwingers" *Ultra-Hegel*, in which transhumans break decisively with natural history. The question of what rights should be recognized, including whether and which nonhumans should have protective rights, is explored in Upendra Baxi's chapter, "Toward Posthuman Human Rights?". However, Baxi predicts complex social consequences of artificial intelligence, and thinks enhancement "may turn out to be vastly inegalitarian."

Posthumanism is closely connected to criticism of the human as an essentially able-bodied individual, since humans are in fact quite differently abled, including the lengths of their lifespans. In their chapter "Disability, Neo-Materialism, and the Biopolitics of the Project of Western Man: Toward a Posthumanist Disability Theory," David T. Mitchell and Sharon L. Snyder present a materialist perspective on disability, which becomes almost paradigmatic of posthumanism, since it criticizes normative privilege, and exposes the body to complex hybridization with technological devices. Therefore, the distinction between therapy (reinstating normalcy) and enhancement (transcending normalcy) becomes increasingly problematic, as Sarah Chan notes in the chapter "Therapy, Enhancement and the Posthuman." As medicine and other treatments advance, "we will need some other way of evaluating interventions, as well as to encourage publics and policy-makers to think more critically about the distinction and its usefulness."

TECHNOLOGY

Predictions of technological development tend to age poorly, and we anticipate that some of the agendas discussed here will look very different in a couple of decades. Even foreseeable phenomena, such as self-driving cars and autonomous humanoid robots, float in a sort of limbo where prototypes will be implemented while risks and benefits are still being assessed. In all likelihood, we will overestimate the importance of some existing technologies, and fail to predict future inventions that have the potential to radically affect the world.

Four articles closely relate to technological influences on the human body. In the chapter "What Can We Learn from Eugenics?," Nicholas Agar takes up the question of a traumatic legacy that has moved from the sphere of governmental practice to citizens' individual choices. For instance, in the age of what Jürgen Habermas has called "liberal eugenics," we already see a much lower birth rate of children with Down's syndrome. As dilemmas hover between paradigms of individual transhuman enhancement and generalized posthuman disability, there is no reason to think that there will be fewer of them in the future. Societies' ethical stances will also be put to the test in the sphere of medicine, for, as Søren Holm demonstrates in the chapter "The Medicalization of the Posthuman Transformation Trajectory," dependence on medical support leads to increased pressure to finance new medical procedures. However, in a world of limited resources, priorities will have to be set in a decision space that includes many actors. In the third contribution, "Life Extension and the Pursuit of Immortality," Andy Miah shows how hope for life extension or immortality has a long cultural history, in contexts from religions to contemporary science fiction. Even if radically extended lives may not be around the corner, research into the possibility of creating longer lives threatens to again divide humanity into those who have access to such

treatments and those who do not.

Finally, in the chapter "Sport, Technoscience, and Posthumanist Athletics," Rayvon Fouché focuses on the dilemmas of using prosthetics in sports. Since sports claim an ethos of fair competition—that is, an ethos of competition among unaided bodies—the pervasive use of prosthetics challenges the very notion of sports. Nevertheless, with enormous amounts of money and media attention at stake, athletes' bodies are under great pressure to perform better, and in practice, all kinds of technologies have been used to optimize performance. As in the case of Oscar Pistorius, the disabled athlete whose specially designed leg blades made him able to outdistance able-bodied runners, the dilemma will be how to determine who can compete with whom, and under which circumstances.

Computing is another world-changing force. At the same time that it is possible to build machines that are superior at playing increasingly difficult games, from chess to Go, the internet, which was unknown to most people in the early 1990s, has become so pervasive that many young people in industrialized countries dread being offline, and one billion mobile phones have transformed commercial conditions in Africa. However, there are also many worrying aspects, such as surveillance, existential isolation, and the commodification of personal data. David Chandler's "Data and Information in the Posthuman Sensorium" shows how the exponential increase in data has profoundly changed the experience of agency, from everyday practices to governance approaches.

In all likelihood, the next level of computer-driven change lies in the development of artificial intelligence. Machine learning already influences people in their daily lives, but the final step toward a general artificial intelligence has not yet been taken. It is, though, a part of the collective imagination of the future and perhaps most unsettling and interesting when it appears in the form of a humanoid robot. Johanna Seibt argues that social robots present a particular pressing issue as they are treated as surprisingly full subjects by their human collaborators and consequently raise a series of questions to what human nature might constitute. Finally, Cathrine Hasse addresses the question of education, which will be increasingly embedded in a technological context, as well as in an idea of the human subject as an interconnected being whose learning should be informed by a more complex understanding of human and nonhuman actors and networks.

AESTHETICS

Although various sorts of intellectual thought provide more or less precise models of posthuman scenarios, the whole field of aesthetics—from perception, to art, to popular visual culture, including everyday body cultures—offers more sensually engaging and indeterminate and open ways of approaching a field that is notoriously difficult to imagine. In Alexander Wilson's chapter, "What Aesthetics Tells Us about Posthumans," the posthuman condition itself emerges as a turn to indeterminacy, one governed by what the ancient Skeptics called *epoche*, suspension of judgment. This epistemological and aesthetic indeterminacy is interpreted as a sign of evolutionary risk-taking that echoes the evolutionary reboot described in Wamberg's article in section 1. Dissolving the boundary between negentropic self and entropic other, the so-called *Markov blanket*, indistinction may lead to a

higher flexibility to act in the fitness landscapes modeled by complexity theory, in which individual selves with their too-narrow adaptation become isolated on negentropic peaks.

If we move to the concrete molding of aesthetics in the various arts, Mads Rosendahl Thomsen's chapter, "Literature's Humanist Posthumanism," describes literature as a prime medium for exploring the conflictual field between individualism and more de-individualized fields of subjectivity. Throughout its varied historical contexts, literature has always transcended simple communication and offered a highly varied medium for giving nonhumans voice, and in which humans could explore more distributed and directly nonhuman ways of being situated. Rosendahl Thomsen observes that despite its transhistorical presence, this tendency acquires particular relevance with the posthuman and Anthropocene turn. As regards the visual arts, their exchange with the posthuman is approached via reconfigured notions of time in Pernille Leth-Espensen's chapter, "Posthuman Temporalities in Science and Bioart." As is manifestly demonstrated by artworks that focus on the way tissue cultures can live outside the bodies from which they were sourced—indeed, how these cultures may survive the death of these bodies—the posthuman concerns a dissolution of linear time, as much as the spatial distribution of subjectivities. Whereas such biotechnological explorations are typically foregrounded in discussions of the arts' relation to the posthuman, this is, however, not so with the avant-garde music discussed in Stefan Sorgner's chapter on "Music." Sorgner considers this art's prime posthuman characteristic a dissolution of the humanist subject/object dualism. Wagner's music drama was an early forerunner of this posthuman tendency, and it peaks in the work of twentieth-century composers such as John Cage and Morton Feldman, often facilitated by marked technological mediation.

Aesthetic approaches to the posthuman field are by no means limited to the avant-garde aspects of the fine arts; they pervade popular cultural phenomena such as mainstream film and television, comics, and computer games. Although Ivan Callus, in his chapter "Posthumanism in Film and Television," does observe a certain overemphasis of literary examples as illustration in scholarly texts on posthumanism, he demonstrates how film and television are vanguards in molding the popular imaginary of posthumanism, from science fiction proper, to explorations of corporeal hybridity, to futurist faction. Moreover, these media keep upholding a promiscuous exchange ecology with each other. As we learn from Edward King's chapter "Digital Comics and Unstable Interfaces," an early popular—and still humanist—version of the posthuman, for example, appears in the transmedial figure of the superhero who is densely connected to eugenics and fascist hopes of the perfectability of the human body. Yet in the last decades the popular portrayal of the posthuman has become much more complex, with cyborgs and assemblages invading media not only on the level of motives, but in their very visual languge. For instance, in the digital sphere of comics, the effects of temporal continuity associated with film and animation are broken up and alienated when moving images appear within the grids and windows of the old-fashioned comic strip.

Jaqueline Berndt makes similar observations on the mixed graphic language of Japanese anime in the chapter "Anime's Situated Posthumanism: Representation, Mediality, Performance." Although its puppet-like or cyborgian figures appear uncanny when seen through the techno-Orientalist lens through which this genre is typically received in the

Western sphere, this is less pronounced in its country of origin, where distinctions between the animated and non-animated have never been so rigid. As Kelly I. Aliano demonstrates in her analyses of computer games, "Ready Player Two: The Digital Avatar as Extension of Self," the posthuman dissolution of individual identity may in fact reach right out to the consumer. Here we approach the condition described in Ernest Cline's 2011 novel, *Ready Player One*, in which the online gaming platform offers its participants a true "second life" in the virtual realm, "an escape hatch into a better reality." However, in the aesthetic field, it is impossible to predict whether the realities we approach with the posthuman are in fact utopian or dystopian. In Pramod Nayar's overview of how conception and progeny appear in futurist accounts of literature and popular visual culture, "Precarious Lives in the Age of Biocapitalism," the dystopian aspect is clearly dominant. No matter where human bodies originate, in the uterus or the petri dish, they are treated as patentable, possessable objects.

We hope that this handbook will provide a useful map of the posthumanist field as well as inspire to see new connections and new challenges that arise across the many intricate and interwoven subjects. Although some scholars may maintain that the fault lines of posthumanism remain more conspicuous than its common denominators, the whole unruly field comprises both a crucial theoretical subject of our time and a dazzling perspective on the past and future.

SOURCES CITED

Barad, Karen M. *Meeting the Universe Halfway: Quantum Physics and the Entanglement of Matter and Meaning*. Durham: Duke University Press, 2006.

Bennett, Jane. *Vibrant Matter: A Political Ecology of Things*. Durham: Duke University Press, 2010.

Braidotti, Rosi. *The Posthuman*. Oxford: Polity Press, 2012.

Darwin, Charles. *On the Origin of Species by Means of Natural Selection, or the Preservation of Favoured Races in the Struggle for Life*. New York: D. Appleton and Company, [1859] 1860.

Fukuyama, Francis. *Our Posthuman Future: Consequences of the Biotechnology Revolution*. New York: Farrar, Straus and Giroux, 2002.

Haraway, Donna J. *Manifestly Haraway*. Minneapolis: University of Minnesota Press, 2016a.

Haraway, Donna J. *Staying with the Trouble: Making Kin in the Chthulucene*. Durham and London: Duke University Press, 2016b.

Harman, Graham. *Immaterialism: Objects and Social Theory*. Cambridge: Polity Press, 2016.

Hayles, N. Kathrine. *How We Became Posthuman: Virtual Bodies in Cybernetics, Literature, and Informatics*. Chicago: The University of Chicago Press, 1999.

Hayles, N. Katherine. *Unthought: The Power of the Cognitive Unconscious*. Chicago and London: University of Chicago Press, 2017.

Heise, Ursula K. *Imagining Extinction: The Cultural Meanings of Endangered Species*. Chicago: University of Chicago Press, 2016.

Kurzweil, Ray. *The Singularity Is Near: When Humans Transcend Biology*. New York: Penguin Books, 2005.

Latour, Bruno. *Reassembling the Social: An Introduction to Actor-Network-Theory*. Oxford: Oxford University Press, 2007.

Latour, Bruno. *Facing Gaia: Eight Lectures on the New Climatic Regime*. Translated by Catherine Porter. Cambridge and Medford, MA: Polity Press, 2017.

More, Max, and Natasha Vita-More, eds. *The Transhumanist Reader*. West Sussex: John Wiley, 2013.

Morton, Timothy. *Dark Ecology: For a Logic of Future Coexistence*. New York: Columbia University Press, 2016.

Wolfe, Cary. *What Is Posthumanism?* Minneapolis: University of Minnesota Press, 2010.

Paradigms and Transformations

CHAPTER ONE

Humanism

HANS ULRICH GUMBRECHT

On June 8, 1960, in a session of his seminar on the "Ethics of Psychoanalysis" dedicated to Sophocles' "Antigone," Jacques Lacan recommended his students that, while he agreed with the erudite view of Sophoclean tragedies as standing halfway between "rootedness in archaic ideals" and a different, more individual-oriented "pathos, sentimentality, criticism, and sophistry," they should not associate this typological position with the concept and the values of "Humanism": for "we consider ourselves to be at the end of the vein of humanist thought" (Lacan 1992: 275). Lacan based this historical diagnostic on the observation of a "splitting" in the "relationship of man to the signifier," and saw himself in proximity to Claude Lévi-Strauss "when he attempts to formalize the move from nature to culture or more exactly the gap between nature and culture."

As so often with arguments from Lacan's seminars, it seems difficult—or impossible indeed—to agree on an ultimate meaning of the phenomena he is pointing to, here with the intention to explain his impression of having arrived "at the end of the vein of humanist thought." But whatever may have triggered this statement, it anticipated by several years the famous final paragraph of Michel Foucault's book *The Order of Things* where the author dared to "bet that," after having emerged around 1800, "the concept of 'man' will vanish like a face drawn into the sand at the border of the sea."[1] Similar to Lacan, Foucault did not feel ready to predict under what specific circumstances "the face" and the concept of being human would disappear ("nous pouvons tout au plus pressentir la possibilité" [398]), and even less so was he able to say how this form might be replaced one day. Foucault was quite

precise, by contrast, in referring to the time "around 1800" as the moment of its first emergence.

In today's retrospective, the 1960s may appear as an early stage within a movement at whose tail end we find ourselves, that is as an early stage in the process of growing fragility about a conception of being human which during much of the nineteenth and the twentieth centuries had been regarded as meta-historical—or at least as a definitive achievement of human self-understanding. In Central Europe and in North America, the intellectual years following the end of the Second World War, with its hitherto unimaginable humanitarian catastrophes, had been energized by an astonishingly optimistic belief in the possibility of redirecting the course of humankind toward the values of Enlightenment and the "project of Modernity." This belief, however, turned into impatience and frustration, culminating in the youth protests of 1968, when it became clear that an atmosphere of restoration had established itself instead of the high-flying ideals of humanistic progress (see Gumbrecht 2013). The subsequent reactions of incipient skepticism may have been the driving force behind Lacan's and Foucault's intuition about the imminent end of traditional "Humanism."

*

Different from the days of those first and vague uncertainties, we are now drowned by an oversupply of suggestions as to what forms of self-reference and life may have substituted (or should substitute in the future) the traditional notions of being human. There is a need and a market indeed for handbooks that distinguish and individually describe the fast-expanding horizon of meanings that we give to words like the "posthuman" or the "transhuman" (see, for example, Braidotti and Hlavajova 2018). If in 1967, one year after the publication of Foucault's *Order of Things*, Jacques Derrida paradoxically—and also famously—stated on the opening pages of *Grammatology* that "we had left behind metaphysics" and the human self-reference inherent to it, "without being able to go beyond" (Derrida 1974: 20ff). I believe that today we have departed toward truly new, different, and sustainable conceptions of what it might have become "to be human." Otherwise documentary volumes like the one of which this text belongs had no reason to exist. Now under the title of "Humanism" it is not my assignment to penetrate into the intellectual jungle of all those descriptions and definitions of new forms of being human that can be seen either as the result of a historical transformation or as a consequence of more normatively oriented suggestions toward better collective and individual life forms.

What I will try to narrate instead are two prehistories of our present which, in the majority of its voices, wants itself "posthuman." I will offer a history (including its own prehistory) of the emergence of the conception of "Humanism" that dominated large segments of the Western nineteenth and twentieth centuries, and I will then continue with the trajectory, starting in the early to mid-twentieth century, of that ever-growing fragility undercutting the notions and conceptions of "Humanism." Needless to say that no such narrative can claim to be all-comprehensive or objective. What I will therefore have to present is obviously my own version of that story, a version whose central idiosyncrasy may lie in the close connection (already announced by Foucault) that I see between the emergence of the so-called "historical

world view" from 1780 to 1830 and the simultaneous shaping of the concept of "Humanism"; a version of the story of "Humanism" also whose main goal will be to provide clear contours for an epistemological reconstruction that lends itself to comparisons with (already existing) competing narratives.

*

The long prehistory of the "Humanism" that we now seem to leave behind started in Roman Antiquity, and it did so based on a distinction which quite surprisingly resembles the semantic contrast lying at the foundation of "Humanism" after 1800. If the late Roman Republic and the earlier imperial period were times when thinkers intensely debated what being human was and should be like, this seems to suggest that a distance of the everyday from coherent mythologies or religions has long been a premise and a condition for such discussions. During the third quarter of the second century AD indeed, the grammarian Aulus Gellius noted how the word "humanitas" was mainly invoked by his contemporaries in the Greek sense of "paideia," that is, for an "education and training in the liberal arts," whereas another meaning of the word that Cicero had used simultaneously, namely, "philanthropy" as a positive feeling toward all men without distinction, was largely abandoned (Gellius 2006: 17). More than 1,600 years later, in 1808 the Bavarian educational commissioner Friedrich Immanuel Niethammer would coin the neologism "Humanismus" (in the exact meaning of "paideia") to describe the curriculum, mainly based on texts from Greek and Roman antiquity, that he wanted to introduce to the Gymnasium of his State, while his larger political environment cultivated generous ideas of equality and freedom for all human beings promoted by the bourgeois Revolutions (in the sense of "philanthropy").

The seeming continuity connecting Roman antiquity with the early nineteenth century through the contrast between those two meanings of "Humanism" hides a more complex history in which their distinction, rather than being stable, needed to be reinvented. For in its very different idea of humans being shaped by a monotheistic God and inhabiting the world as an all-comprehensive divine creation, medieval theology had by no means shared the premises of classical anthropocentrism. Against the medieval background, Renaissance scholars rediscovered Aulus Gellius and his two notions of "Humanism"—but this was not yet the beginning of a "Humanism" linked to the historical worldview that I believe we have inherited from the nineteenth and twentieth centuries. The logical and historical precondition for its slow emergence was a human self-image as outside observer of the material world whose ontological distance from the world followed from a purely spiritual self-reference in the style of Descartes' "cogito ergo sum." It was this spiritual outside observer who first elevated reason and rationality to the levels of absolute norms and criteria for any kind of world appropriation.

*

The rise of the historical worldview, together with a reshaped conception of "Humanism" as its core dimension, did not start before self-observation in the act of world observation became habitual (to the degree of inevitable) among intellectuals ("philosophes" in the

French koiné of that time) during the third quarter of the eighteenth century.[2] It is quite easy to document how almost immediately two new concerns sprang from this structural innovation on the level of human self-reference. In the first place, a self-observing world observer had to realize how each experience of individual objects and persons depended on his or her particular point of view, and as the potential numbers of such points of view appeared infinite, the result was a potential infinity of representations in relation to each object of reference. For many "philosophes" this new condition of absolute contingency turned into an existential challenge (sometimes indeed into an existential nightmare). The second problem came from the rediscovery of the body and the senses as a medium of world appropriation through self-observing world observers, and it led, within eighteenth-century "Materialism," to new questions regarding the (in)compatibility between (rational) world appropriation through the spirit and its concepts and (material) world appropriation through the body and its senses.

Looking back we can see how both problems, the problem of contingency and that of Materialism, soon found "solutions" thanks to epistemological changes that were then not experienced as solutions. From the late eighteenth century on the intellectual problems of Materialism became increasingly bracketed as peripheral (without ever being actively repressed or excluded). The problem of contingency, by contrast, got absorbed by a shift from a mirror-like principle of world appropriation (as it had for example oriented the "Encyclopedias" as a favorite genre of Enlightenment) to a narrative form of world appropriation. Since around 1800, questions about the identity of places or institutions received "historical" answers; questions about objects of Nature triggered "evolutionary" narratives; and even Hegel's first book, *The Phenomenology of the Spirit*, gave a narrative answer to the question of what the spirit was.

This shift toward narrative forms can be understood as a "solution" (or "absorption") of the problem of contingency because narrative discourses are capable of integrating different representations of individual objects of experience and of presenting them as a philosophically "necessary" and meaningful sequence. Hegel's philosophy explored and systematized this new and all of a sudden "inevitable" relationship to the world[3] that would yield the historical worldview as a temporality that also contained a different human self-reference. Through the historical worldview the future appeared, probably for the first time in Western culture, as an open horizon of possibilities from which humans believed they could choose and that they wanted to shape; the past seemed to recede behind the present and to lose all value of orientation the further distant from the present it became; the present itself was experienced as an "imperceptibly short moment of transition."[4] Most importantly and centrally from the perspective of "Humanism," this short present of the historical worldview became the epistemological habitat for a (Cartesian) self-reference of being human as purely spiritual ("Subjekt" is the German concept in question) and capable of shaping the future, based on experience extracted from the past (this is exactly what we call "agency" today). Finally time, within the historical worldview, functioned as an inescapable agent of change.

By 1830, this conception had found such intense resonance and acceptance all over the Western world that it was not only appreciated as an ultimately "true" conception of human existence but also became the epistemological ground for a new, democratic conception of

politics, based on equality (a purely spiritual self-reference does not allow for fundamental difference and hierarchy) and on agency over the future (as allowed by an open future). It would offer a basis for Socialism and Capitalism (both needed an open future), and for a "Humanism" that, besides agency, self-determination, and a completion of the knowledge about the world, called for an ongoing self-shaping as "Bildung" (see Clemens 2015). According to Foucault (1966), humans thus turned for the first time into both the Subject and the Object of description, analysis, and investigation in the now emerging "Humanities" ("Sciences Humaines," "Geisteswissenschaften") (360–366)—and it is interesting to see how the majority of the European languages used the root of the word "Humanism" to baptize the cluster of academic disciplines rising from that matrix since the late nineteenth century.

*

If the historical worldview, with its inherent conception of "Humanism," emerged as the overwhelmingly strong institutional matrix of the West, a different epistemological configuration coming from the eighteenth century, that is the epistemology underlying "Materialism," had been pushed, as I said before, to the intellectual periphery without ever being actively repressed. In this other worldview, presupposed and practiced by authors and artists like Diderot, Lichtenberg, Goya, or Mozart (see Gumbrecht, forthcoming), the growing impression of (and even indulging in) contingency as the result of self-observation becoming habitual had never been absorbed by a shift toward narrative patterns of representation. Instead of "History" with its narrative discourses, judgment became central here as the ongoing everyday practice of coping with the world's complexity. Human self-reference, as illustrated by the title hero of Diderot's "Neveu de Rameau," never turned completely spiritual, and "Materialism" (in the original eighteenth-century meaning, rather than in that of Karl Marx) remained high on the intellectual agenda here.

One would probably go too far in giving to this peripheral syndrome the status of an elaborated and coherent "epistemology." But I think that it did remain on the Western intellectual horizon throughout the nineteenth and early twentieth centuries as a repertoire of alternative, often less anthropocentric ideas and motifs that never quite came together as a legacy or as a tradition with full self-awareness. And yet it was capable of occasionally challenging the established "Humanism" together with the historical worldview. In this sense and almost paradoxically, we may today adopt traces of that peripheral intellectual style as a prehistory of our own, more programmatic posthumanism. Schopenhauer's philosophy is such a case, with its concept of the "will" as an impersonal principle of unrest that permeates human existence and provokes change without ever coming together in the form of a trajectory. Even more so we should refer in this context to Nietzsche's temporality of the "eternal return," as a counter-concept to History, combined with the "will to power" as energizing humans in a not exclusively spiritual surge. The young Martin Heidegger was still at a distance from thinkers like Schopenhauer and Nietzsche but with the concept of "Dasein," introduced and developed in "Being and Time" from 1927, he re-inserted a both spatial and bodily component into human self-reference, undermining thus the hitherto dominant epistemological configuration of the Humanities where humans were at the same

time Subject and Object of observation. At the same time, Heidegger anticipated a philosophical fascination of our present by giving the moment of facing one's own death (death in its "Jemeinigkeit") the central place in his conception of human existence.

During the years of the Second World War it was the concept of History that entered a zone of multiple revisionary critiques. In his "Theses on the Philosophy of History" written in 1940, Walter Benjamin's "angel of History" would turn its back to a future that was no longer open for a German-Jewish author with leftist leanings (after the Soviet Union had joined Nazi-German in non-aggression treaty) and would concentrate, in an empathetic view, on the victims of the past. Eight years later, Heidegger's former Jewish student Karl Löwith published his book *Meaning in History* trying to argue that any attempt at extracting philosophical meanings from the past implies the risk of feeding into totalitarian ideologies.

What intellectually dominated the post-war years, however, were good-intentioned efforts of returning to basic values of "Humanism," now seen as features of individuality that had been abused (or at least neglected) by the competing ideologies. Jean-Paul Sartre's lecture "L'Existentialisme est un Humanisme" from October 1945 was a landmark event on this level. With his tendency to detach individual self-reference from overarching conceptions of History, he gave the dimension of freedom a new centrality that he highlighted with his formula of "being condemned to freedom." No philosophy, one might say, had ever been more anthropocentric than mid-twentieth century Existentialism where even traditional forms of institutional life turned into objects of individual choice. But when a year after Sartre's emblematic lecture Jean Beaufret invited Heidegger to comment on that new conception of "Humanism," he provoked the most drastic alternative to the tradition.

In his "Letter on Humanism" which also, more clearly than any other text, marked the "turning" ("Kehre") between Heidegger's earlier and later work, he not only commented with meticulous skepticism on Sartre's radically (or naively) anthropocentric philosophy and the ensuing tonality of a melancholic moral optimism; Heidegger's main provocation and philosophical point came with a basic shift regarding the concept of "thinking" that he no longer attributed to humans as their defining activity but to "Being" ("Sein") as an extra-human and extra-cultural instance supposed to confront and engage human life without being accessible to any human interpretations or control.[5] Truth, since the "Letter on Humanism," was no longer knowledge produced by human world observations for Heidegger but the self-unconcealment of Being (as depending on Being's own initiative) to which, as an event, human "Dasein" can only contribute with an attitude of "serenity" ("Gelassenheit"). Likewise, history of Being ("Seinsgeschichte") was considered as the irregular sequence of times in which such self-unconcealment of Being became an either more or less likely event, independently of human effort or agency. With the own post-war present identified as standing on the verge of possible truth events of Being, the traditional thinking and the language of philosophers (or "Metaphysics," as Heidegger also called it here) seemed to have arrived at its ultimate decline: "The thinking of the future (i.e., the thinking happening in Being) is no longer philosophy, because the thinking of the future thinks in a more fundamental ('ursprünglicher') way than Metaphysics …. The thinking of Metaphysics is on the decline towards the poverty of its essential preliminarity" (Heidegger 2004: 364). If Extentialism around 1950 had pushed the classical anthropocentrism of "Humanism" to the

limit, it is difficult to imagine a less anthropocentric philosophical position than that of Heidegger's work since the "Humanismusbrief"—and this may well give the texts from his later years a specific appeal in our present situation.

By comparison and despite their intuitions about "Humanism" and the historical worldview being close to their end, Lacan and Foucault had still been thinking and writing from within the framework of traditional Western epistemology. Foucault above all expected the face of "Humanism" to ultimately disappear according to time's function as an inescapable agent of change. Jean-François Lyotard systematically criticized this paradigm for the first time in a small book from 1979 under the title *La condition postmoderne*. It mainly referred to the "grands récits," that is, the master narratives of the historical worldview and of the Hegelian tradition. The point Lyotard made was elementary and therefore polemically efficient: if those master narratives, in their origin, had been an antidote to an overwhelming contingency as it had emerged from self-observation in the act of world observation, how could they possibly justify their claim of not being contingent themselves? What followed from this question, as a cultural style that liked to present itself as "postmodern" (in the intended meaning of "post-historical"), was an affirmation of any kind of polyperspectivism leading to the dissolution of grand historical narratives into a multiplicity of regional stories.[6]

I will not pay any attention to the exuberant and obsessive discussions about an essence (or a "definition") of "postmodernity" and about the "defense of the project of Modernity" against it, as they occupied much of the intellectual life during the 1980s, because they often deteriorated into a thinking that tried to capture the spirit or the essence of the own present as a specific moment—and thus turned fully historical again, losing out of sight the progressive fading of "Humanism" and of "History" as concepts and as institutions. By contrast, the end of State Socialism, as the one ideology that had remained in political power and with it of the Cold War during the years following 1989, had an incomparably more decisive impact. It gave new intensity and resonance to the idea, articulated for the first time in the 1930s (if not already in Nietzsche's philosophy), that History—and with it "Humanism"—might now really have reached its ending.[7]

*

While there is no doubt that History and "Humanism" have survived until the present day in certain pockets of Western societies, above all in the academic world and in parliamentary politics (that cannot exist without the belief in an open future), most humans today inhabit a temporality in their everyday lives that is profoundly different from the historical worldview in whose center "Humanism" had shaped itself.[8] When we wake up in the morning, our future no longer appears to be an open horizon of possibilities from which we can choose and which we can shape. Rather it is filled with multiple threats that seem to come from the future toward us: global warming and the ongoing climate change, the overpopulation of the planet, and the exhaustion of natural resources.[9] Likewise, our past no longer recedes and falls behind a moving present. Largely (but not exclusively) thanks to electronic memory storing capacities, we can no longer forget the past, and it thus inundates the present. This

also is the reason why even the temporality of History will not disappear but coexist and compete with the new temporality of the Broad Present that cannot fully replace it. Between this aggressive past and a future filled with threats, our new present is no longer an "imperceptibly short moment of transition" but an ever-broadening present whose growing complexity contains everything that we know and that we can possibly imagine. It indeed surrounds us as a broad present of simultaneities.

Now if the short present of the historical worldview was coupled to a purely spiritual ("Cartesian") self-reference, that is to the self-reference of classical "Humanism," its transformation in the broad present explains why the body and the senses have had such a strong comeback during the past decades, both in the ways we think philosophically about being human and in our everyday practices (the astonishing recent career of sports, both as a popular fascination and as a daily exercise, illustrates the point well). We may also say that this new human self-reference has culturally caught up with the concept of "Dasein" through which, for purely inner-philosophical reasons, Heidegger had replaced the Cartesian notion of the "Subject" in the early twentieth century. And in the larger context of all these changes we have finally re-learnt, against the grain of "History," to imagine conditions in which time is no longer an inescapable agent of change.

Intellectuals should live up to these new conditions of time and think our new present in a non-historical, that is, in a non-narrative way. As long as we don't manage to do so (as it is the case with my own essay), we can of course recur to the excuse that we prefer to write under the premises of the historical worldview that has not yet vanished (and probably never will). But the more powerful and productive challenge should indeed be, in the long run, a description of the broad present's interior as a simultaneity of different scenarios that will not be connected in a narrative sequence.[10]

*

Without of course claiming to provide an all-comprehensive or even exhaustive description, I will finish this text by describing our present of the early third millennium in three scenarios, which, against the inevitable sequentiality of textual writing and reading, want to be understood and imagined as a simultaneity indeed. The first picture starts out from the new human self-reference that has recuperated the body and connects it with the concept of a different broad present, that is with the concept of the "Anthropocene." We will see how the Anthropocene and "Dasein" converge in a perspective that thinks human existence from the perspective of its vulnerability and mortality. In the second picture, I will presuppose that while until recently we have been living our everyday as a (limited) "field" of contingency, it has now turned into an overwhelming "universe" of contingency. What are the frustrations and desires (among them political frustrations and desires) with which we have reacted and will still react to this challenge? Finally, I will refer to an irresistible passion with which mostly young specialists today are working on the creation of an intelligence that might become superior to human intelligence and that therefore implies an obvious risk of collective human self-annihilation. This risk may well be the most dramatic contrast, in our present, to the old "Humanism" and its benign focus on self-preservation. Without alluding to

any philosophical "necessity" (in the sense of the historical worldview) it will become clear, especially with the first and with the second scenario, how their internal problems and structures show a surprising affinity with some of the central motifs of the peripheral, and never fully institutionalized epistemology from the eighteenth century—that has also never fully vanished.

First used during the final decades of the twentieth century, we can certainly characterize the notion of the "Anthropocene" as propagating a comparatively broad conception of the present. As it draws the line of its beginning with the first detrimental impact of humans on the planet's ecosphere (and thus on our survival as a species), different semantic versions give different ranges of temporal expansion to the Anthropocene. One can certainly identify symptoms of such detrimental impact in any (even very early) traces of human culture but the more common versions of the concept have the ecological problems begin with nineteenth-century industrialization. The future within the Anthropocene, by contrast, is less controversially evoked by the imagination of a vanishing of the human species from the planet—which gives the concept an unavoidably apocalyptic connotation.

Larger or shorter, the extension of the Anthropocene has been filled with at least three different discourses that are today emblematic and influential for the ways we conceive of ourselves as physical beings. In the first place, there is a moralistically (almost preacherly) charged narrative that speaks of a more or less imminent end of humankind as a punishment for its ecological "sins" and sometimes also for its existential eccentricity. More morally and politically efficient are, secondly, attitudes and texts based on the hope that we still have the chance, through improved ecological behavior, to play a less damaging role in relation to our physical environment and to thus extend and secure sustainability for human life. There is, however, a potential paradox inherent to this vision. On the one hand, it implies the assumption of an ecological proximity between humans, animals, and plants; but on the other hand, it seems to exempt us, through the work toward sustainability of humankind, from the regularities and from the logic of evolution to which animals and plants seem submitted. More plausible from an ecological point of view and above all more realistic appears the concrete question about standards of human life that we have become used to and that we can predict will no longer exist within a few decades. What degrees of deterioration will we then be willing to accept in order to postpone and to keep at a distance of many generations the end of humankind? Or, more radically, if the vanishing of humankind became inescapable or if we found unbearable the price to pay for an extended survival, which would be conditions that allowed humans to leave the planet in a dignified way (and I am aware of how unbearable many fellow humans must find such an aesthetic perspective on the future vanishing of humankind).

Now while, under the premise of a no longer Cartesian self-reference, the philosophical (and probably also the popular) attention has shifted from death as the ultimate challenge for individual life to the "death" of the human species, complexity has steeply increased in our perception of the everyday world. Since the middle of the eighteenth century, as we have seen, the primary perception of the world occurred in the form of contingency, that is with multiple perspectives from which objects and persons could be interpreted. While the historical worldview absorbed such multiplicity in narratives of transformation, the more

"lateral" epistemology reacted to it by acts of judgment. In both cases, however, contingency appeared surrounded by zones of "necessity" and "impossibility," that is on the one side by objects of experience each of which was attached to one and only one cogent interpretation or reaction ("necessity") and, on the other side, by objects that humans could imagine but not identify as being accessible to themselves ("impossibility").

During the past three decades, I think, and largely under the impact of electronic technology, these zones of "necessity" and "impossibility" have considerably melted and thus transformed the everyday from a "field" into a "universe" of contingency, with the existential effect of an intensified complexity that we have to face. Here are two examples. It used to be a premise of human self-experience that the genitals with which a person was born had the status of "necessity" (or "fate"), independently of her or his feelings about this dimension of identity. Transsexual surgery has now begun to transform such necessity into an object of choice (and thus into contingency). On the other side, humans have always been able to imagine forms of life that they had to exclude from their own reality (and they often attributed them to divine beings): omniscience and almightiness, ubiquity and eternity. Quite obviously, computers have meanwhile promoted omniscience and ubiquity to almost normal dimensions of our everyday life, while eternal life, that is an existential situation where we can choose the extension of our existence, has become a target for medical research.

We should for sure appreciate the more than partial vanishing of the zones of necessity and impossibility as a decisive conquest of individual freedom. But it also results in a loss of shape for human existence and in an over-complexity of everyday experience that is hard to bear—for intellectuals as much as for people with little education. For our new present is not only a broad present that contains past and future, it has also increasingly replaced institutional forms of orientation by openness for universal choice. We therefore increasingly experience our everyday life as an exhausting process of intransitive mobilization that ultimately leads nowhere (the "burnout syndrome"), and we sense a—politically problematic —longing for "strong figures" with whom we can connect through the elementary medium of resonance instead of conversation, debate, and judgment. An alternative—promising and precarious—way of coping with the world as a universe of contingency is to engage in movements of intensity that can take us from existential entropy to a negentropy of life forms and to the bliss of social proximity—but only with the risk of becoming addicted the enhancers of intensity.

Compared to the times of "Humanism" within the historical worldview, the two scenarios evoked in order to illustrate dimensions and modalities of human existence in our broad present imply a decline of self-determination and agency—a decline that, paradoxically, appears to be the consequence of a hyperbolic conquest in potential agency and choice. Exceptionally and by contrast, agency has had a hyperbolic rise of energy in the present-day work toward the creation of an artificial intelligence supposed to become superior to human intelligence. Such an intelligence would and will be the ultimate transhuman product, a product also, as I already mentioned, that will inevitably imply the threat for us humans of being challenged, overwhelmed, and annihilated by something "beyond ourselves" that we created. As Heidegger's "unconcealment of Being" would be misunderstood as a secular form of the formerly divine (and mostly benign) "revelation," we might well imagine the

end-product on the way to artificial and its possible impact as an aggressive "unconcealment of truth." And yet people who are able to contribute to this process never seem to hesitate in going the unknown way toward the ultimate danger. Being self-destructive continues a serious temptation for posthuman Humanity.

These three scenarios (and there must be many more of them) coexist but are not synchronized (let alone coordinated as "complementary") within the broad present. Their uncontrolled interactions and interferences may turn out explosive and thus anticipate artificial intelligence as a force toward the annihilation of humankind. Sometimes I have the impression that "political correctness" (not only in the United States and not only in academia) is functioning as a system of behavioral prescriptions along the lines of traditional "Humanism" (or simply as a lid) that blinds and thus protects us against the horror scenarios of the broad present that we inhabit.

---

ranslated from the end of the following passage in *Les Mots et les Choses* (Foucault 1966: 398): "Si ces dispositions venaient à disparaìtre comme elles sont apparues, si par quelque événement dont nous pouvons tout au plus pressentir la possibilité, mais dont nous ne connaissons pour l'instant encore ni la forme ni la promesse, elle basculaient, comme le fit au tournant du XVIIIe siècle le sol de la pensée classique– alors on peut parier que l'homme s'effacerait, comme à la limite de la mer un visage de sable." For the reception history of this quote, see Klaus Birnstiel (2016).

ee, for a more detailed description of the emergence of the historical worldview, Hans Ulrich Gumbrecht and Michael Rössner (2017).

ee Foucault (1966: 231): "Mode d'ètre de tout ce qui est donné dans l'expérience, l'Histoire est ainsi devenue l'incontournable de notre pensée."

formula coined by Charles Baudelaire in "Peintre de la Vie Moderne" (2013 [1863]).

or a more extensive attempt at understanding Heidegger's philosophy after the "Kehre," see my book: *Production of Presence: What Meaning Cannot Convey* (2004).

ayden White had anticipated this tendency in his particularly successful book *Metahistory* ([1973] 2015).

rom a reception perspective, the most emblematic text of the 1989-moment was Francis Fukuyama's Nietzsche-inspired essay "The End of History" (1989).

or more detailed illustrations of this thesis, see my book: *Our Broad Present* (2016).

personally believe that most of those threats are "for real"—but this is not even the question here. Real or not, they block our new future against utopian projects and against the traditional historicist expectation of regular "progress."

1 1997, long before the development of this description of a new temporality, I published a book under the title *In 1926: Living at the Edge of Time,* which tried to describe a year of the past without using any narrative structures. Although this had not been (and could then not be) my explicit intention, Marcelo Jasmin has interpreted it as a reaction to the emergence of the "broad present" (see Jasmin 2018).

SOURCES CITED

Baudelaire, Charles. *Le Peintre de la Vie Moderne*. Paris: Mille et une nuits, 2013.
Birnstiel, Klaus. *Wie am Meeresufer ein Gesicht im Sand: Eine kurze Geschichte des Poststrukturalismus*. München: Wilhelm Fink, 2016.
Braidotti, Rosi, and Maria Hlavajova, eds. *Posthuman Glossary. Theory in the New Humanities*. New York: Bloomsbury, 2018.
Clemens, Manuel. *Das Labyrinth der ästhetischen Einsamkeit: eine kleine Theorie der Billdung.* Würzburg: Königshausen

& Neumann, 2015.

Derrida, Jacques. *Of Grammatology*. Baltimore: Johns Hopkins University Press, 1974.

Foucault, Michel. *Les Mots et les Choses: Une Archéologie des Sciences Humaines*. Paris: Gallimard, 1966.

Fukuyama, Francis. "The End of History." *The National Interest*, 16 (1989): 3–18.

Gellus, Aulus. *Attic Nights XIII*. Cambridge: Harvard University Press, 2006.

Gumbrecht, Hans Ulrich. *Production of Presence: What Meaning Cannot Convey*. Stanford: Stanford University Press, 2004.

Gumbrecht, Hans Ulrich. *After 1945: Latency as Origin of the Present*. Stanford: Stanford University Press, 2013.

Gumbrecht, Hans Ulrich. *Our Broad Present: Time and Contemporary Culture*. New York: Columbia University Press, 2016.

Gumbrecht, Hans Ulrich. *Prose of the World: Diderot, Goya, Lichtenberg, and Mozart*. Stanford: Stanford University Press, 2020.

Gumbrecht, Hans Ulrich, and Michael Rössner. "Zum Zeitbegriff in den Geisteswissenschaften." *Akademie im Dialog 10*. Diskussionsforum an der Österreichischen Akademie der Wissenschaften, July 23, 2017, https://www.oeaw.ac.at/fileadmin/NEWS/2018/PDF/Akademie_im_Dialog_10.pdf.

Heidegger, Martin. "Brief über den 'Humanismus'." In *Gesamtausgabe: 1. Abteilung: Veröffenlichte Schriften 1910–1976*, edited by Friedrich-Wilhelm von Herrmann. vol. 9. Frankfurt: Vittorio Klostermann, 2004, pp. 313–63.

Jasmin, Marcelo. "Formas da História e da Temporalidade: Revisitando 'Em 1916' de Hans Ulrich Gumbrecht." *Arte e Filosofia*, vol. 25 (2018): 121–30.

Lacan, Jaques. *The Ethics of Psychoanalysis 1959–1960: The Seminar of Jaques Lacan*. Edited by Jaques-Alain Miller, translated by Dennis Porter. New York: W. W. Norton, 1992.

White, Hayden. *Metahistory: The Historical Imagination in Nineteenth-Century Europe*. Baltimore: Johns Hopkins University Press, [1973] 2015.

CHAPTER TWO

The Self and Subjectivity: Why the Enlightenment Is Relevant for Posthumanism

KARIN KUKKONEN

"Posthumanism" can imply a wide range of diverse concerns. The approaches assembled under this tag, however, are surprisingly consistent when it comes to their rejection of Enlightenment arguments about subjectivity and the self. Romanticism, Modernism, and Transcendentalism clearly inform posthumanist thinking about the self and subjectivity, while the Enlightenment appears to be everything that posthumanism is not. This chapter will challenge that assumption and demonstrate that many of posthumanism's core issues, such as the entanglement of self and environment, animal and human experience, and subjectivity in a mediated and technologized age, were already central concerns of the Enlightenment. Rather than paint a conclusive picture about the Enlightenment, I propose to highlight certain aspects of this period, diverse and enamored with debate as it was, in order to outline how claims about the self and subjectivity raised by the posthumanist mainstream in fact echo through the centuries.

POSTHUMANISM AND THE PROBLEM WITH SUBJECTS

"The proper study of mankind is man" ([1743] 2016: 28). No other claim is perhaps as provocative to posthumanism as this statement from Alexander Pope's *An Essay on Man*.

Posthumanism revolts, per definition, against such a privileging of the human. Posthumanism further finds that this perspective is due to Enlightenment constructions of subjectivity and its concept of the "liberal self" that independently judges, conquers, and owns the world. A brief survey of the foundational works of posthumanism can illustrate how fundamental this revolt is to the approach. N. Katherine Hayles, in *How We Became Posthuman* (1999), argues for "transforming the liberal subject, regarded as the model of the human since the Enlightenment, into the posthuman" (xiv). "It signals the end of a certain conception of the human, a conception that may have applied, at best, to a fraction of humanity who had the wealth, power and leisure to conceptualize themselves as autonomous beings exercising their will through individual agency and choice" (1999: 286). The option of a subject and a self that dares to think is open only to a select group, it is argued, excluding the disabled and the non-conscious, nonhuman animals, and machines from a share in "humanity."

Cary Wolfe, in *What Is Posthumanism?* (2010), positions the posthuman approach as moving past "the fantasies of disembodiment and autonomy inherited from humanism itself" (xv). Timothy Morton relates the notion of the human subject to an understanding of "nature," as perceived through human eyes and minds, an environment made graspable and useful, in *Ecology without Nature* (2007). Rosi Braidotti, in *The Posthuman* (2013), more specifically details the understanding of the "human" rejected as "that creature familiar to us from the Enlightenment and its legacy: 'The Cartesian subject of the cogito, the Kantian "community of reasonable beings" or, in more sociological terms, the subject as citizen, rights-holder, property-owner and so on'" (1; citing Cary Wolfe). We witness "the possible crisis and end of a certain conception of the human," says Stefan Herbrechter (2013: 3). Pramod Nayar's introduction to *Posthumanism* (2014) condenses these attitudes toward the Enlightenment as follows: "Posthumanism as a philosophical approach involves a rethinking of the very idea of subjectivity because it sees human subjectivity as an assemblage, co-evolving with machines and animals" (8). Eighteenth-century philosophy and cultural theory, these posthumanist accounts imply, have nothing to say on any of these issues, and, as they came to shape Western perspectives on the self and subjectivity, this stopped us from understanding these assemblages and entanglements properly.

The posthuman subject, as it unfolds from these discourses, is embedded in its natural environment, inextricably linked to the animals and vegetation around, and fused with technology. It is posited in contrast to a conception of the Enlightenment subject that appears to master the environment, think about it abstractly and reasonably, and devise and control machinery and technologies of knowledge. Indeed, the Enlightenment heritage comes to be identified with proponents of transhumanism, who argue for human self-enhancement and the ultimate transcendence of bodily limits. Wolfe cites Nick Bostrom's outlining of the intellectual pedigree of transhumanism in Enlightenment thinkers like Kant and clarifies, "my sense of posthumanism is the *opposite* of transhumanism, and in this light, transhumanism should be seen as an *intensification* of humanism" (2010: xv). Most proponents of posthumanism would agree (see, for example, Braidotti 2013: 102).

Timothy Morton's *Ecology without Nature* already indicates in the title that there is a difference between posthuman "ecology" and humanist "nature," and Morton is careful to trace the different modes of understanding such relatedness across the centuries. "Nature," in

Alexander Pope's *Essay on Man*, for example, refers to an underlying, ideal configuration of the world that can be brought to the fore in the design of artworks, landscape gardening, etc. Nature, in other words, becomes the world as it is shaped by humans. Posthuman "ecology" does not hold such pleasant vistas. It refers to the world as it exceeds human capacities to perceive, understand, and reason. The phenomenology of the Anthropocene is replete with plastic gyres in the Pacific and melting icebergs, moving too slowly for the human to understand their significance. Climate change, pollution, and their effects on our planet might be man-made, but it is notoriously hard to perceive them and grasp them conceptually. In another publication, Morton (2013) dubs these "hyperobjects," because they go beyond the traditional "objects" to which the subject relates itself. As our understanding of "object" changes, however, also the understanding of the "subject" needs to change, and here the posthuman comes in.

Rosi Braidotti explicitly proposes a post-anthropocentric formulation of subjectivity. She writes, "Posthuman subjectivity expresses an embodied and embedded and hence partial form of accountability, based on a strong sense of collectivity, relationality and hence community-building" (2013: 49). Hers is a "nomad subject" that relates itself tightly to all of *zoe*, that is, self-organizing and intelligent matter, be it described in terms of human, animal, or human-animal. The "nomad subject" does not argue for animal rights based on the model of human rights, conceiving of the nonhuman other as modeled on the human, but rather understands that these are all expressions of *zoe*, "life," and stresses that they "develop a comprehensive eco-philosophy of becoming" (2013: 104). Speaking of Pope's adage that the proper study of mankind is man in the past tense, Braidotti continues that "it seems to follow that the proper study of the posthuman condition is the posthuman itself. This new knowing subject is a complex assemblage of human and nonhuman, planetary and cosmic, given and manufactured, which requires major readjustments in our way of thinking" (2013: 159). The interrelatedness of the posthuman subject therefore goes even beyond the expressions of *zoe*, its "companion species" (Haraway 2003) and ultimate symbioses (Wohlleben 2016), and reaches into the cybernetic and machine-driven. Katherine Hayles in particular has contributed to this aspect of posthumanism with publications from *My Mother Was a Computer* (2005) to *Unthought* (2017). As Nayar observes, posthumanism "does away with the mind/body dualism but also refuses a centralised mechanism of consciousness that has been the foundation of liberal humanism" (2014: 38). Donna Haraway's "Manifesto for Cyborgs" (2004) points toward the "leaky distinction" (10) between human, animal, and machine, and sees a distinct source of empowerment in overcoming old dualisms. "We are all chimeras, theorised and fabricated hybrids of machine and organism; in short: we are cyborgs" (8).

Agency and subjectivity, then, are distributed in posthumanist thinking. They extend beyond the boundaries of the head and the individual human body and into the environment, pulsing through neuronal, embodied, and algorithmic conduits. Consciousness is also conceptualized as an emergent property in posthumanist discourses, based on Luhmann's systems theory and notions of autopoiesis in neo-cybernetics (Maturana and Varela 1980). Bruno Latour's ANT ("actor-network-theory" [2005]) and Andy Clark and David Chalmer's notion of the "extended mind" (see Menary 2010) can be considered related endeavors;

without explicitly signing up to posthumanism, these thinkers aim at a distributed understanding of actions involving human agents, objects, and discursive structures. Posthumanist thinking is no longer rooted in the individual subject but emerges from linked symbiotic structures, systems, and networks within which biological and artificial bodies are enmeshed.

POSTHUMANISM'S ENLIGHTENMENTS

Posthumanist accounts, more or less, take as a given that the Enlightenment self privileges rationality, autonomy, and the human as an exclusive category. And, after stating the problems with this model of subjectivity, they move swiftly to their main business of opposing it. Cary Wolfe begins *What Is Posthumanism?* with the observation that "most definitions of humanism look something like the following one from Wikipedia" (2010: xi), without further consultation of the sources. The posthumanist project understands itself as theorizing a change in consciousness about what it means to be human, but it does not relate this change to the complexities involved in the historically previous change in consciousness that took place in the Enlightenment. With the exception of Morton's *Ecology without Nature*, it is rare to find Locke's *Essay Concerning Human Understanding,* Hume's *Enquiry Concerning Human Understanding*, or any of Kant's *Critiques* in the sections of works cited in these volumes, and Pope is usually only referenced for the single verse from *An Essay on Man*.

At first glance, Rosi Braidotti makes a second exception here, because she relates her posthumanist theorizing explicitly to the seventeenth-century philosopher Baruch de Spinoza in *The Posthuman* (2013), building on earlier work on "the nomadic subject" (1994, 2011). She describes the perspective change to *zoe* and its expressions in terms of "The Spinozist switch to a monistic political ontology [that] stresses processes, vital politics and non-deterministic evolutionary theories" (2013: 95). However, in order to make this "switch," she does not consult Spinoza but rather Deleuze and Guattari. Braidotti argues explicitly for an "up-dated braid of Spinozism" (2013: 86) and the need to read Spinoza through these twentieth-century exegetes. As Thomas Abrams (2017) has pointed out, Braidotti engages with Spinoza exclusively as he has been interpreted by Deleuze in *Expressionism in Philosophy* (1990) and *Spinoza: Practical Philosophy* (2001), which Adams criticizes from the point of view of disability studies. In this, Braidotti is an indicative case. Posthumanists in general seem to take their understanding of the Enlightenment from postmodern and poststructuralist thinkers. Cary Wolfe appears to reference Kant's "Was ist Aufklärung?" (What Is Enlightenment?) in the title of his book *What Is Posthumanism?* (2010), but actually he draws on Foucault's treatment of Kant, also entitled "What Is Enlightenment?" (1984), rather than the Enlightenment philosopher himself. Wolfe repeats what he perceives to be Foucault's assessment of the enlightenment. "Humanism is, in so many words, its *own* dogma, replete with prejudices and assumptions" (2010: xiv). Wolfe also draws on *The Order of Things,* and he is particularly interested in Foucault's analyses of how subjectivity is constructed through Enlightenment discourses. Wolfe then comes to the conclusion that the mirage of rationality depends on its creation of madness as an alternative. Bodies, as detailed

in Foucault's *Discipline and Punish,* are contained and controlled in the name of rationality in prisons and hospitals, and minds come to be categorized in psychological wards. Further reference points for posthumanism's relationship to the Enlightenment are Jean-François Lyotard's *Postmodern Fables* (1997) and *The Inhuman* (1991).

When Foucault writes, however, that "man is only a recent invention" (1994: xxiii; cited in Wolfe 2010: xii), he refers to the modern episteme of the nineteenth century and not the classical episteme of the Renaissance and Enlightenment. More specifically, Foucault writes, "man, as a primary reality with his own density, as the difficult object and sovereign subject of all possible knowledge has no place in [the Classical *episteme*]" (1994: 310). The Enlightenment, as Foucault describes it, understands the "human" differently, and there is a paradigm shift between the classical episteme and the modern episteme. The notion of Enlightenment subjectivity as devised by posthumanism does not fit with the classical episteme that depends on an "ordered continuity of beings" in patterns of representations (1994: 308). Indeed, as we shall see, some of the proponents of eighteenth-century thought about natural philosophy (not mentioned by Foucault) turn away from "privilege" and "order" in their accounts to devise a take not too different from what posthumanism thinks of as an assemblage. Similarly, Foucault's "What Is Enlightenment?" sees the Enlightenment (and Kant in particular) as non-dogmatic, a critique that constitutes "work on our limits" (1984: 50). Indeed, Kant discusses human duty to nonhuman animals in several writings (see Kain 2018); it is, rather, later discussions that understand the Enlightenment as caught in its own rational dogma (see Horkheimer and Adorno 1987) and limit their accounts to the human exclusively (see Habermas 2003).

As Herbrechter (2013) points out, for posthumanism it is not enough to historically locate the blame for unpleasant and restraining aspects of subjectivity in the Enlightenment. The critique of the Enlightenment and its constructions of subjectivity fuels the mission statements of posthumanism. "Wolfe [and others] propose that the tacit speciesism or anthropocentrism which underlies the idea of subjectivity will have to become the central target of posthumanist critique" (Herbrechter 2013: 199). "Once we removed meaning from the ontologically closed domain of consciousness, reason, reflection, and so on," Wolfe promises, the human experience can be rethought, and posthumanism "also insists that we attend to the specificity of the human—by being in the world, its ways of knowing, observing and describing—by (paradoxically, for humanism) acknowledging that it is fundamentally a prosthetic creature that has coevolved with various forms of technicity and materiality, forms that are radically 'non-human' and yet have nevertheless made the human what it is" (2010: xxv). Or, as Braidotti argues, "Posthuman knowledge—the knowing subjects that sustain it—acts a fundamental aspiration to principles of community bonding while avoiding the twin pitfalls of conservative nostalgia and neo-liberal euphoria" (2013: 11). Braidotti is certainly right to warn of these problems, and the Enlightenment (or rather its popular caricature) continues to exert an unfortunate appeal for "conservative nostalgia and neo-liberal euphoria," as for example Steven Pinker's *Enlightenment Now* (2018) demonstrates. However, it is perhaps not necessary to cast the Enlightenment in the part of posthuman's "other" once we take a closer look.

WHAT IS ENLIGHTENMENT, THEN?

On closer inspection, the "humanist past" looks very little like the image of the subject trapped in a panopticon, suffering from delusions of grandeur, that posthumanism paints.

> Know then thyself, presume not God to scan;
> The proper study of Mankind is Man. ([1743] 2016: 28)

Epistle II in Pope's *An Essay on Man* does not start with triumphant trumpets. Pope asserts that "the proper study of Mankind is Man" precisely because we are profoundly limited in our capacities to understand. The Epistle continues

> He hangs between; in doubt to act or rest,
> In doubt to deem himself a God or Beast;
> In doubt his Mind or Body to prefer,
> Born but to die, and reas'ning but to err;
> Alike in ignorance, his reason such,
> Whether he thinks too little, or too much …
> Sole judge of Truth, in endless Error hurl'd:
> The glory, jest and riddle of the world! (29)

An Essay on Man is a poor crown witness if you want to make a case for the arrogance of the Enlightenment. Pope highlights the limits of human reason and the profound embodiment of experience, along with a single substance of creation, to the extent that he was accused of Spinozism by his contemporaries (such as Crousaz 1737, see Jones 2016: xciii). He also imagines the worlds that animals inhabit and makes a case for vegetarianism and human-animal interdependence; "it is the victim's vision" (see Shklar 1998: 176; cited in Jones 2016: xli). Moreover, Pope criticizes the colonial projects, and the spread of globalization through raw power, rather than justifying them

> Now Europe's laurels on their brows behold,
> But stain'd with blood, or ill exchang'd for gold,
> Then see them broke with toils, or sunk in ease,
> Or infamous for plunder'd provinces. (93)

Pope is certainly not unproblematic, especially when it comes to his gender politics, but his *Essay on Man* already points toward the understanding of subjectivity that posthumanism exclusively locates in present-day philosophy.

Many philosophers living at the time did not subscribe to the inflated notions of reason and human subjectivity that posthumanist thinkers now associate with "the Enlightenment." Indeed, one need not go to those thinkers of the eighteenth century whose work is commonly foreshortened as "precursors of romanticism," like Jean-Jacques Rousseau or Edmund Burke, in order to find accounts that take up explicitly posthuman concerns in the age of Enlightenment. The Enlightenment is a period of controversy and highly divergent thinking. Ernst Cassirer's *The Philosophy of the Enlightenment* ([1932] 2009), in many respects still the most comprehensive and best account of the period, sketches the importance of feelings,

the imagination, and the perception of the world for Enlightenment projects to devise accounts of understanding and reason, leading in particular to the development of aesthetics in Baumgarten and Kant's *Critiques*. There is by no means a straight line from Descartes' distinction between *res extensa* and *res cogitans* to Enlightenment epistemology. Its paths of development go through libertine philosophies of bodily, sexual pleasure and their value for thought (see Darnton 1995), and through assessments of the imagination. Emilie du Châtelet writes in her *Discours sur le bonheur* ([1779] 2009) on the limits of the value of rational inquiry: "Far then, from seeking to make [illusions] disappear by the torch of reason, let us try to thicken the varnish that illusion lays on the majority of objects" (349). Illusions run "the great machines of happiness" in our minds, and one should seek to work with them rather than destroy them (355). "Such is the artifice that we can use, and that artifice is neither useless nor unproductive" (355). In her intervention in the debates of Newtonian physics, the *Institutions du physique* (1741), du Châtelet brings in the *vis viva* argument which explains phenomena in motion and gravity through a "life force" in play not only in humans and animals, but also in matter itself. In the figure of a prominent Enlightenment thinker like Emilie du Châtelet, indeed, we already find a cyborg manifesto of sorts, arguing for the mind as a theatrical machine, and for a continuity of motion across a global ecology in different states of existence.

As Michel Chaouli's (2017) careful reading of Kant's *Kritik der Urteilskraft* shows, through the engagement with aesthetics, Kant comes to rebut Descartes' seclusion of cognition from the world.

In einem solchen Produkte der Natur wird ein jeder Teil, so, wie er nur durch alle übrigen da ist, auch als um der andern und des Ganzen willen existierend, … gedacht: welches aber nicht genug ist … sondern als ein die andern Teile (folglich jeder den andern wechselseitig) hervorbringendes Organ … und nur dann und darum wird ein solches Produkt, als organisiertes und sich selbst organisierendes Wesen, ein Naturzweck genannt werden können ([1793] 2014: §65, 322).

In such a product of nature will every part, such as it is only present through all the other ones, also be thought to exist for the others and the whole … but this is not enough; rather [it should be thought] as an organ that brings forth itself and the other parts (therefore generating each other mutually and only then and for this reason can we call such a product, an organised and self-organising being, a natural purpose).

In the process of judgment, Kant devises an "explanatory model in which every feature of a system depends on its relation to every other feature by virtue of its dependence on the whole" (Chaouli 2017: 226). Chaouli identifies links to both Varela's autopoiesis and Luhmann's system theory in Kant's coinage of "self-organization" in *Kritik der Urteilskraft*. Literary critics like Schiller in *Aesthetische Erziehung des Menschen* ([1795] 1987) underline the need for the sensual, bodily dimension and the political charge in this connection. Enlightenment subjectivity starts looking much less rational and controlled than the creature of the public imagination presented in many posthumanist accounts.

Kant's description of a self-organizing being is not unusual in the eighteenth century. Indeed, self-organization, as Jonathan Sheehan and Dror Wahrman have shown in *Invisible Hands* (2015), is a central concept in Enlightenment thinking. Adam Smith's "invisible hand" that keeps the market economy in balance is only one incarnation of this thought figure. The notion of divine providence and its ineffable balance runs through Alexander Pope's *Essay on Man*, but it can also be found in Carl Linnaeus' reflections on ecology and balance in *Oeconomiae naturae* (1749) and *Politia naturae* (1760), as well as his unpublished *Nemesis divina* (see Lepenies 1982). Even if divine providence as an explanatory principle is no longer tenable today, ideas about self-organizing systems and the many ways in which they can be upset remain relevant today for posthumanism. It is against these earlier notions of self-organization that the specificity of posthumanism would need to be articulated if one is so inclined, and, it appears to me, Linnaeus' holistic vision of planetary balance could also inform present-day notions of the Anthropocene.

Self-organization is also a relevant concept when it comes to the question of subjectivity. Adam Smith develops the traditional notion of "public vices, private benefits" further in *Theory of Moral Sentiments* (1759) into an account where the individual's imaginative construction of another's suffering and his understanding of another's judgment through the imagined "impartial spectator" hold society together in a self-organizing system where the individual's weakness contributes to the welfare of everyone. Smith's *Theory of Moral Sentiments* was translated into French by Sophie de Grouchy, who added her own *Lettres sur la sympathie* (1798). De Grouchy roots sympathy not in the imagination but in the body, understanding it as a direct response to suffering, and she comes to define the self not as individualistic as Smith, but as profoundly relational. She turns Smith on his head, observing that sympathy depending on the relational conception of the self becomes impossible in contexts where institutions, gender assumptions, and wealth create strong inequality; sympathy no longer plasters over social differences, but becomes impossible in unjust and unequal contexts. While de Grouchy stands in the liberal tradition of rights and property, her definition of the self as relational offers a clear point of conversation with posthumanism for the different ways in which self-organizing systems have been conceptualized already in the eighteenth century.

In *Radical Enlightenment* (2003), Jonathan Israel proposes an alternative to Cassirer in the parsing of Enlightenment thinking. While in Cassirer the lines of development in the eighteenth century lead to Kant, in Israel they all lead away from Spinoza. Spinoza most prominently challenges Descartes' distinction between mind and matter, bringing the materialism of Lucretius and others into the Enlightenment age. As Israel and others have shown, Spinoza is not an isolated thinker in his time. Denis Diderot in "Lettre sur les aveugles" (1749) and "Le rêve d'Alembert" (1769), Helvétius in *De l'esprit* (1759) and d'Holbach's *Système de la nature* (1770) show prominent thinkers developing materialism in the eighteenth century. Perhaps the most infamous entry in this line of thought (and all works mentioned here were indexed or censored) is Julien Offroy de La Mettrie's *L'homme machine* (1749). La Mettrie squarely engages with several of the core concerns of posthumanism. In *L'homme machine*, he describes the most abstract feats of the human mind (such as geometry) not as particular achievements, but in continuity with animal capacities

and conceives of no meaningful distinction between man, animal, and plant ([1749] 1981: 209). Indeed, La Mettrie rejects speculations about the afterlife with reference to the metamorphosis of the caterpillar: "Jamais un seul des plus rusés d'entre eux n'eut imagine qu'il dût devenir papillon. Il en est de même nous. Que savons-nous plus de notre destinée que de notre origine?" (213; Not even one of the most shrewd of them can imagine that he will become a butterfly. It is the same with us. What do we know more about our destiny than about our origin?).

La Mettrie's *L'homme machine* (Man a Machine) (1750), *Les animaux plus que machines* (Animals More Than Machines) (1750), and *Réflexions philosophiques sur l'origine des animaux* (Philosophical Reflections on the Origin of Animals) (1750), along with Guillaume-Hyacinthe Bougeant's *Amusement philosophique sur le language des bestes* (Philosophical Amusement on the Language of Animals) (1739), develop an extensive account of animals in the Enlightenment framework (see Jauch 1998). Neither the atheist La Mettrie nor the Jesuit Bougeant argues for animal rights modeled on human rights here, an approach that posthuman animal studies reject (see Wolfe 2010), but as fellow creatures that share nature with humans, rather than as the negative counter-image of human subjectivity. Ursula Pia Jauch shows in her extensive study of La Mettrie, among other things, how the French thinker turned to Abraham Trembley's experiments on polyps showing their self-regenerating force as a model for all aspects of nature. "The polyp is the actually existing emblem for the astonishing capacity of matter to transform, move and organise itself" (1998: 246). After humans and animals, La Mettrie then also includes plants in his discussion with *L'homme plante* (1748). As Jauch argues, in the course of this treatise, La Mettrie moves from comparing plants and humans to animals, on to a continuity of matter (251).

Those who only know the title of La Mettrie's most famous treatise, *L'homme machine*, might assume that he contributes to "a materialist reduction of the soul and a general theory of *dressage*." At least that is how Foucault includes him in *Discipline and Punish* (Foucault 1977: 136; cited in Jauch 284). When La Mettrie asks that the imagination should curb itself, however, it is not to subdue it to "dressage" but to bring out its capacities to the fullest. "Voyez cet oiseau sur la branche, il semble toujours prêt à s'envoler; l'imagination est de même [.... si on s'accoutume] à arrêter, contenir ses idées, à les retourner dans tous les sens, pour voir toutes les faces d'un objet: alors l'imagination prompte à juger, embrassera par le raisonnement la plus grande sphere d'objets" ([1749] 1981: 172–3; see this bird on the branch, it appears always ready to take flight; imagination is the same [… if we accustom yourself] to stop, contain our ideas and rotate them in all direction to see all aspects of an object: then the imagination prompts judgment and will embrace through this train of thought the greatest sphere of objects). Exploring the fascinating thought world of La Mettrie, his fellow materialists, his engagements with du Châtelet and his (potential) echoes in Kant can open a similarly multifaceted perspective on the Enlightenment for posthumanism. Rosi Braidotti writes, "This is no time for nostalgic longings for the humanist past, but forward-looking experiments with new forms of subjectivity" (2013: 45). These new forms of subjectivity, however, might emerge from a dialogue with the Enlightenment past that does not rest on preconceived notions about rational master minds. The Enlightenment has been configured in many different ways from Foucault's *The Order of Things* and *Discipline and*

Punish, to Cassirer's *Philosophy of Enlightenment* and Israel's *Radical Enlightenment.* Its so-called defenders today, in transhumanism and elsewhere, tend to limit the thinking of the period to rationalist nostalgia, but this does not mean that it is necessary to summarily dismiss Kant, La Mettrie, du Châtelet, or de Grouchy. Neither do I make a call to reconstruct the Enlightenment (or humanism, which is not forcibly the same thing) in the image of posthumanism, because such an approach would also lead to an unnecessary distortion. The Enlightenment clearly was not posthumanism *avant la lettre.*

Since posthumanism, however, depends so much on its definitions of subjectivity and its claim of inclusiveness, it should take seriously these earlier discussions around self-organization, links and continuities between humans, animals, and matter, as well as the relational quality of subjectivity. The question of who is in and who is out, in this respect, relates not only to animals, machines, or plants, but also to the heritage of literature and philosophy, and there is no need to be exclusive across time. Thinking, as the Enlightenment lived it in the salons, coffee houses, correspondences, and journals, is best developed in sociable encounter, and it is such an exchange of thought across time, rather than positing absolute newness, which could lead to the most exciting "forward-looking experiments" when it comes to modes of subjectivity.

SOURCES CITED

Abrams, Thomas. "Braidotti, Spinoza and Disability Studies after the Human." *History of the Human Sciences*, vol. 30, no. 5 (2017): 86–103.

Braidotti, Rosi. *Nomadic Subjects: Embodiment and Sexual Difference in Contemporary Feminist Theory*. New York: Columbia University Press, 1994.

Braidotti, Rosi. *Nomadic Theory: The Portable Rosi Braidotti*. New York: Columbia University Press, 2011.

Braidotti, Rosi. *The Posthuman*. Cambridge: Polity Press, 2013.

Brown, Karin, and James E. McClellan. "Sophie De Grouchy Letters on Sympathy (1798): A Critical Edition." *Transactions of the American Philosophical Society*, vol. 98, no. 4 (2008): i–198.

Cassirer, Ernst. *The Philosophy of the Enlightenment*. Princeton: Princeton University Press, [1932] 2009.

Chaouli, Michel. *Thinking with Kant's Critique of Judgement*. Cambridge, MA: Harvard University Press, 2017.

Châtelet, Emilie Du. *Selected Philosophical and Scientific Writings*. Edited by Judith P. Zinsser. Chicago and London: University of Chicago Press, 2009.

Darnton, Robert. *The Forbidden Bestsellers of Pre-Revolutionary France*. New York: W. W. Norton, 1995.

Foucault, Michel. *Discipline and Punish: The Birth of the Prison*. Harmondsworth: Penguin, 1977.

Foucault, Michel. "What Is Enlightenment?" In *The Foucault Reader*, edited by Paul Rabinow. New York: Vintage, 1984, pp. 32–50.

Foucault, Michel. *The Order of Things: An Archeology of the Human Sciences*. New York: Vintage, 1994.

Habermas, Jürgen. *The Future of Human Nature*. Cambridge: Polity Press, 2003.

Haraway, Donna. *The Companion Species Manifesto: Dogs, People and Significant Otherness*. Chicago: Prickly Paradigm Press, 2003.

Haraway, Donna. "A Manifesto for Cybords: Science, Technology, and Socialist Feminist in the 1980s." In *The Haraway Reader*, edited by Donna Haraway. New York: Routledge, 2004, pp. 7–46.

Hayles, N. Katherine. *How We Became Posthuman: Virtual Bodies in Cybernetics, Literature and Informatics*. Chicago: University of Chicago Press, 1999.

Herbrechter, Stefan. *Posthumanism: A Critical Analysis*. London: Bloomsbury, 2013.

Horkheimer, Max, and Theodor Adorno. *Dialektik der Aufklärung: Philosophische Fragmente*. Frankfurt: Fischer, 1987.

Israel, Jonathan. *Radical Enlightenment: Philosophy and the Making of Modernity, 1650–1750*. Oxford: Oxford University Press, 2003.

Jauch, Ursula Pia. *Jenseits der Machine: Philosophie, Ironie und Ästhetik bei Julien Offray de la Mettrie*. München: Hanser,

1998.

Jones, Tom. "Introduction." In *An Essay on Man*, edited by Tom Jones. Princeton: Princeton University Press, 2016, pp. xv–cxii.

Kain, Patrick. "Kant on Animals." In *Animals*, edited by Peter Adamson and G. Fay Edwards. Oxford: Oxford University Press, 2018, pp. 211–32.

Kant, Immanuel. *Kritik der Urteilskraft*. Frankfurt: Suhrkamp, [1793] 2014.

La Mettrie, Julien Offroy de. *L'Homme-machine*. Paris: Folio, [1749] 1981.

Latour, Bruno. *Reassembling the Social: An Introduction to Actor-Network-Theory*. Oxford: Oxford University Press, 2005.

Lepenies, Wolf. "Linnaeus's *Nemesis divina* and the Concept of Divine Retaliation." *Isis*, vol. 73, no. 1 (1982): 11–27.

Maturana, Humberto, and Francisco Varela. *Autopoesis and Cognition: The Realisation of Living*. Dordrecht: Springer, 1980.

Menary, Richard, ed. *The Extended Mind*. Cambridge, MA: MIT Press, 2010.

Morton, Timothy. *Ecology without Nature: Rethinking Environmental Aesthetics*. Cambridge, MA: Harvard University Press, 2007.

Morton, Timothy. *Hyperobjects: Philosophy and Ecology after the End of the World*. Minneapolis: University of Minnesota Press, 2013.

Nayar, Pramod K. *Posthumanism*. Cambridge: Polity Press, 2014.

Pope, Alexander. *An Essay on Man*. Edited by Tom Jones. Princeton: Princeton University Press, [1743] 2016.

Sheehan, Jonathan, and Dror Wahrman. *Invisible Hands: Self-Organisation and the Eighteenth Century*. Chicago: University of Chicago Press, 2015.

Shklar, Judith. "Poetry and the Political Imagination in Pope's *An Essay on Man*." In *Political Thought and Political Thinkers*, edited by Stanley Hoffman. Chicago: University of Chicago Press, 1998, pp. 193–205.

Wohlleben, Peter. *The Hidden Life of Trees: What They Feel, How they Communicate – Discoveries from a Secret World*. Translated by Jane Billinghurst. Vancouver and Berkeley: Greystone Books, 2016.

Wolfe, Cary. *What Is Posthumanism?* Minneapolis: University of Minnesota Press, 2010.

CHAPTER THREE

Transhumanism

STEFAN LORENZ SORGNER

Transhumanism is the "world's most dangerous idea." This is at least Francis Fukuyama's judgment concerning this cultural and philosophical movement, which he stated in the magazine *Foreign Policy* (Fukuyama 2004: 42–3). Transhumanism is a cultural movement which affirms the use of techniques to increase the likelihood that human beings manage to transcend the boundaries of their current existence. It is in our interest to take evolution into our own hands. Thereby, we increase the likelihood of our living a good life as well as the likelihood of not getting extinct.

Transhumanism has slowly increased in significance since 1951 when the term was first coined by Julian Huxley in his article "Knowledge, Morality, and Destiny." Then, he described transhumanism as follows: "Such a broad philosophy might perhaps best be called, not Humanism, because that has certain unsatisfactorily connotations, but Transhumanism. It is the idea of humanity attempting to overcome its limitations and to arrive at fuller fruition; it is the realization that both individual and social developments are processes of self-transformation" (Huxley 1951: 139). I regard this formulation still as the best possible definition of transhumanism.

The concluding chapter of Julian Huxley's book *New Bottles for New Wine*, published in 1957, is entitled "Evolutionary Humanism." The relationship between evolutionary humanism, represented today by the Giordano Bruno Foundation, and contemporary transhumanism must still be clarified more precisely. There seems to be a structural analogy between transhumanism and evolutionary humanism which needs to be considered when

clarifying the relationship between humanism and transhumanism and also between traditional humanism and evolutionary humanism.

Julian Huxley had a brother who is at least as well-known as he himself, Aldous Huxley. Between Julian Huxley's affirmative considerations concerning the impacts of technologies and those of his brother Aldous Huxley, the author of the critical novel *Brave New World*, there are significant tensions in terms of content. Julian Huxley also shares his fundamental evolutionary approach with his grandfather Thomas Henry Huxley, who distinguished himself as Darwin's supporter. He was known as Darwin's bulldog. Julian Huxley's half-brother, Andrew Fielding Huxley, was also active as a natural scientist. He was a university professor of biology in London and even won the Nobel Prize, but is currently less well known than the other family members already mentioned. Julian Huxley was a university professor in London, too. In addition, he was the first general director of the UNESCO who made a significant contribution to the first Declaration of Human Rights, and was on the Board of the British Eugenics Society.

A close friend of Julian Huxley was the catholic evolutionary thinker Teilhard de Chardin, who used the word "transhumanizing" in *The Future of Man* (De Chardin, 1959: 251). The reflections by this Jesuit priest are still of great relevance for considering potential religious aspects of transhumanism and for further clarifications concerning the relationship between Christianity and transhumanism.

In the time period between 1969 and 1972, there were six manned US landings on the moon which significantly revived interest in this way of thinking. It was then, when the notions of the "post-" and the "transhuman" in a transhumanist sense were coined. Both concepts definitely show up in the article "Transhumans—2000" by F. M. Esfandiary, who changed his name to FM 2030 to stress the contingency of naming conventions and to highlight the relevance of a prolonged lifespan, as 2030 would have been the year of his 100th birthday: "On our way beyond animal beyond transhuman—to a post-human dimension" (1974: 298). In his book *Up-Wingers* from 1973, he had already talked about a "post-animal/human stage" (170). The notion "superman" is prominent in the seminal book *Man into Superman* by R. C. W. Ettinger from 1972. It is the notion of the superman which relates transhumanist reflections also to the philosophy of Friedrich Nietzsche. A detailed debate (see Tuncel 2017) on the complex relationship between these two ways of thinking was initialized in 2009 by the article "Nietzsche, the Overhuman, and Transhumanism" by me who himself stands for a Nietzschean version of transhumanism (2010, 2016a, 2018, 2019). Most leading transhumanist philosophers, however, belong to the tradition of Anglo-American analytical philosophy, which is one reason why there is a widely shared hesitation within the continental philosophical tradition to seriously engage with transhumanist thinking (More and Vita-More 2013).

Further significant ancestors of transhumanist thinking can be found within Russian cosmism and Russian science fiction. It would be anachronistic to refer to any thinker before 1951 as transhumanist, yet many structural analogies and parallels can be found between their reflections and the realm of topics which is usually being covered by transhumanist thinkers, activists, and artists. Nikolai Fyodorovich Fyodorov is the most noteworthy thinker among the Russian cosmists concerning the similarities to transhumanist reflections. In

contrast to Nietzsche who was hostile toward religions, Fyodorov was a devout church-going orthodox Christian, which also influenced his futuristic ideas. At least as fascinating as the cosmists were Russian science fiction writers. Alexander Romanovich Belyaev's books *Professor Dowell's Head, Amphibian Man, Ariel,* and *The Air Seller* are particularly relevant. The novel *We* by Yevgeny Ivanovich Zamyatin is also noteworthy in this context as well as the brothers Arkady Natanovich Strugatsky and Boris Natanovich Strugatsky, who developed the complex world of "Noon," in which several of their novels take place, and which was named after the first novel of their series: *Noon: 22nd Century*.

Transhumanism as a cultural movement developed further during the eighties with a close friend of FM-2030, Natasha Vita-More. In 1982, she published the "Transhuman Manifesto", which preceded the first version of the "Transhumanist Arts Statement," of which a revised version was republished in 2003. In 2013, she summarizes her central insights on these issues in the article "Aesthetics: Bringing the Arts & Design into the Discussion of Transhumanism" (Vita-More 2013: 18–27). Like FM-2030, who was born as Fereidoun M. Esfandiary, she changed her name to highlight the contingency of naming. Natasha Vita-More was born as Nancie Clark, and her later husband Max More as Max T. O'Connor. Max More, Natasha Vita-More, and FM-2030 were particularly relevant in promoting transhumanism at the beginning of the nineties. Max More's essay "Transhumanism: Toward a Futurist Philosophy" from 1990 (More 1990: 6–12) and FM-2030's book *Are You a Transhuman* from 1989 were particularly important writings from this period. Later during the nineties, some transhumanists realized that a more formally organized structure was needed to increase the cultural impact of transhumanism. Consequently, the World Transhumanist Association (WTA) was founded by Nick Bostrom and David Pearce in 1998. Nick Bostrom is particularly famous for the paper "Are You Living in a Computer Simulation?" (Bostrom 2003: 243–55). David Pearce is widely known for having authored the "Hedonist Imperative" (Pearce 1995). The WTA also established the conference series TransVision and founded the *Journal of Transhumanism* to promote transhumanism as a legitimate field of academic research.

Still, the WTA did not realize the expected academic impact. Hence, Nick Bostrom and James Hughes established the techno-progressive think-tank Institute for Ethics and Emerging Technologies (IEET) in 2004, and integrated the *Journal of Transhumanism* into the structures of this organization. Thereby, the peer-reviewed academic, open access online-only journal was renamed as *Journal of Evolution and Technologies*. In order to generate an increased impact and to reduce the fear resulting from the word "transhumanism," the WTA was rebranded in 2008. It has been re-named "Humanity Plus" since then, and its focus is that of cultural activism, whereas the focus of the IEET is an academic one and it is open not only to transhumanists but also to other techno-progressive thinkers, like bioliberals. You can be a bioliberal and regard it as morally obligatory to select specific fertilized eggs after in vitro fertilization (IVF) and preimplantation genetic diagnosis (PGD) for implantation without regarding the coming about of a posthuman as desirable. This is a position which is being held by Julian Savulescu, who is a prime example of a philosopher and bioethicist who is close to transhumanist's thinking, but who does not explicitly associate himself with this movement. On the other hand, it can also be the case that you reject the notion of any moral

obligation, while regarding it as individually desirable to overcome the current human limitations by means of technologies, which is the decisive feature of transhumanists.

A further opening toward academic debates took place with the realization of the Beyond Humanism Conference Series in 2009 for which I have been primarily responsible. Its goal is to promote the academic exchange between humanist, transhumanist, and critical posthumanist scholars. This is also the dedicated aim of the book series *Beyond Humanism: Trans- and Posthumanism* which I established in 2011. To promote the goal of an academic engagement with the great variety of discourses further, James Hughes, Sangkyu Shin, and I established the world's first double-blind and peer-reviewed academic journal dedicated to the posthuman, the *Journal of Posthuman Studies,* which is being published in print as well as online by Penn State University Press since 2017. From 2019 onward, the world's oldest publishing house, Schwabe Verlag (founded in 1488), which is deeply rooted in the humanist tradition, embraces the challenges related to emerging technologies and publishes a high-class book series entitled *Posthuman Studies* under my general editorship.

PHILOSOPHICAL ISSUES

There is an enormous amount of philosophical issues connected with transhumanism. Here, I highlight a selection of debates which are particularly relevant concerning the cultural movement as a whole. The first question deals with the relationship between transhumanism and the enlightenment. James Hughes (2004, 2010, 2014), Steve Fuller (2011, 2012, and with Lipinska 2014), and several other transhumanists regard transhumanism as a continuation of the enlightenment project. In this case, transhumanism stands for humanism on steroids or a type of hyper-humanism. Consequently, it means that the same ideals and methods which used to be affirmed within enlightenment are still central for transhumanism. Whether this is the case is an open question. What are the central features of the enlightenment project? Is transhumanism nothing but a hyper-humanism? The rebranding of the WTA to Humanity Plus definitely suggests such an understanding. Yet there are also good reasons for doubting this conceptualization of transhumanism, for example, the transhumanist understanding of reason, or the transhumanist judgment, who counts as a person.

It is clear that during the enlightenment reason was used to criticize the established absolutes, norms, metaphysics, and political and ethical ideals. Yet it remains an open question on which anthropology this criticism is based. Are Machiavelli, de Sade, La Mettrie, and Nietzsche the tradition which represents the enlightenment, or is it more closely connected to the tradition in which Descartes and Kant are regarded as the leading thinkers? The first group of thinkers use reason to undermine the universal validity of reason and to stress the relevance of the body. The thinkers from the second group use reason to move beyond the rigid metaphysical claims of medieval thinking, as they regard reason as a means for grasping the truth in correspondence with the world, whereby reason is not part of the material world of causation, but it is part of the non-empirically accessible world of freedom. If enlightenment is identified best with the bodily philosophical approaches, then reason undermines the universal validity of reason. Truth in correspondence to the world is no longer an option. Scientific truths are still possible, but they are no truths in the traditional

sense of the word. Scientific truths do not actually say something about the world, but they make us realize some pragmatic insights. The principle of induction enables us to generate judgments which usually work, but nothing more. It is useful to have these insights, and it is usually reliable to trust them. We all live with these pragmatic insights and accept their reliability, as otherwise we would not even get onto a plane. On the other hand, the second group of thinkers identifies reason with a non-empirically accessible capacity which enables us to grasp proper insights, truth in correspondence with the world. Reason has the power to provide us with such insights, as it is a non-empirically accessible capacity.

The reliable trust in the capacity of reason, and its possibility to gain a foundational type of knowledge by using it, is closely associated with the rationalist enlightenment tradition, which seems to me as the dominant enlightenment tradition. Thereby, I do not wish to imply that it is the tradition with which I identify. However, concerning the wider impact, the thinkers of the rationalist enlightenment tradition are more widely identified with the enlightenment than are the thinkers with philosophical approaches focused on the body. Hughes and in particular Fuller also stress these elements of rationality and truth for their takes on transhumanism. I am skeptical concerning this self-understanding of some transhumanists, as the majority of transhumanists identify with a variant of a naturalist account of the world, according to a survey undertaken by the IEET. A naturalist account implies that all entities can in principle be accessed empirically. This does not imply that all entities can already be investigated empirically, but it implies at least that in principle an empirical analysis of all entities is possible. To claim that reason lies outside of the empirically accessible realm of cause and effect and can be identified with the realm of freedom is not a philosophical stance which can be identified with naturalism. Yet it was this anthropology on which the rationalist enlightenment tradition bases all of their insights. An anthropology from the rationalist enlightenment tradition is incommensurable with a naturalist anthropology. However, you need a non-empirically accessible notion of reason to guarantee the claim of accessing a truth in correspondence to the world. Hence, it is clear that even though Hughes and Fuller identify transhumanism with a hyper-humanism, further philosophical reflections bring out the tensions between transhumanism and the rationalist enlightenment tradition.

Let us focus on the enlightenment tradition which is centered on the human body and identifies the mind as being a part of the body. If your body is the decisive entity to which all of our judgments are related, and if there is nothing in us by means of which we can gain different insights, then we have to embrace a variant of an epistemological perspectivism, as Nietzsche realized correctly. Perspectivism is the theory that each philosophical perspective is an interpretation (Sorgner 2007). Being an interpretation does not imply that a philosophical judgment has to be false, but merely that it can be false. In this way, perspectivism successfully evades the possibility of committing a performative self-contradiction. Hence, by employing philosophical thinking you realize that reason cannot provide us with philosophical judgments which correspond to the world. Here, it becomes clear that reason undermines itself. This understanding of an enlightenment humanism leads toward an anti-humanism, whereas the rationalist approach leads toward a hyper-humanism.

If the IEET survey is correct which shows that most transhumanists are naturalists, then it

follows that transhumanism implies a variant of anti-humanism, which again means that both critical posthumanism and transhumanism represent variants of anti-humanist thinking. This is the understanding which I find plausible (Sorgner 2017). If reason undermines itself, it does not have to imply that reason is no longer useful. Reason is no longer able to grasp the truth in correspondence with the world. However, reason developed evolutionarily. Reason is useful, as it provides us with insights which so far have enabled us to survive and flourish. Yet this is not a claim which Hughes and Fuller embrace. It is the philosophical stance which you take with respect to this issue which has significant and enormous implications on many more specialized challenges. According to Fuller, rational beings deserve respect. David Pearce, who is the author of the "Hedonist Imperative," and I think that respect ought to be based upon the capacity of suffering, as suffering but not rationality is a morally relevant capacity. Hence, I argue transhumanism moves away from enlightenment by giving it a new twist, whereas Hughes and Fuller see transhumanism as a continuation of the enlightenment tradition. A twist is different from the process of overcoming. Overcoming leaves behind and separates itself categorically from the past, whereas a twist develops the past further in an inclusive manner. It is not the case that we get rid of the mind. Yet we reinterpret the immaterial mind so that it becomes an entity which is the result of an evolutionary process. Hence, we do not overcome the enlightenment anthropology, but it gets twisted!

A second major issue is that of transhumanist politics. The media widely identifies transhumanists with cold-blooded, blood-drinking Silicon Valley billionaires who fight for libertarianism. This description is one-sided. There are libertarian transhumanists like Peter Thiel or Zoltan Istvan, but the majority of intellectual transhumanists are in favor of a social democratic version of transhumanism, as it is upheld by most members of the IEET. Particularly noteworthy concerning transhumanist politics are the activities of Zoltan Istvan, who founded the US Transhumanist Party, and who ran for US presidency in 2016. In the novel *Transhumanist Wager* (2013), Istvan explains many of his transhumanist positions. Because of his libertarian sympathies, his activism was not universally approved of by transhumanists. A complex social democratic version of a transhumanist politics had been published in the book *Citizen Cyborg* by James Hughes (2004). The monograph not only presents a strong political position, but also serves as an excellent introduction to transhumanism in general.

No serious transhumanist rejects liberalism. All affirm some liberal political stance but the range of possible positions is enormous. This is also the reason why the right to morphological freedom plays such a central role in transhumanism. The concept had originally been coined by Max More in his 1993 article "Technological Self-Transformation: Expanding Personal Extropy" (More 1993: 15–24). A particularly strong case for morphological freedom was presented by Anders Sandberg in his article "Morphological Freedom—Why We Not Just Want It, but Need It" (Sandberg 2013: 56–64). This right includes not only the self-ownership of one's own body but also the right to modify it according to one's own wishes.

This right can be explained further by reference to a utilitarian foundation, as most academic transhumanists belong to the Anglo-American analytic philosophical tradition, where utilitarianism is dominant. There are some particular strong transhumanist scholars in

the disciplines applied ethics and the philosophy of mind. Academic contributions by those were strongly responsible for the recognition of transhumanism in academia as an approach which deserves to be taken seriously from the beginning of the 2000s onward. This does not mean, however, that there are no transhumanists who argue on the basis of a different ethical theory. James Hughes used to be a Buddhist monk, and many of his arguments are founded on a virtue ethical approach, for example, when he stresses the need to technologically enhance mindfulness. I argue for a hermeneutical ethical position which was strongly influenced by Nietzschean reflections.

Depending on the ethical foundation, different concepts of the good are being upheld by transhumanists, even though in the main stream media, transhumanism is usually being presented as if all transhumanists wish to become immortal by turning into a Renaissance genius, whereby the male version can be identified with Superman on Viagra, and the female ideal is best described as Wonder Woman with Botox. It is not the case that no transhumanist upholds these ideals, but it needs to be pointed out that there is a much greater diversity concerning the concepts of the good which are being affirmed than it has widely been acknowledged.

The main aspect of the concept of the good which is being shared among many transhumanists is the prolongation of the human health span. The health span must not be identified with the life span, the quantity of years we are alive. What most people are interested in is the prolongation of healthy years, during which they are alive. This is what the health span stands for. One academic discussion among transhumanists is about the status of this claim. Should the normative claim be upheld that all human beings ought to identify any prolongation of the health span with an increase of the likelihood to live a good live? Is it the case that the health span is valid only for most human beings, but that it is not a universally valid normative ethical position either? Does the affirmation of the prolongation of the human health span imply the position that immortality is being aimed for or not? Is transhumanism a utopian enterprise or not? Should aging be seen as a disease (de Grey and Rae 2010)? Is cryonics a possible way to increase one's health span? Is mind-uploading the best possible option for doing so or should we create human-animal-hybrids to move beyond the 122 year age limit which seems to apply to currently living human beings? All of these issues are being discussed in academic exchanges by transhumanists.

My own take on these issues is that most human beings indeed identify an increase of the health span with a higher likelihood of living a good life. Yet, cryonics or mind-uploading does not seem to be the most promising techniques for promoting this goal. This being the case, it needs to be pointed out that immortality is not a realistic option. We cannot even conceptualize the notion of immortality on the basis of a naturalist understanding of the world. Immortality implies either that humans cannot or that they must not die. Both options are absurd, if we think the world on a naturalist basis. In this case, the world began with the big bang. It has expanded since then, and eventually the expansion process will slow down, so that the entire world will come to a standstill. A different option is that at a certain stage the expansion process will get revised into a contraction process which ends up in a cosmological singularity, a point of immense density. In both cases, there does not seem to be a legitimate option for human beings to survive. Yet, this is what ought to be possible if

immortality was an option. Hence, it is clear that immortality in its literal sense cannot be a realistic option for most transhumanists (Sorgner 2018b). Yet, many transhumanists use, mention, and deal with the notion of immortality (Rothblatt 2015). If the person in question is a serious thinker, the concept of immortality only ought to be used in a rhetorical sense. It can be employed to create media attention, and as a means to generate a public awareness of a widely shared aspect of a good life, namely the prolongation of human health span. Immortality in this case merely serves as an advertising tool for generating attention for an enormously important aspect of the good life, namely for stressing the relevance of increasing our health span. No serious transhumanist ought to affirm immortality in its literal sense as a realistic option. Furthermore, I defend a non-utopian version of transhumanism, as I regard utopias as extremely dangerous (Sorgner 2018a). Thereby, the present gets sacrificed for a future which most probably will never get actualized. Yet, I am aware that this attitude is not universally being shared among transhumanists; see Bostrom's "Letter from Utopia" (Bostrom 2008: 1–7). The issue of utopia is definitely another important academic topic concerning transhumanism (see Hauskeller 2012: 39–74).

What else can be said about the concept of the good life? Do we all want to be renaissance geniuses, even though this is not a realistic option, as Bostrom (2001) claims, should we aim for a common sense ideal of the good life, for which Julian Savulescu (2001; with Kahane 2009) argues, or is any non-formal account of the good bound to be implausible, as I (2016b) stress? This is a central question when dealing with applied ethical issues concerning the relationship between therapy and enhancement, if this distinction is philosophically plausible, and which enhancements ought to be seen as morally or legally legitimate. Transhumanists take many different perspectives on the question of the good. To hold that transhumanism is merely about getting more beautiful, stronger, and better is simply wrong. It is rather about having the right to use the great range of technologies for increasing the likelihood of living a good life, that is, the human right of morphological freedom. By overcoming or maybe even better twisting who we are and by turning into a posthuman, this goal can be promoted. Yet, it is an open question who is the posthuman exactly: it could be that a posthuman still belongs to the human species but has at least one capacity which goes far beyond the capacities of currently living human beings. A second option is that the new human or the posthuman is a member of a different species, such that interbreeding between humans and posthumans would be impossible. Both meanings belong to carbonate-based transhumanisms. A third option is a silicon-based posthumanity. By means of uploading, we turn into posthumans who exist on a silicon basis, rather than on a carbonate one, as currently living beings do. All of these possibilities are being affirmed within the transhumanist discourse. There is not one definition of the posthuman which is being held by all transhumanists. Yet, the technologically induced move beyond the limitations of currently living human beings by means of established as well as emerging technologies is the central goal which is the minimal common denominator which is being shared by all transhumanists. Which posthuman ought to be realized and which techniques are the most promising ones for doing so are subject to debate.

In particular the question concerning the appropriate techniques is an important one. Which enhancement techniques are particularly relevant for bringing about a posthuman?

One enhancement technique which had already been in place in antiquity were surgeries. By means of surgeries, one can change the shape of one's eyes or one's nose, enlarge one's penis, reconstruct the hymen, or create bigger breasts. All of these interventions are widely used and popular in all parts of the world. This issue is particularly tricky when a client wishes to have his healthy leg removed, as it does not belong to himself according to his own self-understanding. A surgeon in the UK actually performed such surgeries on two of his clients who had healthy legs. Hymen reconstruction or hymenoplasty is particularly sought after by young Muslim women in Germany and the Netherlands, as they are no longer virgins and are afraid of honor killings.

Another long-established technique is pharmacological enhancement. Blood doping, pain killers, cognitive enhancers, anabolic drugs, love drugs, and many other types of pharmaceutical enhancement methods can be used to enhance human capacities. Each specific moral issue deserves a separate treatment. Oxytocin, MDMA, or Selective Serotonin Reuptake Inhibitors (SSRIs) can be taken in order to promote the mutual feeling of love. Microdosing LSD is the act of consuming sub-perceptual amounts of psychedelics, which has become popular in the Silicon Valley in recent times in order to promote creativity, gain energy, treat depression or anxiety, or even promote a spiritual awakening process. It is often the case that drugs which were used for treating diseases can also be employed to promote a certain capacity in healthy clients. Studies seem to indicate that one in three US University student takes Adderall for being better prepared for an exam.

However, for promoting the likelihood of bringing about a new human, posthuman, other interventions are even more promising. Gene technologies, cyborg technologies, as well as digital technologies seem to be the most important ones within transhumanists debates. The issues can be dealt with in an even more complex manner, if we include altered external settings, like total surveillance systems, smart cities, internet of things, internet of bodily things in upgraded humans, and autonomous cars. Furthermore, an additional topic has been prominent in recent years, too: moral bioenhancement; there has been a popular and intense debate during this decade on various aspects of this topic (Sorgner 2016). Traditionally, enhancements were discussed which promote qualities which were widely identified as advantages, so that the likelihood of a person leading a better life can be promoted. What about morality? Can moral bioenhancements at all be conceptualized? Should moral bioenhancement procedures become legally legitimate, if they were available? Who would be interested in promoting their likelihood of acting morally? Would or should Catholics be interested in moral bioenhancement procedures to increase the likelihood of being rewarded with a fulfilled afterlife? Each of these questions and many others, too, deserve an individual academic treatment.

I regard gene technologies as well as cyborg technologies as the most promising means for expanding human boundaries (Sorgner 2018). Concerning gene technologies, gene modifications, as well as gene selections have to be distinguished. Gene modifications are particularly promising due to the development of CRISPR-Cas9 as well as other genome editing methods. Gene selection can occur during the process of an IVF, if several fertilized eggs are available, as it is the case in the UK, but not in Germany. Then, it is possible to analyze these fertilized eggs genetically and decide which ones should get implanted. In the

meantime, even an AI can realize an analysis, and it might be an incredibly powerful tool for this purpose, too. My own take on these issues is that it is advisable to seek established processes which are structurally analogous to new ones for developing an initial ethical take on new moral challenges. Then, it is possible to transfer the established moral norms to the new procedure. This approach has the following implications concerning genetic technologies of parents on their offspring. There is a structural analogy between parents genetically modifying their children to traditionally educating them (Sorgner 2015: 31–48). Hence, the same moral standards ought to apply to both procedures. In both cases, parents make decisions to alter their kids in order to increase the likelihood of them living a good life. Not all genetic modifications are morally legitimate in the same way as not all types of parental education are morally appropriate. Some procedures which count as child abuse also ought to be banned and penalized. However, this explanation also reveals that in principle it can be morally appropriate for parents to genetically enhance their children. Whether certain procedures also ought to become legally legitimate is a crucial issue. Certain vaccinations are legally obligatory in the United States, and vaccinations are bioenhancements, too. The other tricky case concerning gene technologies is that of selecting fertilized eggs after IVF and PGD. Concerning this procedure the same standards ought to apply as in the case of someone looking for a partner for reproductive reasons, I argue, as selecting a partner for reproductive reasons is structurally analogous to selecting a fertilized egg after IVF and PGD (Sorgner 2014c: 199–212). Another promising genetic technique is that of gene analysis, in particular, if information techniques get combined with gene techniques. Big Data analysis of genes is a necessary prerequisite for the other genetic techniques just mentioned, as it is necessary for gaining more information concerning correlations between genes and gene clusters and traits, like qualities, diseases, or reactions toward drugs.

Cyborg technologies are a further flourishing field, as a permanently increasing amount of scientific examples reveal what it can mean, for example, RFID (radio-frequency identification) chips get implanted into different parts of our bodies (Sorgner 2019). Coneptually, we are turning into cyborgs. This is a development which has taken place since we became *Homo sapiens*. Acquiring a language is the first human upgrade. Parents turn us into cyborgs by teaching us a language, as cyborgs means cybernetic organism. The word "cyber" comes from the Ancient Greek κυβερνητική, which means governance or steering. So a cyborg is a governed, a steered organism. By getting upgraded with language, we are getting steered by our parents. Education is all about steering children. Vaccinations are a further means for doing so. Recently, RFID chips are getting integrated into our bodies, for example, into our front teeth to measure what we eat and drink, which was realized by scientists from Tufts University. This information then can be sent to our smartphone, so that we receive further advice concerning our diet. The most promising technique in this context is that of predictive maintenance. So far, predictive maintenance is being used in machines. Sensors tell us if a certain part of a machine will most probably fail to function within the next six months. We receive this information at a stage where the part is still fully functional. The same procedure can be applied in humans. Predictive maintenance of the human body can be used to adapt one's diet to avoid an increase of our blood sugar level. It is this technique which can enable us to radically increase the likelihood of an increased health

span.

Quite a few transhumanists regard the option of mind uploading as the most promising enhancement technique, whereby we would turn our carbonate based personally into silicon based one. We digitize our personality. Bostrom's simulation argument (Bostrom 2003) is an interesting thought experiment which presupposes mind-uploading. It demands careful consideration. However, from my perspective its pragmatic relevance is comparable to the academic question of how many angels fit onto the tip of a needle which used to be discussed during the Middle Ages. Both arguments are interesting and make sense from the culturally dominant paradigms of each time. However, they are of no relevance whatsoever concerning any practical relevance. My main reason why I regard the possibility of mind-uploading as highly problematic is that we have no reason for holding that life can exist on a silicon basis. Computer viruses are self-replicating entities, but they do not have a metabolism for gaining energy, which is a central feature for other living entities. Otherwise, we have no indication for holding that digital life can even be possible. However, as uploaded personalities we would still want to be alive, and being alive also seems to be a necessary prerequisite for having consciousness or self-consciousness, too. All of these reflections indicate that mind-uploading is a highly dubitable procedure. I cannot exclude that it will eventually be possible, but our current scientific basis does not provide us with a strong reason for regarding it as a likely option. This is the reason why I compare it to the medieval angel argument. Kurzweil's reflection on mind-uploading turns this procedure into a quasi-religious claim which I find highly problematic as well as implausible (Kurzweil and Grossmann 2011). This does not mean that there has to be a tension between a traditional type of religiosity and transhumanism, but the quasi-religious concepts developed so far have often been rather wild speculations. Still, it needs to be acknowledged that research concerning the relationship between religious experiences and technical processes, which support such experiences, as well as other religious issues deserves further studies in the future, for example, the relationship between non-dualist anthropology and the possibility of technologically induced religious experiences.

A further topic which has not yet been addressed at all in this text is that of transhumanist arts. Series like Black Mirror, West World, and Electric Dreams have strongly been relevant for sparkling a wide-ranging interest in transhumanism recently. The Hollywood movie *Transcendence* with Johnny Depp, the series *Big Bang Theory*, as well as the novel *Inferno* by Dan Brown have reached an audience of millions of people. In all of these works, transhumanism was addressed either implicitly or explicitly. Comics, movies, science fiction, as well as computer games are full of references to transhumanist ideas. In addition, the fields of body art, performance arts, new media art, and bioart also deserve to be studied concerning their transhumanist implications. The works of the following artist deserve particular attention in this context: Stelarc, Orlan, Eyeborg Neil Harbison, Moon Ribas, Eduardo Kac, Patricia Piccinini.

SOURCES CITED

Bostrom, Nick. "Transhumanist Values." *Nick Bostrom's Home Page*, Version of April 18, 2001,

http://www.nickbostrom.com/tra/values.html

Bostrom, Nick. "Are You Living in a Computer Simulation?" *Philosophical Quarterly*, vol. 53, no. 211 (2003): 243–55.

Bostrom, Nick. "Letter from Utopia." *Studies in Ethics, Law, and Technology,* vol. 2, no. 1 (2008): 1–7.

de Chardin, Teilhard. *The Future of Man*. New York: Doubleday, [1959] 2004.

de Grey, Aubrey, and Michael Rae. *Niemals alt!: So lässt sich das Altern umkehren. Fortschritte der Verjüngungsforschung.* Bielefeld: Transcript, 2010.

Esfandiary, Fereidoun. M. *UpWingers. A Futurist Manifesto*. New York: John Day Co, 1973.

Esfandiary, Fereidoun. M. "Transhumans-2000." In *Woman in the Year 2000*, edited by M. Tripp. New York: Arbor House, 1974, pp. 291–8.

Ettinger, Robert. C. W. *Man into Superman*. Palo Alto: Ria University Press, [1972] 2005.

FM-2030. *Are You a Transhuman?* New York: Warner Books, 1989.

Fukuyama, Francis. "The World's Most Dangerous Ideas: Transhumanism." *Foreign Policy,* vol. 144 (September/October 2004): 42–3. Print.

Fuller, Steve. *Humanity 2.0: What It Means to Be Human Past, Present and Future*. Basingstoke: Palgrave Macmillan, 2011.

Fuller, Steve. *Preparing for Life in Humanity 2.0*. Basingstoke: Palgrave Macmillan, 2012.

Fuller, Steve, and Veronika Lipinska. *The Proactionary Imperative: A Foundation for Transhumanism*. Basingstoke: Palgrave Macmillan, 2014.

Hauskeller, Michael. "Reinventing Cockayne. Utopian Themes in Transhumanist Thought." *Hastings Cent Rep*, vol. 42, no. 2 (March–April 2012): 39–47.

Hughes, James. *Citizen Cyborg: Why Democratic Societies Must Respond to the Redesigned Human of the Future*. Boulder: Westview Press, 2004.

Hughes, James. "Contradictions from the Enlightenment Roots of Transhumanism." *Journal of Medicine and Philosophy,* vol. 35, no. 6 (2010): 622–40.

Hughes, James. "Politics." In *Post- and Transhumanism: An Introduction,* edited by Robert Ranisch and Stefan Lorenz Sorgner. Frankfurt am Main: Peter Lang, 2014, pp. 133–48.

Huxley, Julian. "Knowledge, Morality, and Destiny—The William Alanson White Memorial Lectures, Third Series." *Psychiatry*, vol. 14, no. 2 (1951): 127–51.

Huxley, Julian. "Transhumanism." In *New Bottles for New Wine*. London: Chatto & Windus, 1957, pp. 13–17.

Istvan, Zoltan. *The Transhumanist Wager*. USA: Futurity Imagine Media LLC, 2013.

Kurzweil, Ray. *The Singularity Is Near: When Humans Transcend Biology*. London: Penguin, 2006.

Kurzweil, Ray., and Grossman, Terry. *Transcend: Nine Steps to Living Well Forever*. New York: Rodale Books, 2011.

More, Max and Natasha Vita-More, eds. *The Transhumanist Reader: Classical and Contemporary Essays on the Science, Technology, and Philosophy of the Human Future*. Chichester: Wiley-Blackwell, 2013.

More, Max. "Technological Self-Transformation: Expanding Personal Extropy." *Extropy*, no. 10 (winter/spring 1993): 15–24.

More, Max. "Transhumanism: Toward a Futurist Philosophy." *Extropy*, no. 6 (Summer 1990): 6–12.

Pearce, David. "The Hedonist Imperative." *HedWeb*, 1995, https://www.hedweb.com/hedab.htm.

Rothblatt, Martine. *Virtually Human: The Promise—and the Peril—of Digital Immortality*. London: Picador, 2015.

Sandberg, Anders. "Morphological Freedom – Why We Not Just Want It, but Need It." In *The Transhumanist Reader: Classical and Contemporary Essays on the Science, Technology, and Philosophy of the Human Future*, edited by M. More and N. Vita More. Chichester: Wiley-Blackwell, 2013, pp. 56–64.

Savulescu, Julian. "Procreative Beneficence: Why We Should Select the Best Children." *Bioethics*, vol. 15, no. 5–6 (2001): 413–26.

Savulescu, Julian, and Guy Kahane. "The Moral Obligation to Create Children with the Best Chance of the Best Life." *Bioethics*, vol. 23, no. 5 (2009): 274–90.

Sorgner, Stefan Lorenz. *Metaphysics without Truth: On the Importance of Consistency within Nietzsche's Philosophy*. Rev. ed. Milwaukee WI: University of Marquette Press, 2007.

Sorgner, Stefan Lorenz. "Nietzsche, the Overhuman, and Transhumanism." *Journal of Evolution and Technology*, vol. 21, no. 1 (2009): 29–42.

Sorgner, Stefan Lorenz. *Menschenwürde nach Nietzsche: Die Geschichte eines Begriffs*. Darmstadt: WBG, 2010.

Sorgner, Stefan Lorenz. "Is There a 'Moral Obligation to Create Children with the Best Chance of the Best Life'?" *Humana Mente: Journal of Philosophical Studies,* vol. 7, no. 26 (2014):199–212.

Sorgner, Stefan Lorenz. "The Future of Education: Genetic Enhancement and Metahumanities." *Journal of Evolution and Technology*, vol. 25, no. 1 (May 2015): 31–48.

Sorgner, Stefan Lorenz. "The Stoic Sage 3.0: A Realistic Goal of Moral (Bio)Enhancement Supporters?" *Journal of*

Evolution and Technology, vol. 26, no. 1 (2016): 83–93.

Sorgner, Stefan Lorenz. *Transhumanismus: "Die gefährlichste Idee der Welt!?"* Freiburg i. Br: Herder, 2016a.

Sorgner, Stefan Lorenz. "The Renaissance Ideal, the Common-Sense-Ideal, and the Radical Plurality of Goodnesses The Transhumanist Types of (Post)Human Perfection." In *Perfecting Human Futures: Transhuman Visions and Technological Imaginations*, edited by J. B. Hurlbut and H. Tirosh-Samuelson. Wiesbaden: Springer, 2016b, pp. 141–57.

Sorgner, Stefan Lorenz. "Philosophy as 'Intellectual War of Values'." In *Philosophy's Future. The Problem of Philosophical Progress*, edited by R. Blackford and D. Broderick. Hoboken: Wiley Blackwell, 2017, pp. 193–200.

Sorgner, Stefan Lorenz. *Schöner neuer Mensch*. Berlin: Nicolai Verlag, 2018.

Sorgner, Stefan Lorenz. "Transhumanism and the Land of Cockaygne." *Trans-Humanities*, vol. 11, no. 1 (2018a): 165–88.

Sorgner, Stefan Lorenz. "Aging as Disease." In *Two Hundred Years After Frankenstein*, edited by C. Tandy. Vol. 16 of *Death and Anti-Death*. Ann Arbor: Ria University Press, 2018b, pp. 235–52.

Sorgner, Stefan Lorenz. *Übermensch: Plädoyer für einen Nietzscheanischen Transhumanismus*. Basel: Schwabe, 2019.

Tuncel, Yunus, ed. *Nietzsche and Transhumanism: Precursor or Enemy?* Newcastle upon Tyne: Cambridge Scholars Publishing, 2017.

Vita-More, Natasha. "Aesthetics: Bringing the Arts & Design into the Discussion of Transhumanism." In *The Transhumanist Reader: Classical and Contemporary Essays on the Science, Technology, and Philosophy of the Human Future*, edited by M. More and N. Vita-More. Chichester: Wiley-Blackwell, 2013, pp. 18–27.

CHAPTER FOUR

The Non-Human, Systems, and New Materialism

RICK DOLPHIJN

With the early end of a deciphering we thought ought to have lasted longer, some people were amazed at the brevity of our genome. What, so few base pairs! Around five times fewer than a small tropical fresh water fish, the dipnoi Protopterus aethiopicus! Since we dominate living things through research and technology, we ought to win out over all of them in richness, and here we are, reduced to poverty. Fortunately, we have known, since about 1970, that there is no correlation between the complexity of genomes and the complexity of individuals. The fact remains that we find ourselves poor here.

—Michel Serres, *The Incandescent*, 40.

The quote above, from Michel Serres, nicely captures one of those moments in science and technology, which made us realize that the presumed dominance of mankind over all other living species is questionable. Over the past half a century, there have been many of these moments, where, directly or indirectly, the anthropocentrism that we inherited from philosophers like René Descartes and Immanuel Kant was proven wrong. It was therefore not surprising that, inspired by the findings of mainly post-war biology and chemistry, from the early 1970s onward, critical minds started *rethinking* the position of the human being in the world, or better even, started thinking a world in which such a simple model of dominance (with the human being at the top) was "impossible to hold." Modern science (or as Serres refers to it in the quote above "human research and technology"), as it lies at the basis of modernity and therefore also at the basis of our belief that we humans are radically different from any other living being, now shows us, with different findings, a myriad of ways in

which matter matters differently and in which human responsibility has to be conceptualized in a very different way.

Of course, it was "the Generation of 1890" in which human exceptionalism, and especially its idea of rational thought as this would be the sole realm of the human being (other animals "do not think"), was seriously questioned for the first time. This "generation," a term mainly used to group several influential thinkers who had an enormous impact on the academic discourse at the time and even more afterwards, consists of minds such as Sigmund Freud, Karl Marx, Charles Darwin, and Friedrich Nietzsche. Thinkers who all, in their own way, questioned the binary oppositions (the "dualisms") that dominated their day and age, and that often legitimize some sort of human exceptionalism. I am referring here to dualisms such as human versus animal, culture versus nature, but also man versus woman and white versus colored. Michel Foucault, in his famous 1966 book *Les Mots et les choses*, stressed that by turning philosophy into an anthropology, Immanuel Kant paved the way for these dualisms that not just created the dominant features of Modernity, but that also suggested a hierarchy between them that was internalized by members of society and thus created the conditions for truth of the modern era. With their focus on the unconscious, on class difference, on genus and species, all of these thinkers are interested in showing the undercurrents of a particular process. Think for instance of Freudian psychoanalysis, and how the libidinal undercurrents of the desiring body are inextricably connected to the visible, audible, and thinkable self. Contrary to the Kantian Subject, the Freudian notion of subjectivity is not only much more material (as in, not reducible to a metaphysical "I think"), Freud's analysis also leaves a lot of room for "the unthinkable," for all those material and immaterial processes that are "a part of me" and with which thinking happens, but that refuse to make themselves knowable, or, that cannot even be knowable.

RETHINKING INFORMATION, SYSTEMS, AND HUMANISM AFTER 1968

Since the 1970s, the critique on human exceptionalism and the human ratio got serious scholarship from various (transdisciplinary) perspectives. The work of Ilja Prigogine played an important role in this debate. Prigogine was a Russian-born chemist who won the Nobel Prize in Chemistry in 1977 for his work on dissipative structures, open systems that exchange energy and matter with their environment and thus are not in thermodynamic balance. Of great importance to theory was his work with Isabelle Stengers, who was also trained in chemistry, but who switched to philosophy before they met as colleagues at the Free University of Brussels. Starting from systems theory, Prigogine and Stengers proposed a non-binary dynamical theory of nature in which the human being did not so much act as king, but tried to understand the many different (chemical, biological, social) systems at work in which the human being operated, or better even, came to be. They opted for a new alliance, a new dialogue with nature (as the title of their 1979 book already suggests) that had to realize itself in every aspect of life. Commenting on C. P. Snow's weirdly canonical text on the fundamental differences between the sciences and the humanities, they concluded already in 1979: "The two worlds are now drawing closer together" (Prigogine and Stengers [1979]

2017: 311). And as they already note, this new alliance is very much connected to the crises of our times: "It is quite remarkable that we are at a moment both of profound change in the scientific concept of nature and of the structure of human society as a result of the demographic explosion. As a result, there is a need for new relations between man and nature and between man and man" (312).

In the beginning of the 1970s, in the United States, Gregory Bateson already worked with another form of systems theory. Seemingly starting from anthropology (and language theory), Bateson easily traverses many different academic traditions, and had already raised to fame by developing (with colleagues at Palo Alto) the theory of the double bind, a systems theory which showed the complexity of conflicting message streams. His interest in the complexity of information flows made him work on cybernetics which focused on communication streams that run between the animal, the human, and technology (only after Bateson, cybernetics increasingly focused on technology, unfortunately). His most direct critique on humanism can be found in his path-breaking book *Steps to an Ecology of Mind*, in which he combined anthropology with biology, chemistry, physics, and even astrology to set up a transdisciplinary theory of cybernetics which puts major question marks with the supposed rationality and independence of the human being. At the same time, he also showed a keen interest in how our humanism—already by then—introduced us to a series of ecological crises which have become the most pressing urgencies of our age, as we now know.

Bateson's idea of thinking can best be shown with one of his own examples:

Consider a man felling a tree with an axe. Each stroke of the axe is modified or corrected, according to the shape of the cut face of the tree left by the previous stroke. This self-corrective (i.e., mental) process is brought about by a total system, tree-eyes-brain-muscles-axe-stroke-tree; and it is this total system that has the characteristics of immanent mind. (1972: 318)

Bateson thus shows us how thinking is not so much "part" of an individual, but happens within complex and conflicting relations—from communication or information. Parallel to how this was soon to be developed by Prigogine (and Stengers), Bateson's relationality thus severely critiques the Kantian individual. Stressing how the ecological mind follows from the relation, he notices the devastating consequences of Kantian thought, which in the end comes down to forgetting how an environment is (necessarily) involved in thought:

Let us now consider what happens when you make the epistemological error of choosing the wrong unit: you end up with the species versus the other species around it or versus the environment in which it operates. Man against nature. You end up, in fact, with Kaneohe Bay polluted, Lake Erie a slimy green mess, and "Let's build bigger atom bombs to kill off the next-door neighbors." There is an ecology of bad ideas, just as there is an ecology of weeds, and it is characteristic of the system that basic error propagates itself. It branches out like a rooted parasite through the tissues of life, and everything get into a rather peculiar mess. When you narrow down your epistemology and act on the premise "What interests me is me, or my organization, or my species,"

you chop off consideration of other loops of the loop structure. You decide that you want to get rid of the by-products of human life and that Lake Erie will be a good place to put them. You forget that the eco-mental system called Lake Erie is part of your wider eco-mental system—and that if Lake Erie is driven insane, its insanity is incorporated in the larger system of your thought and experience. (1972: 492)

It is precisely this human-centered approach that was critiqued more and more during the 1970s, or actually, in the aftermath of 1968, the year of the student revolts in Paris. Starting from feminism and postcolonial theorists critique the debates that followed proved itself a microcosm for the many radical critiques on humanism and anthropocentism that would dominate continental philosophy, the social sciences, and the humanities in the decades to come.

However, it was not until the mid-1990s that scholars like Rosi Braidotti and Manuel DeLanda, coming from very different backgrounds, called for a new or a neo-materialism. Sparkled by the linguisticism that had overtaken critical thinking, new or neo-materialism in the end holds the intention to rewrite modernity as a whole. Or better even: new materialism is above all an attempt to undo the Kantianism that had been so influential to our (Western) thinking for so long, as it proposes to set up new traditions in thought, more open to other forms of rationality, other subjectivies and other individualities altogether. Prigogine, Stengers, and Bateson were important to contemporary posthumanist thinkers, but if there is one philosophy that inspired both Braidotti and DeLanda to call for this new tradition in thought, it would be that of Gilles Deleuze. Deleuze was in every way a member of the talented generation of post '68 philosophers that had such an immense impact on cultural theory in the 1970s and the 1980s. With authors like Michel Foucault, Jacques Derrida, Julia Kristeva, Jacques Lacan, Hélène Cixous, this group is sometimes captured under the name poststructuralism or postmodernism (especially following the way Paul de Man and others first introduced the work of Derrida in the United States), but actually all of these labels do not do justice to the diversity of the group and the directions that their scholarship has taken today. For whereas quite a few of these thinkers, perhaps with Lacan as the most outspoken, stressed the importance of language as their main entry into cultural theory, Deleuze did not.

Even though Deleuze focused primarily on the history of philosophy during the first part of his career, he had always been practicing a materialist perspective. In France, materialism (though not so much "historical materialism," which is obviously connected to Marxism) has always been read much more in terms of a mathematical approach. While not formally trained as a mathematician, Deleuze in many ways made mathematics an integral part of his thinking (see for instance DeLanda 2013; Duffy 2013), and much more than other members of this generation. An exception would be Michel Serres, already mentioned above, who was actually trained in mathematics and in physics (he wrote an amazing book on physics, *The Birth of Physics*), before he turned to philosophy (for more on this, see Dolphijn 2018).

In short, in (pointless) topology, in quantum physics and in differential calculus, Deleuze saw a "thinking from the relation" at work. In *Difference and Repetition* he explains this when it comes to differential calculus:

The relation dy/dx is not like a fraction which is established between particular quanta in intuition, but neither is it a general relation between variable algebraic magnitudes or quantities. Each term exists absolutely only in its relation to the other: it is no longer necessary, not even possible, to indicate an independent variable. ([Deleuze [1968] 1994: 172)

Unlike Cartesian (Modernist) mathematics which starts from a particular point zero (for instance, the Subject) and places everything in relation to that, Deleuze was always keen on starting from the relation. To translate this into ideas of the self, whereas Cartesian thinking starts from the Cogito (the "I think") and places everything else in relation to it, Deleuze practices a philosophy (and reads philosophies) in which any self exists only in its relation to its outside. It is in this way that mathematics is included in his materialism.

From the start of his career, in which he was keen on rereading of the History of Philosophy through a materialist lens, he focused very much on rereading those philosophers whose thoughts had suffered from a Modernist (Cartesian) interpretation. Philosophers like Spinoza (through "affect") and Bergson (through "becoming") were given a materialist reading by Deleuze, by means of which he liberated them from the Cartesianism as this was read into their ideas for so long.

Following the uproar in Paris in May '68, Deleuze started doing philosophy on his own account (I've called this his "non-carnal birth" as a philosopher elsewhere [see Dolphijn 2018]), his thoughts on politics (with Félix Guattari) and aesthetics, take his materialism away from the mathematical tradition (though it is still in line with it) toward the more transdisciplinary trajectories which have grown immensely popular especially after his death. Halfway through the 1990s, when the linguistic approach to cultural analysis was still dominant in cultural theory (it was the signature of "cultural studies" in those days), the work of Deleuze became of major importance in cultural theory. Following that, also the works of Prigogine, Stengers, and Bateson received new attention. The latter was already (secretly) a major influence on Deleuze and Guattari's opus magnum *A Thousand Plateaus* ([1980] 1987), and Guattari's prophetic *The Three Ecologies* ([1991] 2000), which was built upon Bateson's tripartite "ecosophy" (which suggested a rethinking of ecology in terms of a mental ecology, a social ecology, and an environmental ecology).

FEMINIST MATERIALISM

Feminist materialism was on the rise since Donna Haraway, trained as a biologist, started writing manifestos on body politics and the matters of life. Continuing but also rewriting Derrida's critique of "carno-phallogocentrism" which referred to the human dominance over (animal) life on Earth (see for instance Derrida 1992 and [2006] 2008), Haraway's situated knowledges immediately take us to the ethical and political questions at the heart of today's critique on humanism and human exceptionalism: "If social, emotional, and cognitive complexity is the criterion, Derrida got it right. There is no rational or natural dividing line that will settle on the life-and-death relations between human and nonhuman animals; such lines are alibis if they are imagined to settle the matter 'technically'" (Haraway 2008: 297).

The feminism she proposed, heavily inspired by currents in contemporary biology and the life sciences, does not necessarily provide critiques of these alibis but shows the transversal lines that run through life *and* death, human *and* animal, nature *and* culture, man *and* woman.

The rich work of Donna Haraway reveals that her deconstructive critique of Modernist (Cartesian or Kantian) dualisms is not limited to traversing the oppositions that have established themselves as the conditions of truth today:

> There is no border where evolution ends and history begins, where genes stop and environment takes up, where culture rules and nature submits, or vice versa. Instead, there are turtles upon turtles of naturecultures all the way down. Every being that matters is in a congeries of its formative histories—all of them—even as any genome worth the salt to precipitate it is a convention of all the infectious events cobbled together into the provisional, permanently emerging things Westerners call individuals, but Melanesians, perhaps more presciently, call dividuals. (Haraway 2007: 2)

It is upon this non-dualist trail that Karen Barad, today, through quantum theory and materialist feminism, pursues her deconstructive critique, continuing the way in which Haraway and Derrida deconstruct carno-phallogocentrism. Taking seriously the idea "that subjectivity is not the exclusive prerogative of anthropos" (Braidotti 2013: 82) nor of any "organic culture," Barad opens it up to the Great Outside, introducing critical theory to nature as a whole, to matter undone of its most radical dualism: the nature-culture divide. Accepting the Harawayan neologism naturecultures as a most fitting alternative to this dualism, Barad pushes materialist thinking further away from the Anthropos, introducing us to a materialism that is not focusing on rethinking the life sciences in particular but on engaging with the natural sciences as a whole. As Haraway puts it (in Dolphijn 2012: 110):

> What is *to be* is at stake. How to become-with is at stake. And it matters; it matters who does what. Cynicism is *not* an acceptable position in the face of the crisis that we are in, but "staying with the trouble" is. And it involves aesthetic, cognitive, literary, technical, sensual—all with depths of thinking, sensing, feeling, bearing, acting.

Haraway is fundamentally interested in being and becoming, which Barad fully affirms. By not starting from an idea of subjectivity (and its attendant idea of objectivity) and by not situating life *in* the world (surrounded by the world, by Others), Barad makes critical theory a materialist, perhaps even naturalist enterprise. Critical theory, with Barad, thus does not wait for the human to begin: it has always already been *of* the Earth. With Haraway we were searching for other forms of feminist subjectivity *in situ* (from *sinere* (lat.), "putting down"). We may refer to this as a *relative* form of feminism, as it searches for "a different view." Searching for a way to get beyond an idea of subjectivity and its complex, anthropocentric history, Barad introduces us therefore to "agential realism," as she conceptualizes it. It emphasizes ontology instead of epistemology (stressing "the real" instead of "knowledge") and by that offers us a new materialist feminism that is *absolute*. It is not so much in search of different views (alternative perspectives, other forms of knowledge) but rather focuses on sameness (every reality is and can only be agential). Less activist than Haraway's call to

situate knowledge (which is also aimed at those theorists who refused to do so), Barad's agential realism, being much more analytical, proposes that we study the real *only* through what we may call "its contractions."

When asked her how she saw her "manifesto" end up in contemporary cultural theory, she replied (Barad in Dolphijn and van der Tuin 2012: 70):

> Well, manifesto is a thing that my friend and colleague Donna Haraway can get into, but I cannot claim that term. [Laughs.] Of course, she means it ironically. Agential realism is not a manifesto, it does not take for granted that all is or will or can be made manifest. On the contrary, it is a call, a plea, a provocation, a cry, a passionate yearning for an appreciation of, attention to the tissue of ethicality that runs through the world. Ethics and justice are at the core of my concerns or rather, it runs through "my" very being, all being. Again, for me, ethics is not a concern we add to the questions of matter, but rather is the very nature of what it means to matter.

In light of such a claim, it is urgent to ask ourselves how their materialism then comes with a wholly other (posthuman) emancipation. For although one could argue whether the book is presented as such, Barad's naturalism is about engagement, about situatedness, and about responsibility, appealing in particular to the sciences for reconnecting ethically to "the living present" as Derrida asks us to do. I agree here with the work of Joseph Rouse, who has noted Barad's "feminist naturalism," and to whose work Barad often refers. In a footnote commenting on his work, Barad explains the link between normativity and naturalism (Barad 2007: 407n19):

> [M]y account of scientific practices is not naturalistic in the sense of giving science unquestioned authority to speak for the world, on the contrary; Rouse argues that a suitably revised conception of naturalism takes seriously what our best scientific theories tell us while simultaneously holding science accountable for its practices, for its own sake as it were, in order to safeguard its stated naturalist commitments.

Contrary to the metaphysical naturalism in which concepts such as objectivity quickly lead to the acceptance of the Laws of Nature (think also of genetic coding or "gene fetishists," as Haraway calls them [Haraway 1998: 189]), Barad's naturalism follows Haraway's "naturecultures" which refuses to accept any nature outside of culture, stressing that they have actually never been separated at all. Like Haraway deconstructs the dualisms that are still so dominant in contemporary biology, Barad's agential realism deconstructs the dualist networks that organize our thought from quantum physics (e.g., Schrödinger's cat, see Barad 2007: 284).

NEW MATERIALISM, POSTHUMANISM, AND REWRITING NATURALISM

Preferring to develop her ideas in posthumanist terms, instead of via a critical naturalism,

Barad follows the feminist potential of the former concept, which Braidotti (2013) analyzes in greater detail. Thus, Barad is in line with an increasingly large group of scholars that considers it of the greatest importance to reveal that dualist thinking is the greatest problem of contemporary thought. Barad's response (her respons-ability) is a quantum mechanics that is at the same time *necessarily* a posthuman materialism. Starting from intra-action, the creative powers from which any type of epistemological individuality is being composed, she signals the birth of a particle, of a wave, an apparatus, and a (female) body in whatever form, taking place *only* as contractions in a surface.

Braidotti's new or *neo* materialism (she herself seems to prefer the latter term) is much more linked to the work of Deleuze than to Derrida and insists on mapping a new theory of the (nomadic) subject which surpasses the Kantian Subject (with a capital S). It is not to be opposed to the Earth but is inextricably entangled with it. In Braidotti's work, too, a new theory of the Subject cannot be considered separately from a critical naturalism. She insists on a subjectivity that does not so much follow Foucault's earliest writings (*The Order of Things,* his *Introduction* to Kant's *Anthropology* in which he famously critiques Kant's Subject and the anthropocentrism this entailed), but rather builds upon his last biopolitical analyses, those found in the *History of Sexuality,* and in his lectures at the Collège de France which have only recently been published. Rereading Foucault's emphasis on the "care of the self" (as developed in this later work), Braidotti summarizes the pros and cons of a Foucauldian posthumanism in our age:

> The advantage of such a position is that it calls for a higher degree of lucidity about posthuman bio-organic existence, which means that the naturalist paradigm is definitely abandoned. The disadvantage of this position, however, is that it perverts the notion of responsibility towards individualism. (Braidotti 2013: 116)

The bio-ethical citizenship Braidotti seeks, and that embraces a new materialism which we also find in Haraway and Barad, instead opts for a type of subjectivity that aims at a sustainable, ecological, or relational construction. It is a type of subjectivity that does not demand that the human mind be the "checkpoint" necessary to verify everything there is, upon which post-Kantian thought insisted. The political necessity for a critical naturalism is perhaps the most pressing theme in contemporary cultural theory. As so many scholars are challenged by "the Anthropocene," a term with which Dutch Nobel Prize winner Paul Crutzen (2002) marks the times in which humanity is the geological force responsible for fundamental changes in the bio-sphere, it is more and more problematic to stick to Modernist Humanism. Interestingly enough, Crutzen, himself a geologist and chemist interested in the changing atmosphere, has shown us that human dominance is not limited to the way technology has alienated itself from natural processes, but also includes the fact that humanity, in many ways (including social and economic ones), increasingly opposed itself (Subject) to the world (Object) it intended to master. Aimed at the continuous speeding up of technology in itself (not taking into account its relation to the outside world), the modern subject has gone blind to the matters of the world.

Crutzen confirms the dualism that lies at the heart of the Anthropocene and its long history

in European thought. Dualism is central to what Foucault would consider the condition for our truth: it marks our time and it has done so throughout modernity (see Foucault 1966: ch. 2). At the start of the twentieth century, mathematician and philosopher Alfred North Whitehead, in his *Science and the Modern World,* shows us how this dualism was at work long before the Industrial Revolution via the writings of fellow mathematician and philosopher René Descartes. Analyzing the devastating effects of modern factories and their effect on the (English) landscape, Whitehead ([1925]1967: 194) already warned us that what Crutzen would later call the Anthropocene follows from a state of mind rather than from individual ideas:

> The general conceptions introduced by science into modern thought cannot be separated from the philosophical situation as expressed by Descartes. I mean the assumption of bodies and minds as independent substances, each existing in its own right apart from any necessary reference to each other.

Performing the ecological through both science and the humanities, new materialism therefore shows how fundamentally such dualisms are to be seen as the condition for truth in our times. By dismantling these dualisms, stressing the relation, positing a critical naturalism along the way, new materialism shows how epistemic networks place different cuts, *creating* the subject, the object, the medium, as Barad calls it (2007: 352). Similar to how Serres, Stengers, Prigogine, Bateson, Deleuze, Haraway, and Braidotti practice a materialist transdisciplinarity that immanently displaces the serious (dualist) misfortune that paralyzed academia for so long, Barad shows us how quantum mechanics *is* a critical naturalism *is* a new materialism. Or as she concludes herself (2007: 352):

> My posthumanist elaboration of Bohr's account understands the human not as a supplemental system around which the theory revolves but as a natural phenomenon that needs to be accounted for within the terms of this relational ontology. This conception honours Bohr's deeply naturalist insight that quantum physics requires us to take account of the fact that we are part of that nature which we seek to understand.

Isn't Niels Bohr (through Barad) actually saying this: that the often mentioned "weirdness" of quantum physics and quantum mechanics (the Laws of Nature make no sense anymore) is actually the "weirdness" of Humanism? Isn't it this human, all too human perspective which we, over the past 200 years, somehow believed to be universal, the real reason why we misunderstood the Earth for so long?

THE ORGANIC, THE INORGANIC, THE ANORGANIC, THOUGH THE TECHNIQUES OF EXISTENCE

Manuel DeLanda's geological history starts with concrete movements and the interplays of matter-energy through which morphogenesis happens. Not taking consciousness, linguistics or any other humanist systematics as its point of departure, DeLanda radically rethinks the

notion of life from the autopoetic systems that happen in the surface of the Earth. His various rewritings of the philosophy of science, mixed geology, sociology, mathematics, and history in analogy with how Deleuze did this and in line with how academics like Antonio Damasio and Simon Conway Morris do this today. DeLanda's materialism, which he himself now prefers to call a realism, has no interest in privileging the human being at all. Instead, starting from the dynamics of riverbeds, from lava outbursts and thunderstorms, DeLanda leads us back to the human being, human society, and, much more in general, to how human life (situated in the earthly currents) arises. But it is a kind of "humanity" that we are not too familiar with. His non-anthropocentric view on the economy of the human body immediately tells us that the dynamics of life and the consequences this has for how individual lives take shape, not so much intends to save subjectivity (by ending up with a new type of individuality, a new individual) but rather sets itself to mapping the material resonances by means of which individuality comes to be, albeit organic, inorganic or anorganic.

And thus, in search for how a radically different ecology takes on what humanity is all about, Delanda notes that 500 million years ago a sudden mineralization intruded the soft tissue or at least cooperated with it. The mineral world became part of life ever since, as an integral part of its oneness, creating new forms of life previously unknown. A new life should not be reduced to the organic or the anorganic matters from which it came to be. For one, DeLanda notes, "[it] made new forms of movement control possible … freeing them from the constraints and literally setting them [individual living bodies, r.d.] into motion to conquer every available niche in the air, in water and on land" (2000: 26–7). DeLanda thus asks us to study the techniques of existence that traverse the forms of being, humanity being just one of them. The work of Brian Massumi is in that sense most interesting. Very much inspired by the arts, Massumi searches to map exactly those techniques that are neither human nor nonhuman, yet rather are the same abstractions of nature that Whitehead also sees as the essence of technology.

Massumi recalls a personal conversation with choreographer William Forsythe who stated "a body is that which folds" (Massumi 2011: 140), which is a perfect example of how such technologies can be analyzed. Forsythe's particular conceptualization (in dance) of the body offered Massumi a starting point to differentiate between contemporary and modern dance. Warding off any emphasis on representation and on the use of metaphors, Forsythe's art offers Massumi a way to get rid of the idea that the dancer uses its body as a means to express an inner feeling. This notion of inner feeling is so prominent in conceptions of modern dance (Massumi gives the example of Martha graham's symbolic use of gesture). Contemporary dance, in contrast, expresses pure movement, Massumi states. Thus, whereas in modern dance the body dances (bodily movements create the dance), the dancer in contemporary dance comes to be in the dance (movements create a dancing body). An epic example of the latter would be Pina Bausch's *Café Müller* where the chairs in the café did not surround the dancer creating the mise-en-scène in front of which the dancer danced: the chairs are involved in the dance no less than the dancer. The chairs, the bodies of the dancers and actually everything else, make up for the raw material from which the dance is abstracted.

But although Forsythe's statement can be used to study dance, it has so much more to tell

(of course). Forsythe's definition shows us that contemporary dance overcomes the dualisms that gave form to modernity/modern dance. On the one hand, it has no interest anymore in the opposition between the dancer and the world (which it was supposed to re-present or dance-to). Contemporary dance does not consider the body "already in existence," filled with potentialities to be realized whenever the situation (the dance) asks it to. On the contrary, the body is actualized in the dance, which means that it is *only* through the act of folding (the dance) that it (the "body," the fold) realizes itself. On the other hand, this means that the folding actualizing a bodily whole is not consequential to Aristotelian memory or another agency from which the body is organized in advance. Rather, the body (including the mind) happens in the fold, which is to say that it is only because of the folding that its unity appears.

Rather than starting from a human body that holds the potentiality to dance (as Aristotle would have it), Forsythe not only starts from movement itself (and how human bodies are engaged in this). Forsythe also shows us how dancing happens *always and everywhere* in the folding of the bodies to come, the organic, inorganic, and anorganic bodies that express themselves and are given form in the dance.

It's interesting to see how a choreographer like Forsythe in the end practices a posthumanism, a system theory, or a new materialism quite in line with how the philosophers and scholars discussed above are rethinking the human. Not making reference to the same sources, not being part of a similar field of study, all of the bright minds discussed here do have in common that they feel most uncomfortable with the Modern of Cartesian (dualist) ideas that had been defining ourselves and the world around us for so long now. Second, and this is something that, I expect, will only become of greater importance in what will follow, the different materialisms discussed here, might start from quite an abstract, perhaps even transcendental (or mathematical) perspective, in the end, practice a philosophy of nature. Not by choice but by practice they show—contrary to the modernist belief—that theory is a practice, and that the act of thinking is always already an intervention in what lies outside of us (the Great Outside).

SOURCES CITED

Barad, Karen. "Getting Real: Technoscientific Practices and the Materialization of Reality." *Differences: A Journal of Feminist Cultural Studies,* vol. 10, no. 2 (1998): 87–126.

Barad, Karen. *Meeting the Universe Halfway: Quantum Physics and the Entanglement of Matter and Meaning.* Durham and London: Duke University Press, 2007.

Bateson, Gregory. *Steps to an Ecology of Mind.* Chicago: University of Chicago Press, 1972.

Bausch, Pina. *Café Müller.* Opernhaus: May 1985.

Braidotti, Rosi. *The Posthuman.* Cambridge: Polity Press, 2013.

Crutzen, Paul. "Geology of mankind." *Nature,* vol. 415, no. 23 (2002): 23.

DeLanda, Manuel. *A Thousand Years of Non-Linear History.* Cambridge MA: MIT Press, 2000.

DeLanda, Manuel. *Intensive Science and Virtual Philosophy.* London: Bloomsbury, 2013.

Deleuze, Gilles. *Difference and Repetition.* New York: Columbia University Press, [1968] 1994.

Deleuze, Gilles. *A Thousand Plateaus: Capitalism and Schizophrenia.* Minneapolis: University of Minnesota Press, [1980] 1987.

Derrida, Jacques. "Force of Law, the Metaphysical Foundation of Authority." In *Deconstruction and the Possibility of Justice,* edited by Drucilla Cornell, Michel Rosenfeld and David Carlson. London: Routledge, 1992, pp. 3–67.

Derrida, Jacques. *The Animal That Therefore I Am*. New York: Fordham University Press, [2006] 2008.

Dolphijn, Rick. *Staying with the Trouble: Interview with Donna Haraway*. Rotterdam: NAi 010 Publishers, 2012, pp. 108–15.

Dolphijn, Rick. *Michel Serres and the Crises of the Contemporary*. London: Bloomsbury, 2018.

Dolphijn, Rick, and van der Tuin. Iris. *New Materialism: Interviews and Cartographies*. Ann Arbor: Open Humanities Press/MPublishing, 2012.

Duffy, Simon B. *Deleuze and the History of Mathematics: In Defense of the "New."* London: Bloomsbury, 2013.

Foucault, Michel. *The Order of Things: An Archeology of the Human Sciences*. New York: Vintage Books, 1966.

Foucault, Michel. *Introduction to Kant's Anthropology*. Edited by R. Nigro. Los Angeles: Semiotext(e), 2008.

Guattari, Félix. *The Three Ecologies*. Translated by Ian Pindar and Paul Sutton. New York: Continuum, [1991] 2000.

Haraway, Donna. "Introduction: A Kinship of Feminist Figures." In *The Haraway Reader*, edited by Donna Haraway. New York and London: Routledge, 2007, pp. 1–7.

Haraway, Donna. *When Species Meet*. Minneapolis: The University of Minnesota Press, 2008.

Massumi, Brian. *Semblance and Event: Activist Philosophy and the Occurrent Arts*. Cambridge: MIT Press, 2011.

Prigogine, Ilya, and Isabelle Stengers. *Order Out of Chaos: Man's New Dialogue with Nature*. London: Verso, [1979] 2017.

Rouse, Joseph. "Barad's Feminist Naturalism." *Hypatia*, vol. 19, no. 1 (2004): 142–61.

Serres, Michel. *The Incandescent*. London: Bloomsbury Academic, 2018.

Whitehead, Alfred North. *Process and Reality*. New York: Free Press, [1929] 1978.

Whitehead, Alfred North. *Science and the Modern World*. New York: Free Press, [1925] 1967.

CHAPTER FIVE

The Anthropocene

PIETER VERMEULEN

Our planet is fuller than ever of human life. Whereas the global population stood at 1 billion in 1800, there are currently 7.7 billion humans alive (the projection is that there will be 11.2 billion in 2100). This expansion of the human is actively crowding out other species: humans and the animals they eat consume about 95 percent of what the biosphere produces, which leaves only 5 percent of global food for wild animals (Smil 2013). "Crowding out," for many plants and animals, crosses the threshold to extinction: we are now living through the sixth major extinction event in the history of the planet (the previous one killed off the dinosaurs), and the first "unnatural" one, in that it is caused by human action (Kolbert 2014). Nonhuman species disappear as agricultural monocropping is eroding biodiversity and making the ecological make-up of the planet ever more homogenous. Nor is it only nonhuman *species* that are affected: the human is also an "infrastructure species" that increasingly mobilizes nonhuman *stuff* to the point that the material habitat humans have created—roads, cities, cropland—is now "some five orders of magnitude greater than the weight of the human beings that it sustains"; this amounts to 4,000 tons of transformed earth per human being (Purdy 2018). Our planet, then, is a thoroughly *humanized* one that is being remade as "an integrated piece of global infrastructure" (Purdy 2018). Human life is fundamentally interpenetrated with nonhuman forces, as there is hardly any sector of the planet left that is untouched by human action.

Since the beginning of the millennium, the recognition of human life's geological agency has gone under the name of the "Anthropocene." Literally, the term means "the new epoch of

humans." Although the term still awaits official recognition by the International Commission on Stratigraphy (ICS), the ICS's interdisciplinary Anthropocene Working Group (AWG) has found robust evidence that human life has impacted the earth system in a way that makes it deviate from Holocene values. The Holocene is the relatively stable and warm geological epoch in which human life has flourished for 11,700 years, and that is now coming to an end. The notion of the Anthropocene was popularized by the Nobel Prize-winning Dutch atmospheric chemist Paul Crutzen in 2000, who had picked up the term from the biologist Eugene Stoermer. Since then, the term has served as a catalyst for questions about environmental responsibility, the limitations of economic growth, the possibilities for global governance, and other fundamental questions that concern the nature and the future of human life. It has migrated from the domain of earth science to the humanities and the social sciences, but also to the art world and, more recently, general public debate. In the process, the term's scientific significance has shifted to an ethical and political register: the notion recognizes human life as a geological *force* even while it interpellates it as a responsible ethical and political *agent*. In Dipesh Chakrabarty's terms, Anthropocene discourses are marked by "code-switching between the physical category of force and the social-existential categories of 'consciousness' and 'power'" (2018: 14).

The notion of the Anthropocene, then, is less prone to celebration than to weariness and concern about human agency. It focuses more on the "world of wounds" (Emmett and Nye 2017: 93) that human life is spreading, and on dimensions of loss, extinction, and collapse, than on the human capacity to design techno-fixes for environmental crisis (although, as we will see, so-called ecomodernists believe in a "a good, or even great, Anthropocene" through which we will engineer our way out of the crisis [Asafu-Asjaye et al. 2015: 6]). This gloom follows directly from the insight that all of the natural world has been affected by human action (which, as Andreas Malm has worked tirelessly to remind us, is not the same as saying that human life has *constructed* nature [2017: 37]): the entanglement of the human and the nonhuman implies that human life is not only the subject, but also the object of the Anthropocene. It finds itself on the receiving end of the destructive processes it has initiated, accelerated, or amplified. Anthropogenic climate change is exemplary here: the cumulative outcome of over two centuries of actions and decisions, climate change has now passed a threshold beyond which human ingenuity cannot contain, let alone reverse it. The rubric of the Anthropocene covers not only climate change, but also phenomena such as ocean acidification (which is tied to increasing carbon dioxide levels), global overpopulation, resource depletion, massive species extinction, and ecosystem simplification—phenomena that interlock in complex feedback loops that also threaten the survival of human life. The Anthropocene then also marks the fear that the ongoing sixth extinction event will extend to *Homo sapiens*, and that the planet will morph into an inhospitable place that cannot sustain the survival of the species that undid it.

The Anthropocene imagination is obsessed with worlds that are not so much posthuman as radically *posthumous*. In film, literature, but also in philosophy and popular science, images proliferate of future *worlds without us*—of "disanthropic" worlds (Garrard 2012) in which the legacy of human life has been reduced to a lifeless archive, or to a mere fossil in the geological record. Think of a film like Pixar's *WALL-E*, in which a robot trash compactor is

left to clean up an abandoned earth covered in garbage, or Alan Weisman's popular science best seller *The World without Us*, which imagines a world from which human life has suddenly disappeared. In his book of popular science, *The Earth after Us*, Jan Zalasiewicz imagines "extraterrestrial visitors from the galactic empire" (2009: 4) who, millions of years in the future, attempt to reconstruct the legacy of our "major, intelligent yet transient civilization" (2009: xiv)—a legacy from which many things we consider significant have disappeared. Such fictions are sustained exercises in coming to terms with the diminished prospects of human life on Earth—with the insight that the moment of the human's exaltation (as a considerable physical *force*) spells the moment of its existential endangerment (as a vulnerable and infinitely responsible *agent*). Like other post-catastrophe and post-apocalyptic fictions, such disanthropic imaginings tend to appeal to residual repositories of human action, and to call for a last-ditch effort to prevent the seemingly inevitable collapse of civilization. A lot of their affective appeal, we can suspect, derives from the tensions between the vast geological timescapes they open up and the ever-shortening window of time in which humanity's undoing can still be pre-empted. According to the Intergovernmental Panel on Climate Change's (IPCC) 2018 report, that window closes as early as 2030: absent decisive action to address planetary deterioration before that, all bets are off.

The Anthropocene's signature combination of power and doom generates complex emotions: Robert Emmett and David Nye mention "grief, fear, doubt, uncertainty, morbid curiosity, lethal rage" (2017: 108). These tonalities are captured by the phrase "peak humanity": like the cognate phrase "peak oil," it expresses a sense that we have reached a moment of maximum accumulation that inevitably precedes a trajectory of terminal decline. Any suggestion of species pride is undercut by an awareness of exhaustion and depletion. As an episode in the history of (post)humanism, then, the Anthropocene signals a moment of *species status anxiety*: on the one hand, the technological prowess of humankind has come to assert itself as a significant force; on the other, human life itself is caught in the processes of erosion and disintegration that human life has unleashed.

In the Anthropocene's posthumous imagination, it is often less human species life as such that is at stake, but rather a particularly *humanist* instance of it. In novels and films like *The Road*, *Cloud Atlas*, and *Mad Max: Fury Road*, the way of life that finds itself under erasure is almost consistently a comfortable and Western one; what such works feel nostalgic about is a technologically advanced and economically privileged form of life that has never been the preserve of more than a small minority of the world population. It is not so much the human species that is threatened, but the more provincial comforts associated with liberal affluent urbanity. The wastelands in which the survivors in these works find themselves are only a diminishment for independent and self-sufficient modern subjects—for people living in the global South, they are often already a reality. And have been for a long time: as Déborah Danowski and Eduardo Viveiros De Castro have argued, current metropolitan anxieties merely show that the erosion of the lifeworld has finally caught up with privileged audiences, while "for the native people of the Americas, the end of the world already happened—five centuries ago" (2016: 104). They write that "we are on the verge of a process in which the planet as a whole will become something like sixteenth-century America: a world invaded, wrecked, and razed by barbarian foreigners" (2016: 108). The anxieties that the

Anthropocene inspires, in other words, are often quite precisely posthuman*ist*, rather than radically posthuman. Alternatively, they beg the question about who exactly the human in "the new epoch of humans" is.

THE *ANTHROPOS* OF THE ANTHROPOCENE

One common critique of the notion of the Anthropocene holds that, in declaring our epoch to be marked by the impact of humanity *as a whole*, it fails to differentiate between the various constituencies that make up humanity. In that way, the notion fails to register that diagnosing both the causes and the effects of planetary change calls for *more differentiation*: if Western constituencies are disproportionally responsible for triggering dramatic changes to the earth system, it is people in the global South who will be—and, by now, have become—most vulnerable to its fall-out, as the habitable part of the planet is shrinking fast. What compounds the complexity of this picture is that today, it is no longer an increasingly provincialized Europe and the United States that aggravate planetary pollution, but previously poor nations like India and (especially) China that have become vast engines of industrial growth. Facing up to this complexity shows that the imagining of a collective humanity capable of concerted action to address planetary change—often going under the name of *ecocosmopolitanism*—is wishful thinking; it foregrounds the need to reckon with questions of environmental justice in recalibrating global relations.

Nor, as Dipesh Chakrabarty has argued, is the human who caused planetary destabilization the same one who is called on to address it. Chakrabarty's early influential interventions in the theorization of the Anthropocene had already warned that "we humans never experience ourselves as a species" (2009: 220), only ever as participants of smaller communities. Whatever sense of universality there is "arises from a shared sense of a catastrophe" (220); it is less a shared global identity, but only a negative identity, "a placeholder for an emergent, new universal history of humans that flashes up in the moment of the danger that is climate change" (219). When read closely, it becomes clear that Chakrabarty's assertion of the negativity of this proleptic humanity is a way of disentangling the knotty issue of concerted human action from the complicated legacies of inequality and injustice that complicate the assertion of a universal humanity. More recently, Chakrabarty has introduced a pragmatic distinction between *Homo* and *Anthropos. Anthropos*, for Chakrabarty, names the human who occasioned the Anthropocene—"[i]t is a causal term that does not signify any moral culpability" (2015: 157). *Homo*, in contrast, refers to the "one-but-divided humanity" that is capable of reflecting on "values, ethics, suffering, and attachments" (159); it is the subject who is currently being interpellated to come up with a response to environmental destruction. Chakrabarty's distinction is useful for preventing a focus on the past *causes* of planetary exhaustion from overwhelming the effort of managing its ongoing and emerging *effects*; at the same time, it underestimates the persistence of histories of inequality and injustice, and is then arguably too neat to capture the complex feedback loops and temporal upheavals that the Anthropocene inaugurates.

The stories we tell about the Anthropocene matter to the way we connect past responsibilities to future prospects. Such narratives do not really concern the geologists in

charge of assessing the stratigraphic actuality of the Anthropocene: their concern is with establishing evidence in the geological record to consider "the Anthropocene to be stratigraphically real," that is, with finding sufficiently clear signals in sediments and ice that show the earth system moving away from Holocene values (Zalasiewicz et al. 2017: 55). What geologists want is a so-called "golden spike," a geological marker that unambiguously points to datable and discrete changes in the earth system. In the case of the Anthropocene, the clearest such marker seems to be the layer of radiocarbon left in the rock strata after the first nuclear bomb test on July 16, 1945—a trace that serves as "[t]he most widespread and globally synchronous anthropogenic signal" (qtd. in Menely and Taylor 2017: 6). When this observation is entangled with the stories we tell about the emergence of the Anthropocene, it becomes clear that there are different competing cutting-off points, and that these stories each imply different accounts of the particular *anthropos* names by the Anthropocene. If the Anthropocene constitutes a new grand narrative that displaces the triumphalist account of a science- and technology-driven modernity codified in traditional humanism, it is worth disentangling these different accounts. I will present four competing accounts, which revolve around four proposed starting points: the onset of intense farming activities by our early agrarian ancestors (*c*. 6000 BC), the start of Western colonization (*c*. 1610), the Industrial Revolution (*c*. 1784), and the so-called Great Acceleration after the Second World War (*c*. 1945). Each proposes a different *Anthropos*; they imagine the human as a farmer, a colonizer, an entrepreneur, and/or a profligate consumer.

The so-called "early Anthropocene thesis" propounded by William Ruddiman sees humanity's geological force assert itself as early as 8,000 years ago, when intense farming and deforestation increased atmospheric greenhouse gas concentrations to the point that they delayed a (retrospectively predictable) ice-age. On this (widely contested) account, the whole of human civilization is on trial; the human is essentially an agriculturalist whose concern for its own survival is enough to affect the earth system. A second account more usefully foregrounds the role of violence and differentiated responsibilities in anthropogenic changes to the Earth. Geographers Simon Lewis and Mark Maslin propose to locate the start of the Anthropocene epoch in 1610, with the European conquest of the Americas and the onset of global trade. This version underlines the role of colonialism and imperialism in altering the ecological make-up of the planet: the ecological mixing of the Americas with Afro-Eurasia not only led to mass death because of smallpox and influenza among the native inhabitants of the Americas, but this mass death in its turn informed a large-scale reforestation of the Americas and cleared the way for, among other things, the imposition of monocrop agribusiness and the spread of plantations in the colonies—with the ecological upsets, the forced migration, and the soil exhaustion that this kind of biomanagement entails.

The entanglement of global migration, ecological mixing, and capitalist dynamics has led to a number of suggested alternatives for the rubric of the Anthropocene. The notion of the *Homogenocene* underlines the decrease in biodiversity and the increasing similarity between ecosystems around the world because of the success of invasive species—whether these travel by accident along newly globalized routes, or whether they are introduced deliberately (think of cotton, soy, or cattle), more often than not goaded by capitalist dynamics. As Steve Mentz has noted, the notion of the Homogenocene usefully displaces the human from its

central place in the dominant Anthropocene narrative, as it foregrounds the roles of "mosquitos, tobacco, viruses, plant and animal species such as potatoes, tomatoes … and other things" (Mentz 2013). It participates in a recent shift in critical theory to a consideration of *nonhuman* agents, as part of an effort to decenter the human and factor in the agency of animals, plants, things, and even so-called hyperobjects in the making of the world. Donna Haraway has coined the notion of the *Chthulucene*, a term that echoes not only H. P. Lovecraft's cosmic monster Cthulhu but also the Greek *khthonios*, which means "of the earth" (2016: 173–74n4). Haraway calls for "compositionist practices" in which humans "entangle with the ongoing, snaky, unheroic, tentacular, dreadful ones, the ones which/who craft material-semiotic netbags" (43). She advocates an "earthly worlding that is thoroughly terran, muddled, and mortal" (55) and in which human life embraces its implication in multispecies assemblages.

Foregrounding nonhuman agents may enrich descriptions of the Anthropocene alteration of the globe; it also risks letting powerful groups with a disproportionate responsibility for those changes off the hook. Haraway has also helped promote the notion of the *Plantationocene* (launched tongue-in-cheek during a 2014 roundtable) to nominate the plantation as the exemplary historical site where capitalism wreaks its destructive work. Situated at the intersection of forcibly displaced labor, long-distance financial investment, and cultivation of the soil, the plantation is an agro-industrial system (a "synthesis of field and factory," as Sidney Mintz [1986: 47] called it) that constitutes a major upheaval in the relations between humans, animals, plants, and other organisms. The slave plantation system, in Donna Haraway's words, "was the model and motor for the carbon-greedy machine-based factory system," and it is "continuous with ever greater ferocity in globalized factory meat production, monocrop agribusiness, and immense substitutions of crops like palm oil for multispecies forests and their products" (2016: 206n5). And plantations keep going strong: in the past ten years, 75 million acres of land have been sold or leased for large scale rubber, palm oil, and other concessions (Moore et al. 2019). The *Plantationocene* locks hands with the notion of the *Capitalocene* to highlight the disproportionally destructive role of capitalism in the reorganization of global ecosystems and the threat to the viability of the earth system as a whole. Ever since its emergence in the fifteenth century, proponents of this notion hold, capitalism has revolutionized the landscape and has been an environment-making force.

The decisive role of capitalist dynamics is obliterated in a third proposal for an Anthropocene starting date (after the cases for 6000 BC and 1610 I considered before): this story, which comes close to being the official one, if only because it was long endorsed by Paul Crutzen himself, sees the late eighteenth century as the starting point of the Anthropocene. On this account, James Watt's invention of the double action steam engine in 1784 kick-started the transition to coal fuel that characterized the British Industrial Revolution and began the relentless rise of atmospheric carbon dioxide levels. This account seems to reinstall a great man theory of history, in which the visionary interventions of entrepreneurs reshape not only human life but also the planet that sustains it. At the same time, it reflects a form of technological determinism, which holds that technological innovation irresistibly alters the course of history. Many critics have pointed out that that is

simply not how history works, and that far-reaching ecological changes emerge as a result of capitalist dynamics and not just of technological innovation. Fossil fuel is not magically more efficient, abundant, or reliable than, for instance, hydraulic power, but it is decidedly easier to monetize: it can easily be relocated to sites where labor is cheap, and it allows for competition (rather than require collaboration, as hydropower does) between entrepreneurs (Malm 2016). Later on, the shift from coal to oil is less inspired by technological necessity and efficiency than by the disempowerment of labor and the militarization of the globe that slick pipelines make possible (Mitchell 2011). Nor is the quasi-official Anthropocene narrative only phallocentric and technocentric: it also privileges the role of the British Industrial Revolution, and disregards that the latter was only possible in the context of preexisting transatlantic trade networks in slave labor and cotton (Malm and Hornborg 2014: 63–4; Bonneuil and Fressoz 2016: 232–3).

There are not only stratigraphic reasons, then, to follow the AWG and privilege 1945 as the official start date of the new epoch of humans. The detonation of the first atomic bomb also coincides with the so-called Great Acceleration—an exponential boost in earth system trends (think of increases in ocean acidification, tropical forest loss, marine fish capture, and atmospheric carbon dioxide levels) as well as in socioeconomic trends (think of demographic growth and the steep rise of international tourism, paper production, and foreign direct investment) that dwarfs the increase since the eighteenth century. These interlocking developments show the escalating impact of economic globalization and the expansion of consumer capitalism. The *scale* of these changes provides overwhelming evidence for the complex causal interactions between socioeconomic and earth system changes, even if that influence is not linear: because of the very *size* of human impact, the earth system has now passed irreversible tipping points beyond which processes of thawing, heating, and devastation become self-reinforcing. The Great Acceleration finds human action overextending itself to the point where it becomes the object of nonhuman processes that were yet triggered by human actions, but that can in no way be neutralized by simply discontinuing these actions. The question as to what is left for humans to do, then, is a fraught one.

WHOSE ANTHROPOCENE?

The Anthropocene has not only inspired species anxiety (which I explored in the first section) or sober analytical assessment (section two), but also a somewhat contrived optimism. The belief that human ingenuity will allow us to engineer our way out of the mess we created often goes under the name of *ecomodernism*. Ecomodernists assume that the immense cost that technological progress has exacted from the planet need not diminish our faith in further technological solutions. Technology, on this account, is a vast prosthesis that extends human power rather than a force that also limits it. For Crutzen, for instance, the notion of the Anthropocene highlights "the immense power of our intellect and our creativity, and the opportunities they offer for shaping the future" (Crutzen and Schwägerl 2011). In this way of thinking, the market will foster a green economy that will generate and promote sustainable solutions. In the so-called "Ecomodernist Manifesto," a group of eighteen

scientists cheerfully look forward to "decoupl[ing] human well-being from environmental destruction" through "a sustained commitment to technological progress" (Asafu-Asjaye et al. 2015: 31, 29). Through technological developments, human action can transcend its environmental limitations and enter "a good, or even great, Anthropocene" (6). Limitation is unnecessary, as accelerated technological developments make it possible to let natural territories "re-wild and re-green" (14).

Ecomodernists and geoengineering advocates respond to the diagnosis of peak humanity with a declaration of faith in an ever higher peak that will somehow *not* be followed by a steep decline. This amounts to a fantasy of transcendence that sidesteps physical limitations and earthly attachments in ways that echo the grandiose ambitions of transhumanism rather than the earthly commitments of a critical posthumanism. Ecomodernism not only goes against the downbeat tonality of more critical Anthropocene discourses, its anthropoboosterism also denies the other crucial features of that discourse I identified: the fundamental entanglement of human and nonhuman trajectories, and the vulnerabilities that come with it. Post-catastrophe fiction abounds with examples of failed geoengineering experiments. In Erik Conway and Naomi Oreskes's *The Collapse of Western Civilization: A View from the Future*, a scientifically informed account of the ongoing and coming planetary derangement, a fictional mid-twenty-first-century International Aerosol Injection Climate Engineering Project (IAICEP) is supposed to save the day, but unwittingly shuts down the Indian monsoon, which triggers crop failures and famine and, fatally, political support by India. Having sucked away resources from renewable energy conversion programs, the only upshot of the IAICEP is pushing the greenhouse effect beyond a tipping point (2014: 27–8).

The Collapse offers a compelling argument that science and technology alone will not articulate a viable response to the Anthropocene. If the success of geoengineering projects depends on political developments in India, one at the very least needs to have political scientists and IR scholars on board. Conway and Oreskes earlier wrote *Merchants of Doubt*, a book that laid out how particular scientific and political factions have for decades obscured the truth about issues like climate change, acid rain, or the ozone hole. As long as power players have a stake in obscuring the truth, the mere affirmation of scientific insight will have little purchase on real-world change. The interdisciplinary field of the environmental humanities has increasingly begun to bring together insights from the sciences with knowledge from such fields as cultural geography, environmental history, ecophilosophy, and cultural and literary studies in order to come to grips with the complex dynamics that affect responses to environmental disaster. Such a reckoning with the viability of available techno-fixes must also reckon with the fact that some factions are deeply invested in muddying the water as far as climate change is concerned in order to forestall decisive action.

This is one of the points of Bruno Latour's startling *Down to Earth*. Latour brings together three phenomena that have marked the last couple of decades: the deregulation of finance, the exponential rise of inequality, and the aggressive effort to distort our knowledge about climate change. Taking these three developments together, Latour notes, "it is as though a significant segment of the ruling classes (known today rather too loosely as 'the elites') had concluded that the Earth no longer had room enough for them and for everyone else" (2018: 1). The result is that "[f]rom the 1980s on, the ruling classes stopped purporting to lead and

began instead to shelter themselves from the world" (1–2). The organized refusal to confront the challenge of the Anthropocene, then, is the ruling classes' response to peak humanity: peak humanity then names a moment of crisis in which the elites can rid themselves of the surplus population—the 99 percent who cannot join the likes of Jeff Bezos and Elon Musk on their excursions to Mars, but are irredeemably earthbound. When Musk notes that his much-hyped ambition to colonize Mars is an attempt to "safeguard the existence of humanity" (Assis 2015), the vaguely humanitarian rhetoric of humanity obscures the fact that at best, planetary relocation can accommodate an infinitesimally small segment of the human population while it has to abandon billions to the Earth. In the face of the facile claim that in the Anthropocene, there are no lifeboats, Andreas Malm and Alf Hornborg have underlined that "[f]or the foreseeable future … there *will* be lifeboats for the rich and privileged" (2014: 66)—but emphatically not for us.

THE ANTHROPOCENE IMAGINATION

The threat of species extinction may be a problem for most people, but for some it is a *solution* to the problem of surplus life. For the environmental humanities, it seems crucial not to overinvest in the specter of a diminished post-catastrophe or post-apocalyptic future, but to understand that, first, the Anthropocene's vast reorganization of human life is already ongoing and, second, that there is no universal human subject of the Anthropocene—no *anthropos*, no *homo*, but different constituencies with different interests. Ursula Heise has remarked that the power of the notion of the Anthropocene lies less "in its scientific definition as a geological epoch, but in its capacity to cast the present as a future that has already arrived" (2016: 203). This, she adds, is "one of the quintessential functions of contemporary science fiction" (203). This is why the environmental humanities have also enlisted art projects and literary endeavors to forge an interdisciplinary alliance that can meaningfully intervene in the eroding present.

As an example of a work that recalibrates the relations between ongoing processes of destitution and the coming collapse, consider a science fiction novel like William Gibson's *The Peripheral*. The world of the novel consists of two futures: a near future situated in the impoverished United States and populated by drug "builders," gamers, and cyborg veterans, and a post-2100 future situated in London and populated by a tiny elite living transhuman lives. The two futures are separated by an Anthropocene-like event the novel calls "the Jackpot": a multicausal, slow, drawn-out collapse of civilization initiated by climate change, which also results in political destabilization, mass extinction (of, among others, 80 percent of the world population), and finally the end of democracy. Yet unlike what the term "Jackpot" suggests, the outcome of the Jackpot is not entirely arbitrary, as the crisis allows the already powerful to turn "constant crisis" into "constant opportunity." The 80 percent, for them, are merely collateral damage for a shiny new world "lit increasingly by the new" (2015: 321).

The novel underlines the power differences between the people inhabiting the two futures through the science fictional conceit that information can travel back in time while physical matter cannot. This means that the hi-tech future can freely intervene in the near future, and

that the games the people in the near future are paid to play provide actual labor in the later future. The novel underlines that this is enabled by superior technology, especially data-processing technology: "Information from there affects things here … Their stuff's all seventy years faster than ours" (192). This exploitation, moreover, occurs without fear of retribution or upheaval: once the future world connects with and interferes in the past, that past stops being their past and becomes an alternative timeline, "a stub" (38). Gibson describes this as a process of third-worlding: the same impudence with which colonial powers extracted labor and natural resources from a global South deemed safely removed from the Western metropolis is now unleashed against the American population through data processing, in a way that immunizes the powerful from the masses.

The Peripheral's two futures compose an allegory for the diminishments of contemporary life, while highlighting the role of environmental devastation in reinforcing inequalities and intergroup aggression. They present a scenario that Claire Colebrook has described as a prime science-fictional trope for the engagement with peak humanity: a process of "species-bifurcation, with some humans commandeering and squandering the few remaining resources while enslaving the majority of barely living humans" (2018: 151). Peter Frase has linked the threat of mass extinction to ongoing technological developments to imagine a scenario he dubs "exterminism" (2016: 120). Thanks to technological developments, the lives of the happy few are rigorously independent from those of the rest of the population, who are barely needed. Environmental crisis, then, provides a welcome occasion for decimating surplus populations. If inequality was traditionally kept in check by the mutual dependence between capitalists and workers, in this scenario "an impoverished, economically superfluous rabble poses a great threat to the ruling class," without being of any potential use (2016: 123). In *The Peripheral*, the transhumanist elite has not bothered to save excess populations, as they can count on the free disposability of labor reserves in a past that will never dry up. Only because these past lives are cheaper than technology and because they do not constitute a threat to privilege do they remain alive at all. If the novel's title refers to a kind of drone body that people can inhabit from a distant location, it also underlines the status of most lives in this new dispensation: marginal, of secondary or only superficial importance.

The Peripheral gives a particular spin to Anthropocene posthumanism. It presents it as a combination of transhumanist fantasy and cynical misanthropy. At the same time, it shows how literature and the arts can enrich the environmental humanities project of articulating different human constituencies to planetary emergencies. It does so, crucially, by showing how the Great Acceleration overlaps with the Great Divergence (Nixon 2014)—how planetary deterioration is non-trivially connected to the rise of inequality under neoliberalism in the last decade. *The Peripheral* offers no solutions: the novel's corny ending offers domestic bliss for the protagonists, but such a local windfall means little as the storm continues to rage outside. It suggests that the Anthropocene is less a problem to be solved than a new reality to be inhabited.

SOURCES CITED

Asafu-Asjaye, John, Linus Blomquist, Steward Brand et al. "An Ecomodernist Manifesto." 2015, ecomodernism.org.

Assis, Claudia. "Elon Musk on SpaceX launch: 'Moon Was in the Way'." MarketWatch, April 14, 2015, marketwatch.com.

Bonneuil, Christophe, and Jean-Baptiste Fressoz. *The Shock of the Anthropocene: The Earth, History, and Us*. London: Verso Books, 2016.

Chakrabarty, Dipesh. "The Climate of History: Four Theses." *Critical Inquiry*, vol. 35, no. 2 (2009): 197–222.

Chakrabarty, Dipesh. *The Human Condition in the Anthropocene*. The Tanner Lectures in Human Values, delivered at Yale University, 18–19 February 2015. https://tannerlectures.utah.edu/Chakrabarty%20manuscript.pdf.

Chakrabarty, Dipesh. "Anthropocene Time." *History & Theory*, vol. 57, no. 1 (2018): 5–32.

Colebrook, Claire. "Extinction." In *Posthuman Glossary*, edited by Rosi Braidotti and Maria Hlavajova. London: Bloomsbury, 2018, pp. 150–3.

Conway, Erik, and Naomi Oreskes. *The Collapse of Western Civilization: A View from the Future*. New York: Columbia University Press, 2014.

Crutzen, Paul, and Christian Schwägerl. "Living in the Anthropocene: Toward a New Global Ethos." Yale Environment, vol. 360, January 24, 2011, https://e360.yale.edu/features/living_in_the_anthropocene_toward_a_new_global_ethos.

Danowski, Déborah, and Eduardo Viveiros de Castro. *The Ends of the World*. London: Polity, 2016.

Emmett, Robert, and David Nye. *The Environmental Humanities: A Critical Introduction*. Cambridge: MIT Press, 2017.

Frase, Peter. *Four Futures: Life after Capitalism*. London: Verso, 2016.

Garrard, Greg. "World without Us: Some Types of Disanthropy." *SubStance*, vol. 41 (2012): 40–60.

Gibson, William. *The Peripheral*. New York: Penguin, 2015.

Haraway, Donna. *Staying with the Trouble: Making Kin in the Chthulucene*. Durham: Duke University Press, 2016.

Heise, Ursula. *Imagining Extinction: The Cultural Meanings of Endangered Species*. Chicago: University of Chicago Press, 2016.

IPCC. "Special Report: Global Warming of 1.5 ºC." Ippc.ch, October 8, 2018, https://www.ipcc.ch/sr15/.

Kolbert, Elizabeth. *The Sixth Extinction: An Unnatural History*. New York: Henry Holt, 2014.

Latour, Bruno. *Down to Earth: Politics in the New Climate Regime*. London: Polity, 2018.

Malm, Andreas. *Fossil Capitalism: The Rise of Steam Power and the Roots of Global Warming*. London: Verso Books, 2016.

Malm, Andreas. *The Progress of This Storm: Nature and Society in a Warming World*. London: Verso Books, 2017.

Malm, Andreas, and Alf Hornborg. "The Geology of Mankind? A Critique of the Anthropocene Narrative." *The Anthropocene Review*, vol. 1, no. 1 (2014): 62–9.

Menely, Tobias, and Jesse Oak Taylor. "Introduction." In *Anthropocene Reading: Literary History in Geologic Times*, edited by Tobias Menely and Jesse Oak Taylor. University Park: Pennsylvania State University Press, 2017, pp. 1–24.

Mentz, Steve. "Anthropocene v Homogenocene." *The Bookfish* (blog), January 25, 2013, https://stevementz.com/anthropocene-v-homogenocene/.

Mintz, Sidney. *Sweetness and Power: The Place of Sugar in Modern History*. New York: Penguin, 1986.

Mitchell, Timothy. *Carbon Democracy: Political Power in the Age of Oil*. London: Verso Books, 2011.

Moore, Sophie Sapp, Monique Allewaert, Pablo F. Gómez, and Gregg Mitman. "Plantation Legacies." *Edge Effects*, January 22, 2019.

Nixon, Rob. "The Great Acceleration and the Great Divergence: Vulnerability in the Anthropocene." *Profession*, March 2014. Online: https://profession.mla.org/the-great-acceleration-and-the-great-divergence-vulnerability-in-the-anthropocene/.

Purdy, Jedediah. "The World We've Built." *Dissent*, July 3, 2018.

Smil, Vaclav. *Harvesting the Biosphere: What We Have Taken from Nature*. Cambridge: MIT Press, 2013.

Zalasiewicz, Jan. *The Earth after Us: What Legacy Will Humans Leave in the Rocks?*. Oxford: Oxford University Press, 2009.

Zalasiewicz, Jan, et al. "The Working Group on the Anthropocene: Summary of Evidence and Interim Recommendations." *Anthropocene*, vol. 19 (2017): 55–60.

CHAPTER SIX

The Ahuman

PATRICIA MACCORMACK

The Ahuman asks a simple question: how can we dismantle human exceptionalism and privilege and care for this Earth at this time so that the future of the human—the materialization of the posthuman—is a very different, and hopefully more ethical one that opens the world to all life? By "future" I mean both the immediate future, the next of now, and a longer-term future, future as a duration of care. The Ahuman could be seen as an aspiration from posthumanism, or a technique of posthumanism. Frustratingly it cannot lay in advance a manual on "how to," just as posthumanism closes off its own posthumanism the moment it defines it. For the Ahuman, the goals of opening the world to all life and eradicating human dominance are shared, but the techniques, like posthumanism's, may be infinite, spanning, and crossing all epistemes and practices, from art to science, activism to philosophy.

From the concept's inception, the posthuman has been contested in ways that have enriched and enhanced the manifold unfurlings of both its reason for becoming a crucial tool in understanding our world, past and futures, and its employability in thinking otherwise from those more predictable humanist impulses that led to such worlds and expectations. Posthumanism has never been one thing. Temporally it has been argued that we were always posthuman while many transhumanists see posthumanism as yet to arrive. Those who refuse humanism's anthropocentric tendencies would see us already existing in a posthuman world. Spatially by claiming there is an exemplary template of what it is to be posthuman the concept loses what its infinite manifestations may be. Only in posthumanism*ings* can we

witness posthumanism. Attending to a communal definition is impossible, but there are tendencies that persist. Some, such as human exceptionalism and a return to certain questions around mortality (and potential immortality) and a reason for existence, continue humanist impulses. Others actively refuse humanist ideologies, especially the posthumanism of the last decade that is deeply critical of the questions of knowledge and techniques of biopolitics which lead to the anthropocentric power impulse being the foundation of all negotiations of the world. Posthumanism belongs in this respect to minoritarian politics. It could be argued that feminism, anti-racism and decolonialism, queer theory, disability studies, and even Marxism have always been posthumanist in their shared decentralization of a single template of humanity as viable. Increasingly antispeciesism and deep ecology are informed by and inform posthumanism for similar reasons, combined with a shift in the understanding of life from dividuated entities taxonomically and ontologically demarcated and placed within a hierarchy, to life as a mesh of networks in ethical perpetual feedforward and feedback, a multiplicity of affects and expressions. The "human" part of posthumanism is shifting to a post-world or post-earth in being attentive to and inclusive of all forms of life and the geological layers which support them, with the definition of life itself becoming more complex and nuanced. Common to these developments is the decentralization of the human in the world. It seems all manifestations of the posthuman seek to deliver the human from itself, and some seek to deliver the world from the human. The latter is the arena to which the Ahuman belongs, but as a concept that is attentive to human accountability and the urgent need for humans to forsake their privilege, the Ahuman refers to the ways in which humans can cease to be human so as to dismantle the exceptionalism of human privilege, human dominance, human destruction, and ultimately in its most extreme demand, human life from the natural world. The concept comes originally from the collected anthology *The Animal Catalyst: Toward Ahuman Theory* (MacCormack 2014) and is elaborated in *The Ahuman Manifesto* (MacCormack 2019) as a response to how to manage practical activist considerations of nonhumans and ecological environments with the phantasmagoric experiments of corporeality and becomings of posthumanism, without detriment to the former through the emphasis on human experience in the latter.

Human perception can be considered both the underlying principle and the limitation of the constitution of the Anthropocene. Our current navigations of the epoch and its devastation continue in many aspects via anthropocentric modes of perception, which severely constricts human capacity to think the world otherwise. Or, better, still, to no longer drive to know a world in order to convert that knowledge to use of the world for the human. Not knowing the world, thinking through worlds in nonhuman ways, is the goal of Ahumanism, yet it is impossible in advance to predict those ways, and all the while in art, in activism, in radical refutations of privilege, in acting on the unthinkable, Ahuman practice is already everywhere. In stating how to live a non-Fascist life Michel Foucault states that the fourth principle is de-individualization, that is, decentering the individual as one of many within a hierarchy in preference for diverse combinations and relations (1983: xiv), placing deindividualizing politics in the Spinozist realm of relationality over subjectivity. The final and most crucial of his principles is "do not become enamoured of power" (1983: xiv). Human exceptionalism is inherently Fascist in contemporary ecosophy due to its refusal to

create or allow diverse combinations in and of nature to express freely and to flourish without placing human control and reaping of value of nature before all else. Anthropocentrism is that practice converting use and human parasitism to orders of knowledge—to be known through anthropocentric epistemes—which persists in limiting even minoritarian politics that remain enamored with the individual or the human as a priority. Anthropocentric knowledge organizes, orders, and it always has a motive. Yet even we anti-anthropocentric posthumans are or at least come from the human and to claim otherwise would be to disavow the accountability we must acknowledge to catalyze our Ahuman becomings. We can leave human impulses behind and adamantly repudiate human value as superior to other organic forms, but we are also obliged to navigate the world we have created and the damage we have done. Our becomings are also obliged to neither co-opt nor fetishize another in their experiments, so the age of the Ahuman is also the age of the monster, a counter-revolutionary within the current options that also include the more traditional posthuman cyborg, Vitruvian human, or vulnerable animal. Monster studies is a field toward which Ahumanism is deeply indebted, as it exploits and celebrates the aberrant human, the non-dominant failed anthropoid, while also indulging in a faith in the fictive and unbelievable, not as a form of false consciousness or delusion (two driving forces in capitalist "truth") but of experiments in different practices of being, becomings that effectuate actual shifts in thought and power without replacing one system for another. The faith in the fictive monster, a belief in fabulation, is belief in the powers (puissance, not pouvoir) of affectuation that any force can catalyze, whether it be true or false, imagined or repetitive, fleeing or captured. The material actuality of those affects is consistently "real" in their alteration of the expressivity of entities and their relations. Many manifestations of posthumans can be considered monstrous, and Ahumanism welcomes especially those which transmute without co-opting the other in order to enter becomings or what Deleuze and Guattari call unnatural participations. The monster is a shifting and tactical anti-subject, a citizen of all and no nation, always more-than-one hybrid, incapable of allegiance but always up for co-monstrous alliance with others unlike its momentary self. Monster theory is a political theory of configuring Ahuman selfhood beyond subjectivity and technofetishistic posthumanism in that it already describes the position of many corporeally and politically minoritarian traitors to anthropocentric aspirations of belonging as advantageous. From being heavily critiqued by feminism and disability studies, monster studies has become the ways by which reclamation of alterity can inform new tactics to dismantle anthropomorphism in a similar way to queer theory, with which it shares much in being at once a refusal of human ontologies of biopolitical categories and an embrace of a category of belonging that means everything and nothing at once. The monster, like the queer, is always on the move, a verbing. Its fictive aspect makes it diverge from queer as a specifically desiring politics; however, as both are practices as much as tactical schematic selfhoods, both are deployed to move the anthropocentrism of the world as they move unlike collectives of many within the self and the self as part of many in activisms. This important shift shows the result of what happens when name-calling, pathologization, and denigration due to difference are taken away from anthropocentrism and placed in the hands of the monsters themselves, thus both the critique and celebration reflect the need for accountability with experimental

metamorphosis. Asa Mittman emphasizes this in his claim that contemporary monster studies in anthropocentric sciences is deeply normative and pathologizing while the invigorated turn to a more medieval monster studies in art, history, philosophy, and the areas that initially critiqued it such as women's studies and disability studies is jubilant in its collapse of reality with fantasy (2012: 1, 5). This vague non-definition of monstrosity takes the concept from teratology to potential activist practice, while collapsing he who names from the named. Monstrosity as a self-naming, new individuality of no-individuality, treachery to normative humanity, to the love for power defined by position (the monster is everywhere and nowhere) is nothing more than a refusal to be—to be human, to count being human as the ultimate counting, to conform to allegiances based on likeness, filiation, even species. Because monsters cannot reproduce, we resist reproduction of State, of filiation through nation, of heteronormative structures, and of regimes.

If monsters are the individuals of posthuman Ahumanism, then their utterances and politics are similarly fabulations that collapse reality and imagination—practices of art. By art I mean any practice that wishes to dismantle anthropocentrism, so there is art in science, in politics, as well as un-artistic "artworks." Like monsters, art inflects the oppositionality of reality from fiction, privileging neither aspect as affect is art's only real ambition. Ahumanism's emphasis on monsters and art (and monsters as art and art as monstrous) defines only to the extent that the affects produced disrupt and reterritorialize anthropocentric tendencies. Truth and falsity are irrelevant when speaking of patterns of apprehension and production, because capitalism relies on adaptive patterns which may be true or not, news which may be fake or not, but the material affects and actions produced are always real so the generation purpose of being either true or false is irrelevant when art, in its bareness, never claims a relationship with truth but only with its expressions. The rationality of many anthropocentric epistemes valued over art conceals their own fiction of being necessary, logical, or true. Connecting logocentrism with power impulses, Lyotard states: "Reason and power are one and the same thing. You may disguise the one with dialectics or prospectiveness, but you will still have the other in all its crudeness: jails, taboos, public weal, selection, genocide" (1984: 11). The attribution of hierarchies of organisms based on sentience or consciousness becomes defunct here. Speaking of Spinozan ethics, Deleuze states: "The fact is that consciousness by its nature is the locus of an illusion" (1988: 19) while "the entire *Ethics* is a voyage in immanence; but immanence is the unconscious itself, and the conquest of the unconscious. Ethical *joy* is the correlate of affirmative speculation" (1988: 29, original emphasis). The understandable need to see change as promised potential through activism, always an artistic practice in fictive belief, or in Deleuze's Spinozist words affirmative speculation, is also one which threatens to extinguish itself if planned in advance as a replacement structure. While this tendency seems logical and conscious, it falls into the anthropocentric traps that pair logic and consciousness with power and reason, social techniques of anthropocentric dominance. Art invokes the unconscious, opens the self to the self it never knows, creating collectives between unknowable and unlike selves. These practices sometimes seem risky and frightening but they do not belong to a binarized diachrony, so they also include joy and expansion of potential. Being beyond anthropocentric language effaces both the individual and our ability to know in general, but opening to

thought displaces anthropocentric perception which is the first step in Ahumanism. Activisms as/and art instead collate through what Guattari calls little collective refrains, where tactics are fragmentary, multidirectional compared to the organizing centers of scientific assemblages (2011: 150–1). Serres asks of us, "Can one imagine a different object of science, can one conceive an object of love?" (1995: 91). More important in Serres's critique of science (Ahumanism is *not* anti-science but anti-social contract at the expense of the natural, so it is critical of the dialectic scientific subject object relation) is his invocation of imagining. Serres foregrounds the use of imagination in conceiving an object, elucidating the act of conception in the encounter of an object. The conception occurs in the space between the two, as the object as subject conceives the subject as another object, and the relation between is a virtualized affective-expressivity independent of both that dissipates its intensities throughout the world. The turn to imagination, acknowledgment of conception, is an accountable moment—in science, in writing, in representation, in all relations—and an Ahuman attitude would embrace the other as always imagined as an act not of power but love. Irigaray emphasizes the impossibility of love coming from shared speech, which is essentially complicity (2002: 35), while allowing the other to be unknown but encountered and acknowledging the unknown self of self via an entirely new and non-anthropocentric form of speech. While Irigaray's call is primarily against phallogocentric speech, the following lengthy passage is transferable to the call against and beyond anthropocentrism:

> To go in search of oneself, especially in relation with the other, represents a work not yet carried out by our culture of speaking. It has little investigated this being on the way toward and into interiority, still leaving it to the silence of the without words, to the night of the without light … the task of discovering, beyond the customary rationality of the West, a different speech and reason has not seemed imperative. It appears however the most indispensable and the most sublime task for the human subject, the one able, beyond our oppositions and hierarchies, to recast the categories of the sensible and the intelligible in a rationality that as a result becomes more complex, more accomplished for human becoming, and nevertheless everyday and universal. (2002: 43)

There is an Ahuman aspect of embracing silence and seeing in the dark, only insofar as imagination, art and the language of the absolute other, the language of the human or nonhuman, the environment or the territory seem silent and dark to anthropocentric ears and eyes. But the world is teeming with communications, all of which are sensible and intelligible in excess of anthropocentrism. Reason cannot translate them. Imagination offers the opportunity of hope in entering into relations with consent (and nature rarely consents to the relations into which we force it) and reciprocity.

The Ahuman initially emerges as a third way on the reductive binary that describes the simplest version of the posthuman—the human as a future cyborg with eternal life, and the human as a material experiment in devolutionary politics, becomings, and diversity. The Ahuman repudiates biotechnology only to the extent that biotech concerns itself with profit or human life extension, but not necessarily to the ways it could help care for the Earth. Transhumanism is therefore not considered markedly different to humanism or even religion

in the shared desire for life eternal and man at the zenith of a hierarchy (or at least a God that looks very much like a white man). The Ahuman is suspicious of the motives of devolutionary politics because many experiments in identity metamorphosis end up fetishizing or co-opting the other for the benefit of the dominant (not necessarily always dominant human but certainly dominant over some humans and other species). While the Ahuman embraces all experiments in being whose affects are not detrimental to minoritarian others, human and nonhuman, it is suspicious of turning to the other and making their alterity a performative masquerade or, even worse, using the actual bodies of others in experiments in posthumanism, be it in the theater or the laboratory.

The posthuman owes as much to anti-capitalist minoritarian movements such as feminism, postcolonialism, disability studies, and queer theory (those which also inspired monster studies according to Mittman, [2012: 3]) as to transhumanism's fascination with biotechnology. Posthuman's minoritarian inspiration allies it with movements such as intersectionality but beyond identity politics. Ahumanism could be considered an extension of the reflective address of intersectionality on the histories and memories of the maligned never-quite-human with the fabulated becomings of the anti–identity posthumans, but it takes this address away from its human focus to a rhizomatic understanding of life (itself an increasingly difficult concept to define) as constituting the Earth without signification or subjectification. Ahumanism adds antispeciesism to intersectionality without adding any ontological definition of species and resistant to the very concept of species, which belongs to the anthropocentric worlds of ethology or animal fetishism. Ahumanism accepts the absolute unknowability of the nonhuman other, and voraciously fights for that other's right to express freely and with liberty via no conditions of existence and no human knowledge or understanding of those conditions. Ahumanism in this somewhat perverse term takes the concept of equality—somewhat old fashioned and phallocratic for feminism, utopian, and vague for material rights—and applies it to all Earth's life forms. This delivers it from the asinine and predictable absurd scenarios with which some moral philosophy grapples (is a virus the same as a cow, the stereotype child versus dog on a rail track or human and pig on a desert island) although even in this area the questions are changing their focus from the other's "responsibility" to prove their equivalence to our obligation to allow the other to be, entirely independent of knowledge of that other's drives or desires (see Koorsgard 2019). The Ahuman's inception comes primarily from the inclusion of abolitionism into alterity activism. Abolitionism, unlike animal rights, does not seek to give rights to nonhumans in a human world, but begins with the premise that animals do not occupy a world which is for humans but that all life has an equal claim to liberty of being and therefore all use of another organism is unethical. The nonhuman animal is no longer the fatally disadvantaged or non-consensual plaintiff in a judiciary situation it cannot win, or a pawn about which humans argue, where the site of contestation is always between humans and about humans. Anthropocentric ethology is destined to fail the nonhuman because it is knowledge enamored of power and driven by motive. The use arrives before the endless redundant vindications for using nonhumans and the Earth. Abolitionism reverses this hypothesis.

Posthumanism has a long relationship with deconstructing the identities which constitute the conditions of oppression. It has simultaneously grappled with the ethics of repudiating

new or repressed identities that have never counted as properly or at least equally human in the first place. This attention to memories of oppressions coupled with desires for liberation has been foregrounded in posthuman materialism, against transhumanism's persistent humanist impulses. However, the nonhuman animal was (and often still is) frequently absent in the list of oppressed. Alternatively, nonhumans are included as homogenized species, denying individual nonhuman agency. Frequently the nonhuman as individual or species-archetype has been co-opted into an experiment in becoming or an ethological template for living otherwise than human, both of which allow the nonhuman animal to emerge once again only via human perception without consent. The hypothesis, motive, and use behind these experiments often remained thoroughly human in their dominant actions if not in their resulting posthumanismings. The Ahuman seeks to redress this absence, not through the political tool of inclusion (which continues to fail humans as well) but of a concept taken from Serres—that of grace. Serres only fleetingly mentions grace in *Genesis*:

> Whoever is nothing, whoever has nothing, passes and steps aside. From a bit of force, from any force, from anything, from any decision, from any determination … Grace is nothing, it is nothing but stepping aside. Not to touch the ground with one's force, not to leave any trace of one's weight, to leave no mark, to leave nothing, to yield, to step aside … to dance is only to make room, to think is only to step aside and make room, give up one's place. (1995: 47)

The concept of grace has led me to return over and over to both this quote and the incandescently rich yet simple idea that humans are capable of materially considerable activism which is not always intervention but can be passive action. All binaries of action and non-action, power and passivity, doing something and doing nothing, seem to melt into one another in this concept. This is particularly useful at this time in late capitalism, where doing something as an individual or collective seems increasingly nominal in the face of abstract machines of market, empty economic signifiers, and the world being understood primarily through circulation of data. The material reality of lives, of suffering, gets lost in this system and so too does the effectiveness of some activism and the importance of small changes can seem inconsequential. Yet activisms such as boycott, refusal, holding to account through diminishment of abstract profit can hijack the de-"person"-alized (more correctly dematerialized) world through the purchase histories we make and the activities of consumerism we refuse, activism in not buying or not doing which is a crucial and most easily accessible element of abolitionist activism. Put simply, not being complicit with the wholesale torture and murder of nonhuman animals by not buying the spoils of their suffering which is the primary activism of abolitionists, is a doing in not doing. It performs an additional function of grace which lacks in both ethology and animal rights in that it steps aside from demanding the nonhuman other to vindicate their right to be. Abolitionists do not ask the other to prove their existence based either on equivalence to humans, central to the speciesism of animal rights moral philosophy, or even their desire to live and capacity for pain, seen in some less speciesist moral theory. Humans have a violent tendency to make the other prove the worth of its existence while never reflecting on its own neutralized position

of dominance, and while minoritarian humans know this, we speak the same language at least to negotiate it. Leaving makes no demands of the other, so grace becomes what Ahumanism calls an activism of radical compassion, inspired by Carol Adams' critique of capitalism and malzoan humanism's war on compassion (2014). In addition to vegan practices of boycott and refusal, which even by being defined through negative value presume privation of a superior thus worthy human, imagination and art constitute abolitionist practices. Because we are utterly unfamiliar with a world that is compassionate and shows grace toward nonhuman others, the practices of direct action activism and ways in which anthropocentric patterns of perception can be disrupted require imaginative techniques, unthought of modes of representation and communication, and returning to the first part of this chapter, a commitment to believing in something that at this time may seem unbelievable—a world where the nonhuman does not suffer through human use. So many abolitionists risk despair in the enormity and, to paraphrase Arendt, banal evil, of the way humans abuse nonhuman animals in the daily exponentially overwhelming holocaust (this is explored by Patterson), so embracing joy through the artistry required to navigate an anthropocentric world in non-anthropocentric ways is vital and vitalizing. This kind of jubilant and imaginative artistry has also extended more traditional activisms such as intersectionality to antispeciesism in Adams, A. Breeze Harper (also known as Sistah Vegan), Elena Wewer and Tara Sophia Bahna-Jones, and others. While the maintenance of joy alongside despair is critical for abolitionist Ahumanism, the welcoming of fabulation and liberation from anthropocentrism through art as activism (and vice versa) can be considered a gift, albeit a challenging one, that the optimistic aspects of posthumanism's unpredictable future have celebrated.

There is a further step in Ahumanism that is inspired by the grace of stepping aside and leaving be, which is an increasingly common activism in both abolitionism and environmentalism—antinatalism. How better to open the world to the other, to allow the other to express and develop, evolve in ways liberated from the diminishing affects imposed from human intervention, that for humans to rethink the necessity for the species to exist? In a highly posthuman turn, just as posthumanism rebukes the emptiness of humanist questions of "why are we here" and "how can we live forever," the Ahuman asks "why does the earth need humans?" Ahuman antinatalism is not efilism (the end-all-carbon-based-life fetishization of Buddhism) and it is not genocide, eugenics, or any other thoroughly human hierarchical form of violence. It sees the lives here now as valid because they are here but sees little validity in the already vaguely eugenic idea that human procreation is necessary or beneficial at all. The very concept of continuing one's family line or DNA is akin in many ways to nationalism, patriotism, and other lineage fantasies of false inheritance of attributes that in anthropocentrism has usually led to the most heinous forms of violence and hatred of alterity as a concept. When the state enforces eugenics, when the Right cultivates nationalism, it is horrific. Somehow when the Oedipal family does it, it is domesticated to be natural or even adorable. From an Ahuman perspective, they are the same tendency. This is human exceptionalism at its most creepingly insipid. Currently the worst offense humans can make toward the Earth and environmental damage is reproduction. Presuming one's offspring will share one's values is Fascist (and delusional). But ceasing reproduction leaves us with more than enough to keep our imaginations for this Earth, and its current occupants, human

and nonhuman, challenged. One cannot lament a life never been, one is simply lamenting one's own [insert vacuous humanist concept here] not continuing, whether that be genetic, nationality, family name, or any other vindication that seems to align itself with fascism readily but which, in our breedercentric world, becomes sentimental when we speak of reproduction. In antinatalism nothing is lost, care for the world is won. Humans can graciously care for the living occupants of the Earth, and ultimately, leave the Earth be.

A note on care: Care is increasingly important in posthuman ethical work because it attends to some of the dismissed aspects of posthumanism that logocentric posthumanism refuted as either emotive or feminizing (often interchangeably). Grace as a stepping aside and letting be does not ignore necessity. The large-scale concept of grace measures the violent constant interventions humans have on the Earth against the benefit of not doing so, coupled with the stepping aside from the over valuation of self that humans perpetrate at the expense of the other (including minoritarian humans in the case of, for example, choosing to reproduce over fostering or adoption)—stepping aside from privileging of self; stepping aside from hierarchy, use, abuse, and parasitic relations. The smaller, localized issues that would be described as Ahuman activisms often involve intervention as an attribute of care. Care listens to the very different, untranslatable language of nature and attempts to assist. Grace does not ignore suffering. But it does not force nature into nonconsensual relations either. Rectifying the damage humans have done to the Earth will involve certain interventions which can be described as care with grace, because the primary motive of intervention as parasitic, in order to use nature, is not the driving force. Caring graciously is a passive activism, relation without profit or demand for reciprocity.

Ahumanism will hopefully have an exhaustible time, or perhaps a time where it becomes defunct, advocating for things which would be entirely unthinkable to a future, just as we now think of human slavery (see Spiegel 1997), gender, racial, and sexual persecution as unthinkable—yet of course they still exist and show that anthropocentric impulses lead to predictable results. A world without humans—right now without anthropocentric actions and enforcements of power, eventually perhaps without actual human life—is any number of infinite worlds, but the key lies in our giving away the impulse or desire to know. Arguments against Ahumanism cite care as needing goals and an endgame picture, but while minor revolutions and outcomes and their benefits are invaluable, endgame worldviews are driven by anthropocentrism's obsession with omniscience and its own deification. Ahumanism is a concept that is met with outrage, claims it is delusionally absurd, utopian. What matters is less what Ahumanism seems to the anthropocentric, but its workability as a here and now activism. Both abolition and antinatalism are freely available activisms for the overwhelming majority of humans at this time. The question should not be why should we, but if we can why aren't we? Anything less is an excuse for human exceptionalism, where even the most left wing, the most anti-prejudice, shows their human species-nationalism, and places the onus on the victim. Navigating of what being human means during a time of care is posthuman because it is non-prescriptive. The navigation involves experiments in being non-anthropocentric, queer monsters treacherous to the power-enamored human, effulgent in despair, creative in confoundment. If posthuman is the verbing of subjectivity, Ahumanism advocates practical and unimagined actions that produce material affects immediately real for

the bodies that suffer and die right now. It values the Earth and all its occupants over use, and unknowing becomes the potential of life without dominion, a new way of understanding life liberated from the dominion of both human parasitism and human knowledge. Radical compassion is care without condition as a way to acknowledge what humans were and go beyond what we think we can be not in the world but for the world.

SOURCES CITED

Adams, Carol J. "The War on Compassion." In *The Animal Catalyst: Towards Ahuman Theory*, edited by Patricia MacCormack. London: Bloomsbury, 2014, pp. 15–26.

Bahna-Jones, Tara Sophia. "The Art of Truth Telling." In *Sister Species: Women, Animals and Social Justice*, edited by Lisa Kemmerer. Urbana: University of Illinois Press, 2011, pp. 117–26.

Breeze Harper, A. *Sistah Vegan*. Brooklyn: Lantern Books, 2010.

Deleuze, Gilles. *Spinoza: Practical Philosophy*. Translated by Robert Hurley. San Francisco: City Lights Books, 1988.

Foucault, Michel. Preface to *Anti-Oedipus: Capitalism and Schizophrenia*, Gilles Deleuze and Félix Guattari, translated by Robert Hurley, Mark Seem and Helen Lane. Minneapolis: University of Minnesota Press, 1983.

Guattari, Félix. *The Machinic Unconscious*. Translated by Taylor Adkins. New York: Semiotext(e), 2011.

Irigaray, Luce. *The Way of Love*. Translated by Heidi Bostic and Stephen Pluhacek. London: Continuum, 2002.

Korsgaard, Christine. *Fellow Creatures: Our Obligations to Other Animals*. Oxford: Oxford University Press, 2019.

Lyotard, Jean Françoise. *Driftworks*. Translated by Roger McKeon. New York: Semiotext(e, 1984.

MacCormack, Patricia, ed. *The Animal Catalyst: Toward Ahuman Theory*. London: Bloomsbury, 2014.

MacCormack, Patricia. *The Ahuman Manifesto*. London: Bloomsbury, 2019.

Mittman, Asa. Introduction to *The Ashgate Research Companion to Monsters and the Monstrous,* Asa Mittman and Peter J. Dendle. Farnham: Ashgate, 2012.

Patterson, Charles. *Eternal Treblinka: Our Treatment of Animals and the Holocaust*. Brooklyn: Lantern Books, 2002.

Serres, Michel. *Genesis*. Translated by Genevieve James and James Nielson. Ann Arbor, MI: University of Michigan Press, 1995.

Spiegel, Marjorie. *The Dreaded Comparison: Human and Animal Slavery*. London: Mirror Books, 1997.

Wewer, Elena. "Man, Animal, Other: The Intersections of Racism, Speciesism and Problematic Recognition within Indigenous Australia." *Emerging Scholars in Australian Indigenous Studies*, vol. 2–3, no. 1 (2018): 24–31.

CHAPTER SEVEN

Posthumanism: Critical, Speculative, Biomorphic

DAVID RODEN

POSTHUMANISM: VITAL OR UNBOUND?

The various philosophical posthumanisms—speculative, critical, epistemological, etc.—reject the presumption that reality must be understood from a human perspective. But what is left of embodiment or aesthetics in post-anthropocentric thought? Should it conceive bodily feelings or the aesthetic as modes by which reality is encountered? If not, it seems ill-placed to describe the historical situation motivating this "non-human turn." I refer to this in my book *Posthuman Life* as the "posthuman predicament": a condition under which life and mind have become entangled with planetary-scale technological and ecological processes which portend radical changes in their composition and nature (Roden 2014: 150–65, 186).

Without the idea of a sensing, active body, it is unclear how to explore the ethical salience of the posthuman predicament. For this reason, posthumanists have sought to think ethical agency as no longer the unique preserve of the rational human subject but of *living bodies as such*.

However, such posthumanisms may inflate parochially human experiences into invariants of life as such, effectively singing anthropocentrism in a vitalist key.

I argue here that there is a form of abstraction, which circumvents anthropocentrism. Following related usages of Alain Badiou and Ray Brassier, I refer to this as "unbinding" in

my account of the epistemology of Speculative Posthumanism (see Roden 2014: 75, 76–104).

However, "unbound" posthumanism loosens constraints on subjectivity in ways that could return us to the "disembodied approach" that we initially considered ill-adapted to understanding the historical situation of the posthuman. It must consequently use a more epistemologically vigilant means of folding the body back into posthumanism. To this end, I want to consider the thought of a "subtractive body" whose coherence and status are longer explicitly theorized but effected. Instead of a "vital posthumanism" of affective bodies, I propose one of *biomorphic abstraction.*

I get this term from J. G. Ballard's experimental fiction, *The Atrocity Exhibition*—a montage of 20th Century media landscapes, whose images of assassination, war, psycho-surgical intervention, and mutilation are obsessively and pornographically rendered, as if in a series of attempts to grasp the latent destructiveness of modernity. Its fictive pretext is that these elements have been assembled by a former psychiatrist seeking to understand the exorbitant violence of his period. Yet as his colleague Dr. Nathan notes, the cure is sometimes the poison:

> Travers's problem is how to come to terms with the violence that has pursued his life—not merely the violence of accident and bereavement, or the horrors of war, but the biomorphic horror of our own bodies. Travers has at last realized that the real significance of these acts of violence lies elsewhere, in what we might term "the death of affect." Consider our most real and tender pleasures—in the excitements of pain and mutilation; in sex as the perfect arena, like a culture bed of sterile pus, for all the veronicas of our own perversions, in voyeurism and self-disgust, in our moral freedom to pursue our own psychopathologies as a game, and in our ever greater powers of abstraction. What our children have to fear are not the cars on the freeways of tomorrow, but our own pleasure in calculating the most elegant parameters of their deaths. (Ballard 1993: 93–4)

The "exhibition" is not a detached method for understanding modernity but a perverse iteration of it. Ballard's biomorph thus indicates a similarly perverse solution to the self-prescribed conceptual poverty of unbound posthumanism. It performs a body whose features are revealed in the novel's implacable geometries, just like the conjoined and wounded bodies of Ballard's other great '70s experiment, *Crash* (see below).

Rhetorics of depth or intensity must be sacrificed, not because actual bodies are abstractions, but because unbound posthumanism cannot frame the deracinative effects of the future as the adventure of some given subject (whether human, animal, mundane, or transcendental). If this future can be embodied, it is by remaking and remarking bodies, reiterating the disconnection that lifts the formerly human into the orbit of the posthuman. This biomorphic "body" is thought neither as flesh, nor pre-discursive intensity, nor as socially mediated construct (Thacker 1997: 60). What constitutes the body and its powers—its specific eroticism and affects—is something for bodies to elaborate. Posthumanism then becomes invested in aesthetic experiments that, as we will see in the next section, operate in

the wastelands vacated by philosophies of subjectivity and agency.

Unbound posthumanism has no model of experience familiar from traditional aesthetics. The aesthetic is not discernible within unbound discourse because traditional accounts of subjectivity or embodiment are suspended (see Badiou 2006: 327). Posthumanism explores the possibility space of subjectivity through performance—mutating and experimenting with exemplars and models (biomorphs) rather than by inference or dialectics. The theoretical part of it that we treat here is thus propaedeutic to its operation.

Below, I argue that this opaque posthuman performance ("disconnection thinking disconnection") bears a formal comparison to the ways Francois Laruelle's Non-Philosophy attempts to think in "the Real" rather than *about it*. A consideration of the role of the non-philosophical performative, I argue, limns a "broken" thought that can disconnect without a pre-conception of itself. The final part of the essay will consider examples of this operation in the art and writing of Hans Bellmer, Ballard, and Gary J. Shipley.

THE SPECULATIVE IMPETUS

Whereas "critical posthumanism" opposes the perceived anthropocentrism of modern political and intellectual life, "speculative posthumanism" is concerned with the possibility that radically nonhuman agents might emerge from our technological practice (see Roden 2014). This futurist orientation forces a methodological suspension of anthropological assumptions. While critical and speculative posthumanism overlaps in opposing anthropocentrism, the latter must undertake this more conscientiously, for "we know that we do not know" of the deep technological time of posthuman life.

What can be said—or so I argue in *Posthuman Life*—is currently schematic in nature. For example, I characterize posthumans as *wide human descendants* of humans who have become technologically inhuman.[1] These might come from any locus of the "Wide Human"—the reciprocating assemblage of "narrow" humans, ecologies, technical systems, and networks generating undirected techno-social mutations. Posthumanity, so understood, is a self-catalyzed disconnection from the Wide Human by one of its parts. This "Disconnection Thesis" (DT) affords an appropriately abstract interpretation of "becoming inhuman." It states:

A wide human descendent is a posthuman if and only if:

1. It has ceased to belong to the Wide Human as a result of technical alteration.
2. Or is a wide descendant of such a being (Outside the Wide Human)[2]

(Roden 2014: 112–13)

As stated, DT is purposely nonsubstantive and abstract: multiply satisfiable by agents with disparately mundane or exotic powers (e.g., artificial intelligences, mind-uploads, cyborgs, synthetic life forms, etc.). However, it is important for our purposes to note that DT—at least, this initial version of it—is not wholly "unbound." It needs a theory of agency to give it empirical purchase on future disconnections. For example, it distinguishes posthuman disconnection from uninteresting cases where technical objects—hulks and ruins, say—fall out of the Wide Human by ceasing to work (Roden 2014: 127–8).

I supply this by employing an ecological conception of a self-maintaining agent characterized by the *functional autonomy* to exploit its environment and form collectives with other agents (Roden 2014: 124–50). Apart from this capacity to "enlist" ecological value, functional autonomy implies no specific psychology (e.g., consciousness, language, beliefs etc.).

As observed already, humanist conceptions of agency bind the space of possible agents to some concept drawn from philosophical accounts of what makes actual human subjectivity epistemically or ethically distinctive. This can be extremely abstract and relatively unbound on its own terms. Thus, for Ray Brassier and Reza Negarestani the only part of humanism worth saving is a subtractive version of what Wilfred Sellars calls "the manifest image"—the conceptual framework in which we understand ourselves as reflective subjects evaluable within a social and linguistic "space of reasons" (Sellars 1956). For Brassier's neorationalist futurism, this formal idea of a "self-conscious rational agent" is central to any conception of general intelligence as a "self-correcting enterprise" (Brassier 2011a; Negarestani 2019; Roden 2019).

Critical posthumanists, by contrast, channel Michel Foucault in their suspicion of the idea that the human body instantiates a transcendental or discursive form. Donna Haraway, Katherine Hayles, and Rosi Braidotti appeal to a situated, bodily agent that composes its world by connecting and affiliating with other bodies. Not a transcendental subject but a "transversal force that cuts across and reconnects previously segregated species, categories and domains" (Braidotti 2013: 60, 193). Haraway famously glosses these transversal entities as cyborgs: "creatures simultaneously animal and machine who populate worlds ambiguously natural and crafted" (Haraway 1989: 174). Braidotti refers to this lively power of affiliation with the ancient Greek term for non-human/non-political life (*zoe*)—as opposed to *bios,* the cultivated, discursive life of the human citizen.

Z*oe* marks the sociable tendency of living matter to affiliate with other living systems and form new functional assemblages. Crucially, for Braidotti, this vital posthumanism affirms "the positivity of the intensive subject" and the power of joy, endurance, affectivity, and freedom (Braidotti 2006: 134–5). It has a temporal duration, a future, feels pain and limitation: "Z*oe*, or life as absolute vitality, however, is not above negativity and it can hurt. It is always too much for the specific slab of enfleshed existence that single subjects actualise" (138).

These remarks suggest that while ostensibly non-human, *zoe* has attributes that may only be intelligible in anthropocentric terms. Notions like "duration," "pain," and "affirmation" are, after all, derived from human experience. This point is echoed by the French speculative realist philosopher Quentin Meillassoux, who argues that there is something paradoxical about a critique of humanism that deflates "the primacy of the rational subject" only to inflate "another type of subjectivity (will, life, habit, contraction of duration)" (Meillassoux 2016: Kindle Locations 2903–2908; see also Negarestani 2019: 201–48).

This criticism can be beefed up with the help of epistemological filters developed in *Posthuman Life* and my subsequent work (see Roden 2017, 2018). The first is the claim that there are contents or structures of experience ("dark phenomena") such that having them does not confer significant understanding of them (Roden 2013). Applying the Dark

Phenomenology Filter, Meillassoux's worry is epistemically well-founded. Having such experiences does not tell us what they are, how they are structured, or how generalizable such structures are to nonhuman, non-terrestrial, or posthuman life. Thus, there is no non-empirical basis for generalizing them to life conceived as *zoe*.

Admittedly, Braidotti's orientation, like Haraway's, is primarily political and disclaims totalizing or futurist ambitions in favor of the empirical mapping of power relations in a globalizing world (Braidotti 2018: 4). However, the posthuman predicament is defined, as Claire Colebrook reminds us, by the capture of *zoe* in a "divergent, disrupted and diffuse systems of forces, in which the role of human decisions and perceptions is a contributing factor at best." This decentered multiple is, or seems, without direction or purpose. Unlike *zoe*, it is not an ethical subject. It follows that posthumanism is not ethics but, as Colebrook enjoins, a "counter ethics" (Colebrook 2012a: 37). To think of this inhuman network, to which the Wide Human paradoxically adheres, at the level of theory or art posthumanism must unbind ecological/embodied constraints in order to map the indetermination of the future by anything remotely human.

This applies to the attributes of even the minimal, "psychology-free" account of agency in *Posthuman Life*. What is self-maintenance in the most general sense? A tendency to preserve an organic boundary or core temperature? Why assume posthumans agents should have such fixed tolerances? My fiction of the "hyperplastic agent" (hyperagent) suggests otherwise. A hyperagent is one whose autonomy has grown to the point that it can modify itself to an arbitrary degree. It would be protean—lacking structural invariances beyond hyperplasticity. It would not be self-maintaining in any sense that connects with the life we know.

I have argued that hyperagents could not be assigned rational intentions or boundaries allowing us to attribute them endurance, pain, or passion (for details, see Roden 2014: 100–02; 2015, 2016, 2017). They are thus radically uninterpretable within the manifest image. We could not recognize them in either the rationalist sense favored by Brassier, or in Braidotti's *zoe*-centered sense.

Whether such beings are possible outside H. P. Lovecraft's cosmic horror fiction is irrelevant. I introduce the idea of limit agency to motivate the claim that our concepts of agency might be too parochial to travel far outside our historical niche. If so, unbinding posthumanism requires us to relinquish them as constraints on the potentialities released by the posthuman predicament. Thus, even the ecological agent of *Posthuman Life* proves too "speculative" for speculative posthumanism, which thus loses its means of identifying disconnection events. We must withdraw from speculations on technological deep-time bounded by a psychology-free ecological agency to terrain where disconnection becomes "maximally unbound."

PERFORMATIVE POSTHUMANISM

The withdrawal strategy I will consider here (biomorphism) has affinities and contrasts with François Laruelle's Non-Philosophy which are revealing enough to warrant the following brief and inexpert discussion.

For Laruelle, philosophy is defined by a self-mirroring relation which he refers to as the

principle of "sufficient philosophy" (Laruelle 2011: 16). This guarantees that philosophy can conceptualize any topic it addresses—e.g., hyperagency can perhaps be unpacked as an exotic mode of agency. Philosophy thus wins the war even if it loses every battle. It generates a hallucinatory mastery over its objects and its world; for whatever philosophers talk about, they will be able to say what they are talking about (Gangle 2014: 50). There are no blind spots in its discourse: all is philosophical.

To many, this might seem a benign condition of universal expressibility. What could be wrong with that?

Well, our overview of unbinding and hyperagency motivated the question of whether any philosophical concept of agency, ethics, or life (vitalist or Kantian) can determine its extension into a posthuman or nonhuman field. Other philosophers—e.g., Derrida, Adorno, and Badiou (2006)—cast doubt more generally on the sufficiency of philosophy. Thus, as Brassier argues, we are philosophically entitled to question the dogma of a "pre-established harmony" between concepts and reality: "Thought is not guaranteed access to being; being is not inherently thinkable" (Brassier 2011b: 47).

But, then, how do we conceptualize an inexpressible reality without, once more, reasserting the closure of philosophy? Laruelle and his followers propose to achieve this by cracking the mirror of Philosophy and unbinding the principle of sufficient philosophy.

Laruelle performs this shattering in a writing that axiomatically insists on its own insufficiency. Non-Philosophy radicalizes the idea of a purely immanent field prior to any dualism or synthesis. Braidotti's vitalism and other philosophical repudiations of metaphysical or transcendental subject-object distinctions constitute more familiar avatars of such immanence. Laruelle's radical immanence, however, is introduced formally in terms of a unilateral determination of thought. The Real or One determines thought immanently without being conceptually determinable in thought: "The Real is not an object of representation and consequently auto-representation; the One cannot be reflected as it is" (Laruelle 2013: 137).

As Emma Black reminds us, however, the Real is not, therefore, unthinkable; for thinking is determined from it and is subject to its torsions: "The One forces us to think 'in' or 'from' the real (in a unilateral sense) rather than 'of' or 'about' the real (In a reflexive or representational sense)" (Black 2015: 3).

Non-Philosophy, like other "philosophies of the limit" (to use Drucilla Cornell's revealing term for deconstruction), proposes to unbind or disrupt the constraints that give reality a philosophical face (Cornell 1992; Kolozova 2014: 99; 2018). It thus implies a thinking no longer assignable to an agent or subject separated from or transcending the Real. By the same token, the Real is not other than the human since its immanence precludes such a differentiation. Katarina Kolozova aligns this inhuman real with the posthumanisms of Haraway and Braidotti, recasting the human as the "Inhuman" a dissonant cyborg, hybrid of vulnerable organic nature and formal rationality that, unlike the rationalist subject, is philosophically irreducible to either (Kolozova 2018).

The identification of the Real with an inhuman human foreclosed to philosophical judgment comports with speculative posthumanism's concept of the Wide Human which, as we have seen, has humans as operational components without exhibiting some essential

humanity (Roden 2014: 114–15). This inhuman thinking *from the Real* comports, likewise with a claim about the epistemology of interpretation, I have leveraged against Robert Brandom's analytic pragmatism and its adoption by neorationalist thinkers such as Brassier and Negarestani (Roden 2017). That essay considers the "Hegelian-functionalist" claim that subjects are produced as such in the social game of "giving and asking for reasons."

Describing this capacity requires an account of how certain behaviors qualify as signifying moves. Not all events or behaviors, after all, are potential "texts." I've argued that the most plausible account is that they are "moves" where a competent interpreter would judge them to be so. However, this doubles subjectivity only to unbind it. We have a subject defined by the capacity to follow rules or norms. But we are left with a dangling interpreter subject, presupposed but not independently explained by that pragmatist account.

This leaves what counts as an interpretable behavior or practice undefined, for the scope of interpretation remains undetermined within the discourse it founds (Roden 2014: 128; 2017: 111–12). Thus, the speculative "posthuman performative" unbinds from the intentional, human agent, leaving the performance as a faceless insurgent we grasp "aesthetically" in our encounter with it.

Despite this marked convergence, there are important differences between maximally unbound posthumanism and non-philosophy. Unbound posthumanism does not begin axiomatically, but starts *with philosophy*; for example, using filter arguments to unbind the posthuman predicament. Consequently, it has no need for Laruelle's axiom of the immanent One or for any allusion to pure, unreflective immediacy. In its place, it deploys the more tractable filters composed by the opacity of the performative and, of course, the dark phenomenology principle (Laruelle 2010: 18; Brassier 2012).

Biomorphic posthumanism does not treat the posthuman as a contemporary form of power or life but as the indetermination of life by an anomalous "post-contemporary" reality that never composes an experienced present (see Avanessian and Malik 2016). It cannot bind the posthuman predicament to give a transcendental shape, but it can explore these possibilities by releasing them (see next section).

Clearly, cyborgian and *zoe*-centered approaches to the posthuman body can be used to map this opening or void. But unlike Non-Philosophy or critical posthumanism, biomorphic posthumanism has no thought of resistance. While its inhuman "human" exists on an alien planet unmeasured by philosophy, there is nothing remotely emancipatory about this unmeasure. It is not, after all, philosophy that deracinates the (in)human. The Wide Human deracinates itself. An undefined "human" is no more liable to be saved than a philosophically determined one. And disconnection—now, the relation of the human to this void—is likewise undefined prior to its effects.

Something like this indeterminacy applied to the standard formulation of speculative posthumanism developed in *Posthuman Life* which operated with the minimal agency concept. There, the only means to acquire substantive knowledge of posthumans was engineering, not philosophy: *making posthumans, becoming posthuman* (Roden 2014: 8, 166–93).

This speculative impasse is reiterated in a maximally unbound posthumanism, but without the constraints afforded by its psychology-free agency concept. This relation could now be

described as "a differential function without an ontological basis" (Derrida 1984: 16)—whose effects are thought by invoking or releasing potential biomorphisms.

The posthuman predicament disconnects the human/inhuman; generating novel modes of existence. The figure of the biomorph—which I map below through the work of Bellmer, Ballard, and Shipley—performs or disseminates this effect. The biomorph is, then, a model of the torsions and stresses of the posthuman predicament translated into its proprietary format.

Perhaps a "homely" example will elucidate this. Does the phenomenon of what is known in Japan as *hikikomori*—young men withdrawing from social life into an online world—constitute a disconnection (Yeager 2017: 34)? Well, not in terms of moderately unbound speculative posthumanism since any *hikikomori* remains existentially dependent on the Wide Human. However, in maximally unbound posthuman, there is no agent-based ontology by which such independence is gauged. There can only be an aesthetic rupture that calls for judgment by subverting our habits of recognition or reading. For example, Ben Yeager's novel *Amygdalatropolis* explores the effect of the *hikikomori*'s immersion in the online. Its protagonist /1404er/ buys his parents' master bedroom and bathroom and never leaves. He spends his life in an amnion of online snuff porn, clickbait, and casual online scapegoating in the darknet forum he obsessively follows during fitful periods of wakefulness. Everyone there is called /1404er/ (Connole and Yeager 2017).

There are no other characters to speak of; but then is /1404er/ even a person? He exhibits little in the way of reflection, or introspection; beyond some brilliant oneiric sequences, Yeager sandwiches between the "posts" which take up much of the novel. /1404er/ has disconnected not only from the ethics of the social but from the standards of objectivity on which it formerly depended. Is /1404er/ human, or posthuman? There is, of course, no interesting binary answer to this. What is important is that the novel *performs* the distance between /1404er/ and our fragile judgments of who or what composes the human.

Biomorphism is thus embodied (it is felt, however opaquely) and aesthetic insofar as what constitutes "disconnection" is now mediated through form and reading. Thus, as in the *Atrocity Exhibition* or *Amygdalatropolis,* art can be a source of biomorphic models for the deracinating potentials of the posthuman predicament.

Might such a "counter-ethics" concede too much to the ways capitalism and its planetary technologies are already terraforming the Earth, effectively aestheticizing them? Braidotti and Francesca Ferrando distinguish the "perverse" postanthropocentrism of advanced capitalism—with its constant disruption of boundaries and species—from an "ethical" posthumanism that acknowledges the distinctive existence of all life (Braidotti 2013: 60–1; Roden 2014: 184–5; Ferrando 2019). However, this distinction implies an immanent normativity to life that their materialist vitalism cannot sustain. *Zoe* already enacts biomorphisms—"lines of life beyond organic or living purposiveness" (Colebrook 2012b; Roden 2014: 185–6).

A rigorous posthumanism is, as I emphasize below, perverse in principle. It makes no philosophical decisions, including or especially ethical ones; although, as in Braidotti's posthumanist ontology, it indicates a field where ethical relations between variously living and non-living entities may emerge.

BELLMER—INTO DOLL SPACE

In the remainder of this chapter, I want to consider the work of three artists: Hans Bellmer, J. G. Ballard, and Gary J. Shipley, whose work can be read as performing the biomorphic subtraction of life. A biomorphism extends "no-need into no-utility … no-utility into 'art'" (Massumi 2005: 131; Roden 2014: 189). As Livia Monnet remarks of Bellmer's surrealist doll sculptures and the accompanying texts produced between the 1930s and '50s, this movement is the very structure of perversion—the strategic proliferation of desire for nothing (Monnet 2010: 195).

In one of the texts from his 1934 book *The Doll* (*Die Puppe*), Bellmer describes the doll sculpture as a "poetic stimulator"—one that subtends antithetic ontological principles (Bellmer 2005: 60). It is inanimate yet given potential for movement by permutation and substitution; by articulation: "A mobile, passive and incomplete thing that can be personified" (60).

The living death of the doll is a recombinant afterlife. By disturbing the principle of life, the doll acquires a transverse, cosmological dimension that cannot be reduced to its pornographic image.

For Bellmer, this is allegorized by the ball joint of his celebrated second doll. In a surrealist conceit, he suggests that this mechanical coupling reconciles concentric motion (since the joint's inner ball moves around its center) with eccentric motion, which may be transferred from the outside, causing it to orbit around an alien center (Bellmer 2005: 60–1). This interchangeability of frames, for Bellmer, encodes the instability of body image and of the boundaries between self and non-self.

Desire and the gaze, as Monnet observes, are extroverted in Bellmer's art and writing—pulled inside-out. This process is illustrated in a later essay where he writes of a man who takes pornographic photos of his female lover, as Bellmer did with his collaborator, Unica Zürn. The man comes to identify with the beloved's buttocks, deifying them in fantasy until the fetishized body part absorbs him in turn, a simulation of his notional body (Monnet 2010: 289). Bellmer later remarks that this unstable, permutable body "resembles a sentence that seems to invite us to dismantle it into its component letters, so that its true meanings may be revealed anew through an endless stream of anagrams" (133). Exemplifying the general structure of the biomorphic body, anagrammatic desire is not the joyful, intense becoming of vital posthumanism but generated in deformations, perspectival crossings, or as in Ballard's *Crash*, juxtapositions and collisions (Thacker 1997: 60).

In a brilliant take on the work of Badiou, Tracy McNulty has argued that the philosophical "passion" for the nonhuman absolute, as we find it in Badiou's mathematical ontology or Plato's transcendent idealism, can be understood as formalist perversion.

Like Monnet, McNulty analyzes perversion as counter-ethics: an implacable emptying or subtraction from subjective sense. This subtractive passion is not *for anything* and must, like the biomorph, produce the thing it thinks (McNulty 2013: 33). Thus, we forever mumble about the future in some atavistic pre-human script, invoking the "cthulhoid-continuum" (Land 2011: 547), the "death drive," "purposelessness that compels all purpose" (Brassier 2007: 236; Ireland 2017), destructive repetitions, "modernity"—failing to speak it, failing

worse. Ruminations of a planetary engine perpetually voiding itself without having an "itself" (Roden 2014: 150–65).[3]

CRASH—TOTAL EXTROVERSION

While Bellmer's doll provides a fundamental anatomical module of extroversion: the preemption of desire by the teaming unlife of the posthuman predicament, it is perhaps still too domesticated, too sexualized to hint at its planetary compass. Ballard's pornography of violence is similarly anagrammatic but explicitly imbricated within the technological landscapes of modernity (see Roden 2002). Thus in *Crash*, Vaughan—sexual shaman of outer-London car parks and airport termini—dreams of dying in a car crash with Elizabeth Taylor, remarking that this "unique vehicle collision … would transform all our dreams and fantasies" (Ballard 1995: 130).

The actual collision with which the novel opens is, bathetically, Vaughan's "one true accident" (Ballard 1995: 7). His car misses Taylor's limousine, careening into an airline bus below the London Airport Flyover. This errant driving nonetheless fuels the novel's fatal metaphor. Its narrative is replete with wounds formed by the meeting of soft bodies, hard machine parts, and metalized carapaces. Early in the novel, its central protagonist "James Ballard" observes Gabrielle, a recovering crash victim, finds affinities between her damaged body, sheathed in an enticing orthopedic exoskeleton, and the display vehicles at the Earls Court Motor show (Ballard 1995). When Ballard arouses his wife with fantasized sexual acts between himself and Vaughan, he remarks his desire is purely structural; Vaughan's body "ceased to hold any interest" when detached from its shell, "his … emblem-filled highway cruiser" (Ballard 1995: 117).

Later in the novel, these conjunctions form a savage inventory of overkill bodies: "ruptured genitalia, luminous drifts of safety glass, copulating bodies sheathed in 'glass, metal and vinyl', skin incised by underwear, or chromium manufacturers' medallions" (133) —elements of an anagram more illimitable than Bellmer's nightmares. This biomorph is utterly subtractive; without unity or sense beyond its multiple symbolic ties to the "unique event" that we know, from the novel's outset, cannot occur. The future is thus abolished and unbound in the most elegant gesture by this terminal metaphor. Ballard's cyborgian sexuality doesn't just puncture our skin-bag in the style of the contemporary "posthumanities." It unbinds agency as such, extroverting the body into a limitless multiple.

SHIPLEY'S WAREWOLFF!—NECROCONCEPTUALITY

Gary Shipley's work is often compared to Ballard for its single-minded estrangement of sense. Yet it refuses even more, the satisfactions of setting and psychology. It is sometimes marketed as "concept horror"—which is accurate insofar as it is the concept which does most of the hurting here—remarked, disjointed, its grammatical lifelines sliced, and hamstrung. In a sense, it is one of the purest expressions of a formal disconnection of thought from thought.

With a nod to the conventions of eldritch horror, Shipley's (2017) novel *Warewolff!* has a first person prologue redolent of Lovecraft's "The Call of Cthulhu." Its narrator claims that

what we are about to read are media transcripts documenting an alien influence that can only be understood through its deformation of our bodies and speech. Ten thematic sections follow: *buildings, eyes, families, sky, air, holes, rooms, distortion, screens, ghosts.*

These include terse vignettes like "Russian Dog Fail" (57) and longer sequences of finely tuned incoherence. Their piquant titles include "Nice Gumbo" (112), "Reptile Christ" (70), or "Instagramming Lana Del Rey's Brain" (40).

"Nice Gumbo" nicely exhibits Shipley's technique, in which bodily decomposition is always the instrument of grammatical violence.

It begins: "We were stale the whole day and miniature in our cut-off legs. This was us christened as invalids" (112). Implied mutilation—leg severing—disavowed by two incongruous adjectives: "stale" and "miniature." Nothing has happened. Just a christening, it seems; or a change of aspect: "This was us flushing cramps with a bone saw. Look at us, we're the first of the year" (112).

Deliberate category errors upheap the indeterminacy: cramps are not flushable if we understand the verb properly. But can we? If it is improper, what of the *bone saw'*s inscrutable efficacy?

> Over the bed, beside the crucifix, Kafka's prostate sealed in a freezer bag. The last of Brod's salvage so the legend goes. It looks like the Eraserhead baby shrunk in an oven. We love like mad from opposite corners of the room. K is that sweet gangrene in our celibacy in glass. (Shipley 2017: 112)

The reference to Kafka's unfaithful literary executor and the comparison with the mutant offspring in David Lynch's debut movie supplies a vivid sensory image, but it is offset by the abstraction of the last sentence where the logic of inclusion falters.

If K is "sweet gangrene" what is it to be "in" celibacy? What is it for "sweet gangrene," in turn, to be in glass? Might K merit a prostate? Is inclusion, here, transitive? If K is in our celibacy—and celibacy is in glass—is K too in glass?

One recalls Badiou's claim that the notions of set and set inclusion cannot be explicitly defined outside of set-theoretical axioms.[4] For example, those in Zermelo-Fraenkel set theory excluding self-membership. There can be an implicit mastery of *set* without a concept of set.

But this is not possible here. Like Bellmer's anagrammatic doll, *Warewolff!* has no axioms or rules beyond the hazards of its dispersal. It is its own entirely misleading portrait.[5] It has no people or worlds—only disjointed clones, plucky carcasses, and scripts we mistook as our lives.

Yet despite this ontological poverty, we can read *Warewolff!* Something happens, even if we do not understand what. Its dispersal *is* the horror of biomorphism: a condition somewhat akin to life that, like Shipley's alien, "discloses its arrangements" through our language centers. And this is the condition of unbinding: we are spoken by something; we pass into something without even the assurance that our hunger is our own.

his formulation avoids bio-chauvinism. We don't know where posthumans could come from or how.

he stipulation that WHD's of feral posthumans remain outside the Wide Human avoids us designating as "posthuman" WHD's of feral posthumans that are subsequently re-domesticated or re-humanized into the Wide Human. I am grateful to Søren Holm for bringing this to my attention.

s McNulty puts it in her commentary on Deleuze's account of masochism—speculative philosophy is "an attempt to locate a 'real' that is not given empirically, and that therefore demands to be constructed" (McNulty 2013: 22). Like all speculative philosophy, unbound posthumanism is in revolt against philosophy's own prerogatives. It "thinks" the posthuman by deconstructing its capacity to reflect what it thinks.

t is of the very essence of set theory to only possess an implicit mastery of its 'objects' (multiplicities, sets): these multiplicities are deployed in an axiom-system in which the property 'to be a set' does not figure" (Badiou 2006: 43).

1 the prologue, Shipley's narrator writes that the alien force he is soliciting learned to talk by "shaping the stories of its victims and, in so doing, created 'a portrait of itself – of itself made up with other things" (2017: 9).

SOURCES CITED

Avanessian, Armen., and Suhail., Malik. "The Speculative Time-Complex." In *The Time-Complex Post-Contemporary*, edited by Armen Avanessian and Suhail Malik. Miami: Name Publications, 2016, pp. 5–56.

Badiou, Alain. *Being and Event*. Translated by Oliver Feltham. London: Continuum, 2006.

Ballard, James G. *The Atrocity Exhibition* (annotated). London: Flamingo, 1993.

Ballard, James G. *Crash*. London: Vintage, 1995.

Bataille, Georges. *Visions of Excess: Selected Writings, 1927–1939*.Translated by Allan Stoekl, with Carl R. Lovitt and Donald M. Leslie,. Manchester: Manchester University Press, 1985.

Bataille, Georges. *Story of the Eye*. Translated by Joachim Neugroschal. Harmondsworth: Penguin, 1987.

Baudrillard, Jean. "Crash." In *Simulacra and Simulations*, translated by Sheila Faria Glaser. Ann Arbor: University of Michigan Press, 1994, pp. 111–19.

Bellmer, Hans. *The Doll*. Translated by Malcom Green. London: Atlas Press, 2005.

Black, Emma. "Reactivating the Real: Laruelle, Brassier and the Unilateral." *Australasian Society for Continental Philosophy Conference*, University of New South Wales, 2015, https://www.academia.edu/19527474/Reactivating_the_Real_Laruelle_Brassier

Braidotti, Rosi. "The Ethics of Becoming Imperceptible." In *Deleuze and Philosophy*, edited by Constantin Boundas. Edinburgh: Edinburgh University Press, 2006, pp. 133–59.

Braidotti, Rosi. *The Posthuman*. Cambridge: Polity Press, 2013.

Braidotti, Rosi. "A Theoretical Framework for the Critical Posthumanities." In Transversal Posthumanities, special issue, *Theory, Culture & Society* (May 2018): 1–31. 10.1177/0263276418771486.

Brassier, Ray. *Nihil Unbound: Enlightenment and Extinction*. Houndsmills: Palgrave Macmillan, 2007.

Brassier, Ray. "The View from Nowhere." *Identities: Journal for Politics, Gender and Culture*, vol. 17 (2011a): 7–23.

Brassier, Ray. "Concepts and Objects." In *The Speculative Turn: Continental Materialism and Realism*, edited by Levi Bryant, Nick Srnicek and Graham Harman. Melbourne, Australia: re.press, 2011b, pp. 47–65.

Brassier, Ray. "Laruelle and the Reality of Abstraction." In *Laruelle and Non-Philosophy*, edited by John Mullarkey and Anthony Paul Smith. Edinburgh: EUP, 2012, pp. 100–21.

Colebrook, Claire. "A Globe of One's Own: In Praise of the Flat Earth." *Substance: A Review of Theory & Literary Criticism*, vol. 41, no. 1 (2012a): 30–9.

Colebrook, Claire. "Not Symbiosis, Not Now: Why Anthropogenic Change Is Not Really Human." *Oxford Literary Review*, vol. 34, no. 2 (2012b): 185–209.

Connole, Edia, and Ben Yeager. *Amygdalatropoli*s. London: Schism[2] Press, 2017.

Cornell, Drucilla. *The Philosophy of the Limit*. London and New York: Routledge, 1992.

Derrida, Jacques. "My Chances/Mes Chances: A Rendez-vous with Some Epicurean Stereophonies." In *Taking Chances: Derrida, Psychoanalysis and Literature*, translated by I. E. Harvey, Avital Ronell, edited by J.H. Smith and W. Kerrigan. Baltimore, MD: Johns Hopkins University Press, 1984, pp. 1–32.

Ferrando, Francesca. *Philosophical Posthumanism*. Bloomsbury, 2019.

Foucault, Michel., and Maurice. Blanchot. *Foucault/Blanchot: Maurice Blanchot: The Thought from Outside and Michel Foucault as I Imagine Him*. translated by Jeffrey Mehlman. New York: Zone Books, 1987.

Gangle, Rocco. "The Theoretical Pragmatics of Non-Philosophy: Explicating Laruelle's Suspension of the Principle of Sufficient Philosophy with Brandom's Meaning-Use Diagrams." *Angelaki*, vol. 19, no. 2 (2014): 45–57.

Ireland, Amy. "The Poememenon: Form as Occult Technology." Urbanomic, 2017, https://www.urbanomic.com/document/poememenon/.

Haraway, Donna. "A Manifesto for Cyborgs: Science, Technology, and Socialist Feminism in the 1980s." In *Coming to Terms*, edited by Elizabeth Weed. London: Routledge, 1989, pp. 173–204.

Kolozova, Katerina. *Cut of the Real: Subjectivity in Poststructuralist Philosophy*. New York: Columbia University Press, 2014.

Kolozova, Katerina. "Philosophical and Speculative Economies of the Vanishing Body." *Frontiers in Sociology,* vol. 3 (2018): n.p.

Land, Nick. *Fanged noumena: Collected writings 1987–2007*. Falmouth: Urbanomic and Sequence Press, 2011.

Laruelle, François. *Philosophies of Difference*. London: Continuum, 2010.

Laruelle, François. *Future Christ: A Lesson in Heresy*. London: Continuum, 2011.

Laruelle, François. *Principles of Non-Philosophy*. London: Bloomsbury Academic, 2013.

Massumi, Brian. "The Evolutionary Alchemy of Reason: Stelarc." In *Stelarc: The Monograph,* edited by M. Smith. Cambridge, MA: MIT Press, 2005, pp. 125–92.

McNulty, T. "The New Man's Fetish." *The Southern Journal of Philosophy*, vol. 51, no. S1 (2013): 17–39.

Meillassoux, Quentin. "Iteration, Reiteration, Repetition: A Speculative Analysis of the Sign Devoid of Meaning." In *Genealogies of Speculation: Materialism and Subjectivity since Structuralism*, edited by Suhail Malik and Armen Avanessian. London: Bloomsbury Publishing, 2016, pp. 2745– 4587.

Monnet, Livia. "Anatomy of Permutational Desire: Perversion in Hans Bellmer and Oshii Mamoru." *Mechademia*, vol. 5 (2010): 285–309.

Negarestani, Reza. *Intelligence and Spirit*. Falmouth: Urbanomic, 2019.

Protevi, John. *Political Affect: Connecting the Social and the Somatic*. Posthumanities, vol. 7, edited by Cary Wolfe. Minneapolis: University of Minnesota Press, 2009.

Roden, David. "Cyborgian Subjects and the Auto-Destruction of Metaphor." In *Crash Cultures: Modernity, Mediation and the Material,* edited by Jane Arthurs and Iain Grant. Bristol: Intellect Books, 2002, pp. 91–102.

Roden, David. "Nature's Dark Domain: An Argument for a Naturalised Phenomenology." *Royal Institute of Philosophy Supplement*, vol. 72 (2013): 169–88.

Roden, David. *Posthuman Life: Philosophy at the Edge of the Human*. Oxon: Routledge, 2014.

Roden, David. "Reduction, Elimination and Radical Uninterpretability." 2015, www.academia.edu/15054582/Reduction_Elimination_and_Radical_Uninterpretability.

Roden, David. "Letters from the Ocean Terminus." In *The Time-Complex Post-Contemporary*, edited by Armen Avanessian and Suhail Malik. Miami: Name Publications, 2016, pp. 157–71.

Roden, David. "On Reason and Spectral Machines: Robert Brandom and Bounded Posthumanism." In *Philosophy after Nature,* edited by Rosie Braidotti and Rick Dolphijn. London: Roman and Littlefield, 2017, pp. 99–119.

Roden, David. "Disconnection at the Limit: Posthumanism, Deconstruction and Non-Philosophy." *Symposia Melitensia*, vol. 14 (2018): 19–34.

Roden, David. "Promethean and Posthuman Freedom: Brassier on Improvisation and Time." *Performance Philosophy*, vol. 4, no. 2 (2019). https://doi.org/10.21476/PP.2019.42230

Sellars, Wilfrid. "Empiricism and the Philosophy of Mind." *Minnesota studies in the philosophy of science*, vol. 1, no. 19 (1956): 253–329.

Shipley, Gary J. *Warewolff!* London: Hexus Press, 2017.

Thacker, Eugene. "Bataille/Body/Noise: Notes Towards a Techno-Erotics." In *Merzbook: The Pleasuredome of Noise*. Preston Vic: Extreme, 1997, pp. 57–65.

CHAPTER EIGHT

Rising Negentropy, Evolutionary Reboots, and Gaia as Attractor: Toward a Map of Contemporaneous Posthumanist Positions

JACOB WAMBERG

If there is such a thing as the posthuman turn, how do we situate it in a broader time frame—a grand narrative reaching deeper temporal strata of not only culture, but also nonhuman life, and moreover incorporating the pre-biological, inorganic universe? So far, posthuman theorizing and its extensions into broader posthumanist and anti-anthropocentric terrain has been marked by certain methodological biases that keep us from assembling a more comprehensive mosaic of the transformation from human into posthuman, and thereby also understanding this transformation in a longer evolutionary narrative. Although all posthumanist theories do agree on one basic premise—that we can no longer bracket off humans from the rest of the universe, from technology to animals and plants, to the inorganic world at large—each delivers highly diverse and apparently mutually exclusive interpretations of this basic assumption. In particular, two questions pull us in extreme directions: are we on the verge of a singularity in which technological progress exponentially accelerates a deep-seated evolutionary tendency to rising complexity, or negentropy, as transhumanists such as Ray Kurzweil (2005) claim? Or are we instead on the verge of ecological disaster, in which technology involuntarily causes accelerated destruction, a meltdown into entropic chaos, of that environment that evolution patiently built up over

millions of years, as most Anthropocene theoreticians would have it?

As I hope to demonstrate in this chapter, comparative historiographic considerations pertaining to a number of disciplines—notably, continental philosophy, complexity theory, biosemiotics, and my own discipline, the visual arts—may play a key role in unlocking a more syncretic grand narrative, a theoretical Anthropocene that layers various posthumanist positions in the same physio-theoretical space. If we first loosely map three main posthumanist schools in relation to evolutionary temporality, that is, the way they relate to the evolutionary genesis of complexity, negentropy, the resulting positions—transhumanism (above), flattened ontologies (middle), and Anthropocene theorizing (below)—could be further mapped onto a spatial diagram of the thickening materiality of Umwelten, one that is structurally echoed in the biosphere, or Gaia, as I prefer to call it here, taking inspiration from James Lovelock (1979) and Bruno Latour ([2015] 2017) (Figure 8.1). Since these posthumanist attitudes seem to be entangled in the deeper dynamics of evolution, they get resonance from two evolutionary sequences, in which Gaia has acted as an attractor: that of nature (as mirrored in the layering of the early embryo) and that of culture (as mirrored in the evolution of visual art and that of cosmological world pictures) (Figure 8.2).

In unfolding my syncretic approach, I should therefore correlate both this natural evolutionary sequence and its cultural recapitulation with the first map, ultimately coordinating space and time into a contemporaneous palimpsest. To make my map truly syncretic, however, we have to overcome the map's initial dualism that contrasts Anthropocene regression, materiality, and entropy below with transhumanist progression, immateriality, and negentropy above. This could be accomplished by mobilizing German art historian Wilhelm Worringer's observation of an oscillation in art history, between abstraction (symptom of a deep embedding in inorganic nature) and empathy (symptom of identification with autonomous organisms in larger spaces). Thus, although evolution, in both its cultural and biological cycles, has moved vertically toward increasing negentropy, peaking in the posthuman turn, throughout cultures the concentration of negentropy in individuals has reached such critical levels that it has needed recurrent counter-movements, evolutionary reboots, reflected in abstraction in art. Here, complexity-building is dispersed to messier environments that link negentropic, cultured humans with their less differentiated, entropic surroundings. As the latest of such reboots, the posthuman turn emerges as a reconciliation between evolution's progressionist drive toward negentropy, and a multilayered recapitulation in which the messy blends of negentropy and entropy pertaining to earlier historical cycles, both cultural and biological, are re-actualized in one contemporaneous palimpsest of different modes of being enmeshed (Figure 8.3).

APPROACHING A MAP OF CONTEMPORANEOUS POSTHUMANIST POSITIONS

To negotiate the diverse futures of posthumanism—and their corresponding shallow or deeper pasts—we should establish what I suggest terming a "theoretical Anthropocene," a tightened syncretic space of posthumanist discourse. It is somewhat ironically consistent with the usual humanist theorizing that the philosophical universes of posthumanism have tended

to be mutually hostile and balkanized, unfolding in seemingly infinite theoretical spaces in which neighbors with conflicting views may be safely ignored or actively attacked. Yet a truly posthumanist gesture would be to ultimately unite these spaces in the same theoretical space, which they therefore must share. Such a syncretic reconciliation of theories would echo the way the Earth's citizens must now negotiate conflicts, in order to share the limited space and resources of our common planet. Indeed, according to the Greek author Plutarch, the very notion of "syncretism" is derived from the ancient Cretans, "who, though they often quarreled with and warred against each other, made up their differences and united when outside enemies attacked" (Plutarch 1927: 313 (19, 490b)).

The theoretical Anthropocene, with its required sharing of resources, will not be terrain reserved exclusively for theory. Instead, its very complications and apparent contradictions would be surface vibrations of what Timothy Morton (2013: 4) calls a hyperobject: an overwhelmingly huge, all-pervasive and sticky object with which you engage, although ultimately you cannot grasp it with your senses or imagination, and therefore can "only see pieces […] at any one moment." However, somewhat in contrast to Morton, I do think we could map some aspects of my suggested hyperobject, the syncretic posthumanist condition, even by comparably simple means. Such syncretic mapping releases a whole cascade of mutually strengthening structural equivalences between spatial and temporal coordinates, a both illuminating and bewildering cabinet of mirrors between positions within the biosphere, or Gaia, on the one hand, and on the other hand, large-scale evolutionary sequences in both culture and biology, and their palimpsest-like recapitulations.

To downscale theoretical metaphors from the Anthropocene to nuclear physics, traditional humanism with its compartmentalization could also be likened to nuclear fission, cleaving open and spreading atomic cores to new spaces. On the other hand, my suggested syncretic posthumanism would instead resemble nuclear fusion, a high pressure bringing-together of atomic cores that under normal circumstances are used to having much more space around them. The strange but quite logical thing is that it is this fusion of apparently different resources on the same spot that, suddenly, in the act of sharing those resources, exposes a cascade of earlier overlooked structural correspondences. Although overwhelmingly huge, my posthumanist hyperobject is also disturbingly close, so it requires quite an effort to squeeze in that small distance that allows you to map it and its cabinet of infinite structural resonances from a position you may term "from above."

Moving to empirical matters, I first approach my desired fusionist map of posthumanist positions from a somewhat loose, fissionist perspective that I will later reform by tightening (Figure 8.1)

Transhumanism
Mind/On the fringes of matter

**Flattened ontologies
(critical posthumanism)**
Body/Middle embedding in matter

Anthropocene theorizing
Environment/ Deep embedding in matter

Decreasing materiality of Umwelten/increasing individual-based virtuality of Umwelten

Strengthened belief in evolutionary progress (rising negentropy) through technology

Strengthened belief in evolutionary regress (rising entropy) through technology

FIGURE 8.1 Preliminary (fissionist) map of posthumanist positions. Diagram by author; graphic design by Carl Zakrisson.

The positions are mapped vertically, according to their attitude to the concepts of cultural and biological progress, the evolutionary rise of complexity, and how these attitudes relate to the materiality of Umwelten, the German–Baltic biologist Jacob von Uexküll's designation for the spaces, or interfaces, that mediate between organisms, including cultured organisms, and those physical surroundings with which the organisms interact (Deely 2001). Applying a term suggested by quantum physicist Erwin Schrödinger (1944: 72), evolutionary complexity may be conceived of as "negative entropy," or to use the physicist Léon Brillouin's portmanteau, "negentropy" (1956: 116–17), as, nurtured by the intake of solar energy, it counters the universe's general tendency to increasing entropy, the leveling of differentiation and organization that comprise the building blocks of complexity. If we position a belief in technology's participation in negentropic rise, evolutionary progress, toward the top of the map, and a belief in technology's destruction of negentropic rise, evolutionary regression, toward the bottom, we may distinguish roughly three posthumanist positions: (1) transhumanism celebrating technology's negentropic rise to the top; (2) flattened ontologies, skeptical about evolutionary progress, including technology's role in it, toward the middle and below; and (3) Anthropocene theorizing that foregrounds technology's provocation of evolutionary regression, at the bottom.

The vertical distribution of posthumanist attitudes to evolutionary progress, the rise of negentropy, corresponds more precisely to a distribution of the materiality of Umwelten: toward the top of the map, we encounter an overall thinning of the materiality of Umwelten; toward the bottom, an increase. To say that the materiality of Umwelten thins toward the upper layers of the map is, at least inside the still-fissionist theoretical space, the same as saying that subjects thriving in these layers become more introverted, and concentrate qualities pertaining to virtuality—cognition, consciousness, subjectivity, *qualia*, semiosis, opportunities for choice—in more autonomous entities. And to say that materiality thickens toward the bottom amounts—also inside the still-fissionist space—to stating that subjects become more heavily immersed in actants, and that therefore subjectivity is pressed by material density. However, when I later qualify the diagram in evolutionist and fusionist

terms, we will see that this absolute dualism is only approximate, and that in practice, realities are more mixed—that is, brought together in a syncretic density.

Although the downward slide through intensified layers of material embedding may be a broad and generalized observation, zooming in on a more detailed level will reveal strong geocentric echoes, a geo-topological immersion in the spheres of Gaia, thereby confirming that we are indeed approaching a theoretical Anthropocene in which Gaia acts as an attractor for generating physio-theoretical subject positions. Here, transhumanism finds echoes in the materially thin outer spheres of Gaia, flattened ontologies in the middle spheres of Gaia, and Anthropocene regression in the inner spheres of Gaia. In a vastly different, but nonetheless structurally related, cosmic macro-scale of gravity—extending both nuclear fusion (micro-scale) and Anthropocene (middle scale)—we meet structural correspondences with the three major cosmological theories: transhumanism and the materially thin outer spheres of Gaia echoing the expanding universe, the *Big Rip*; flattened ontologies and the middle spheres of Gaia, echoing the eternal reproduction of matter from nothingness, *Steady State*; Anthropocene regression and the inner spheres of Gaia echoing the imploding universe, the *Big Crunch*.

Defining the Map's Three Layers

If we now zoom in on the map's three layers of posthumanist positions—each layer coordinating structurally attitudes to evolutionary progress, with varying degrees of material embedment and, ultimately, different spheres of Gaia—we initially observe the following points.

(1) Transhumanism: Mind/On the fringes of matter

Without a doubt, transhumanism is both the most blatantly evolutionistic and most rampantly spiritualistic of the posthumanist variants. Seeing new advances in technology as a direct addition to the growth of the evolutionary tree, this facilitation of the upward striving of negentropic complexity also signifies a convergence between mind and information technology. Here, Darwin's evolutionary tree quite concretely grows from terrestrial matter toward the light of immaterial information. Thus, in transhumanism, the posthuman emerges as such an advanced evolutionary stage that evolution's drive to increase negentropy, what the transhumanist philosopher Max More (2003) terms "extropy," is brought to a directly substrate-independent level, the phenomenon of the mind leaving any bondage to specific corporeal or technological media.

The idea of the mind's substrate-independence could be seen as a bottom-up, evolutionary reiteration of the monotheistic and Cartesian concept of mind as separate from matter (Herbrechter [2009] 2013: 96–7). It is already present in the work of Samuel Butler, the British novelist and Darwin-follower who, in his satiric, utopian novel, *Erewhon* (1872) ("nowhere," spelled backward), imagines that machines will offer new media for advancing consciousness, and for exactly that reason predicts a future ban on machines (Butler [1872] 1970: 198). In his attempt to fuse Christian eschatology with technological futurism, the Jesuit paleontologist Pierre Teilhard de Chardin ([1959] 1964: 157) directly predicted "the

growth, outside and above the biosphere, of an added planetary layer, an envelope of thinking substance." If Teilhard and his Russian follower, Vladimir Vernadsky, were thinking mostly in collective terms about this added cognitive layer, which, by the 1920s, they termed the "Noosphere" (Samson 1999: 4–6), later transhumanist thinkers such as Hans Moravec, Marvin Minsky, Max More, and Ray Kurzweil dream of hosting individual minds in various strengthened media, ultimately making minds immortal. Potentially, this could even include the still-fragile human mind, which could now be uploaded (Moravec 1988: 109–10; Kurzweil 2005: 198–202; Koene 2013: 246–9).

An illuminating condensation of how the transhumanist escape from matter is ultimately related to an escape from Gaia, the local structural equivalent of the *Big Rip,* appears in Jean-François Lyotard's "A Postmodern Fable" ([1993] 2001). Here, this otherwise arch-skeptic of grand narratives unfolds the ultimate grand narrative, namely what will happen to life when the sun turns into a "giant nova" (actually a red giant) and swallows the Earth, together with the entire solar system (actually, only its inner parts). Lyotard's idea is that humans are only transient holsters for evolution's main protagonist, rising negentropy, and that negentropy will seek new and more enduring, technologically created media, when it escapes the burning Earth to empty, infinite space:

> The formation called Human or Brain will have been nothing more than an episode in the conflict between differentiation and entropy. The pursuit of greater complexity asks not for the perfecting of the Human, but its mutation or its defeat for the benefit of a better performing system. Humans are very mistaken in their presuming to be the motors of development and in confusing development with the progress of consciousness and civilization. They are its products, vehicles and witnesses. (20)

Although the postmodernist Lyotard is predictably uncomfortable with the idea of civilization's progress, it is difficult to see how "development" as the "pursuit of greater complexity" could indicate anything other than a slight transformation of this very progress. Human civilization mutates into posthuman civilization through facilitating negentropy's evolutionary progress, which was already underway in human culture, the passing vehicle for negentropy.

(2) Flattened ontologies: Body/Middle embedding in matter

In spite of the dizzying crowd of often contradictory posthumanist positions, it seems possible to designate another trend of posthumanism in relation to what it is not, namely the group of flattened ontologies that agree to be skeptical about ideas of evolutionary progress. If they don't explicitly attack the idea of evolutionary progress and humans' part in it (as the postmodernist Lyotard had already torturously tried to do), they at least downplay it through vagueness, complication, or the hesitation to acknowledge that humans should occupy the role of the most complex creature in evolution before the posthuman takeover. The attitude of the most obviously posthumanist part of this group, critical posthumanism, is nicely summed up by a prime representative, the literary theorist N. Katherine Hayles. After noting that the posthuman view typically privileges "informational pattern over material instantiation" (2),

that is, the position of transhumanism, she declares:

> my dream is a version of the posthuman that embraces the possibilities of information technologies without being seduced by fantasies of unlimited power and disembodied immortality, that recognizes and celebrates finitude as a condition of human being, and that understands human life as embedded in a material world of great complexity, one on which we depend for our continued survival. (5)

In Hayles's view, although computation and human mind follow the same self-organizing principles to a surprising degree, they arise in, and are bound to, bodies and matter, and so we move down the material ladder in our diagram. Inspired by roboticist Rodney Brooks, Hayles even believes that human consciousness is a relatively superficial epiphenomenon, an illusion-generating interface that is not part of "the system's essential architecture" (237). As Hayles elaborates in her later work, nonconscious cognition pervades computers as well as life's sub-conscious bodies, from plants to humans (Hayles 2017).

Whereas Hayles departs from the upper part of our material diagram—mind and its artificial equivalent, information—and then embeds this in matter, other representatives of critical posthumanism instead proceed from the body as a broader phenomenon, including the mind, and then embed this ensemble in diverse surroundings, including technology. This is the case with the American science theorist Donna Haraway, whose early key figure, the cyborg, arises in a whole series of hybridization of former dualisms. All these signal a stepwise meltdown into matter, either mind into corporeal embedding, or body into environmental meshwork: mind/body, God/man, self/other, appearance/reality, non-physical/physical, agent/resource, maker/made, male/female, culture/nature, civilized/primitive, organism/machine, human/animal, and so on ([1985] 1991: 151–3, 177). Matter's refusal to incorporate itself into closed bodies is also felt in the ideas of Australian posthumanist philosopher Rosi Braidotti. Her key figure for posthuman life, the Greek *zoe*, implies the self-organizing, dynamic, and unfinished life, in contrast to *bios*, life that has been shaped into autonomy through the model of the independent citizen of the Greek city state (Braidotti 2013: 60).

In its close intermingling with the critical descent into materiality, critical posthumanism undermines the concept of evolutionary progress—often to such a degree that we are left without any sense of a historical path, except perhaps the recent one leading to the allegedly transhistorically valid undermining of humanist thought. To be sure, the posthuman may imply a cyborgian coming together of flesh and machine that is occasioned by contemporary biotechnological and computational developments (Haraway [1985] 1991), but once this is acknowledged, the human body, or any biological organism, was seemingly never autonomous, except in the mistaken view of its humanist oppressors (Wolfe 2010: xv–xvii). According to the same flattened logic that makes Bruno Latour ([1991] 1993) declare we have never been modern, so in this cyborgian *Steady State* we have always been posthuman and radically woven together with technology and the rest of the world (Hayles 1999: 291).

If these positions of critical posthumanism descend into matter and halt evolutionary progress by performing diverse sorts of cyborgian opening up of mind and body, other

flattened ontologies embed themselves in materiality even more, by departing from more distributed assemblages of matter in which technology does not necessarily play a determinate role. Hereby they typically shift the terminology from posthumanism to post-anthropocentrism and new materialism. These strategies include both relational theories, such as actor-network-theory (Latour 2007) and vitalist materialism (Bennett 2010), and the resolutely anti-relational object-oriented ontology (OOO) (Harman 2018: 91–122).

(3) Anthropocene theorizing: Environment/Deep embedding in matter

With the exception of some parts of new materialism, most of the above-mentioned theories are centripetal; that is, no matter how much they expose bodies and minds to their former environments, the dispersed posthuman subjects still comprise certain closed entities or clusters of entities. However, in this lowermost layer of my map, deep embedding in matter, the orientation changes definitively from centripetal to centrifugal, from body to environment. Reaching outward to immersive surroundings also signifies the absolute descent into terrestrial matter (Latour ([2017] 2018), the local *Big Crunch*, and thereby the antipole to the negentropic escape from matter that transhumanism celebrates. In the always materially grounded Anthropocene theorizing, the point of departure is not technology's voluntary construction of transhuman bodies or materially based posthuman cyborgs, but technology's involuntary destruction of our human and nonhuman environments, which threaten to engulf us in our simultaneously open subjectivity (Latour [2015] 2017). Although no more engaged with evolutionary progress than all the above-mentioned flattened ontologies—with which Anthropocene theorizing often overlaps—nevertheless there is a mostly indirect acknowledgment that a certain significant increase in evolutionary complexity must have occurred in terrestrial history. Otherwise, why care about overmining, pollution, the mass extinction of species, the destruction of ecosystems, and the production of gases that lead to irreversible global warming? We could even rephrase all these destructive changes in complexity theory terms, and say that technology's uncontrolled production of waste and heat equals an overproduction of entropy that threatens life's billion-year-long evolution of negentropic complexity. So, whereas for transhumanism, immaterial negentropy ultimately beats material entropy, for the Anthropocene the opposite is the case: material entropy threatens to engulf those negentropic tendencies that in any case evolved through close exchanges with matter.

Since technology's role in Anthropocene theorizing is overwhelmingly that of an ensemble of destructive agents run amok—one approaching Heidegger's ([1954] 1977) all-consuming apparatus of enframing (*Ge-Stell*)—in this context, even a reformed concept of technology typically intensifies the flattened, anti-progressionist tendencies we note in the middle position of my map. If negentropic complexity has increased in pre-human life forms, it certainly cannot be the role of a reformed technology to participate in and intensify this increase. Instead, the forces of technology should be downplayed and adapted to natural ecosystems. It may well be that these systems have long been irreversibly combined with technology, but still they should not be thoroughly repaired and transformed by it, since this would amount to "a comic faith in," indeed a "touching silliness about technofixes"

(Haraway 2016: 3). So, if the centripetal transhumanist upgrading of the human body and mind seems out of sync with an Anthropocene sensibility, this is even more the case with centrifugal geo-engineered transformations of the environment.

SYNCRETIZING SPACE AND TIME: GAIA AS ATTRACTOR FOR CULTURAL AND BIOLOGICAL EVOLUTION

How are we now to syncretically fuse the posthumanist positions, each of which, for an immediate, that is, non-syncretic consideration, seems rather unnegotiable and bound to its fissionist space? Ironically, transhumanism and Anthropocene theorizing appear to be not only compatible, but actually two sides of the same coin. Transhumanism's matterless subject, with its condensation of substrate-independent negentropy, or extropy, and the Anthropocene production of entropy seem thus to be exactly symmetrical. For does not the centripetal building-up of negentropy demand a similar amount of segregated, centrifugal, if completely forgotten, entropy? In this sense, Lyotard's burning Earth is not so much the cause of negentropy wanting to escape its terrestrial holster. It is rather its effect. What causes the Earth to burn is not some futuristically distant, expanding sun, but the feverish, neo-Cartesian mind that desires to shine from a lofty elevation over a materiality which, however, keeps stubbornly embedding it, and whose absorption of negentropy-turned entropy will ultimately suffocate it.

The absolute dualism of transhumanist subject and Anthropocene surroundings is a humanist leftover that needs posthumanist reformation, lest we have to violently polarize constructive negentropy and destructive entropy, progress and regress, utopia and apocalypse, mind and matter. And it is not enough to simply flatten us out of the problems—i.e., remove broader temporalities, and universally mingle mind and matter into one crudely indeterminate hybrid—for although an obvious and necessary advantage of such an anachronic leveling, the critical posthumanist *Steady State*, is a healthier coordination of mind and body, and body and matter than simple dualism, this coordination remains too unnuanced, and lacks a sense of temporal change, the obvious advantage of both the transhumanist and Anthropocene scenarios.

What we need is a more thorough and articulate blending of virtuality and matter. I believe we could approach such blending by shifting the analytic lens of my map from space to time, or rather extending space with time, the spheres of Gaia underlying and creating resonance for evolutionary stages. Here, we expose a many-layered, oscillatory, or rather, spiraling, evolutionary model, a grand narrative of culture and its biological underpinnings that translates earlier evolutionary courses and their recapitulation into some of those spatial positions I approach in my map of posthumanist positions, although a more thorough syncretism will, by its very nature, dissolve the absolute disparities between those positions. Through this syncretic synchronization, the posthuman turn emerges as a contemporaneous palimpsest, "a *disjunctive unity of present times*" (Osborne 2013: 17) that intermingles variously immersed evolutionary subject positions, or, as Latour (2013) terms it, modes of

existence. More specifically, in its mapped version, the layered appearance of this intermingling might resemble a re-actualized version of the Great Chain of Being (Lovejoy 1936). However, this re-actualization presupposes that the ancient geocentric coordination of the hierarchies of organisms and cosmological layers—from earth and water, to the atmosphere, to the heavens—has now turned from its recent Darwinist reformulation as purely horizontal, evolutionary development into a re-frozen spatial contemporaneousness, with the organizational forces no longer coming from above, as in Antiquity and the Middle Ages, but from below.

Basically, we must assume that on the most general level, evolution actually seems guided by its embeddedness in Gaia, whose fundamental material disposition—dense matter below, thinner matter above—has acted as an attractor (Kauffman 1995: 78–9), a landscape of spiraling, recurring possibilities for both biological organisms and culturally formed humans. Although the striving for negentropic increase has actually resembled that physical upward-striving that is implied in transhumanist ideas of mind escaping matter, in the posthuman super-palimpsestic return to material immersion and its earlier forerunners, the earlier autonomized entities—body and mind—seem to be reconciled with matter on several material platforms. What constitutes the dark, mostly unseen underside of my still-fissionist, posthumanist map is this basic striving for negentropy, which is only fully lit toward the map's transhumanist top. So, to approach, but also modify the more complex, flattened, and Anthropocene positions, we must more fully expose this negentropic striving. What will be most controversial with respect to critical posthumanism is that this exposure includes those humanist positions of autonomized body and mind—*bios* rather than *zoe*—that most of posthumanism, except transhumanism, refuses to acknowledge as real modes of existence. However, if we do not acknowledge the humanist body and mind as formerly real products of biocultural stages—projects that in their own times were meaningfully pursued on both practical and theoretical levels, even if their present continuation seems out of touch with reality's demands—then we will never fully understand the present posthuman need for their deconstruction. This acknowledgment should actually be extended far down into biological evolution, in which the autonomization of bodies, *bios,* was for a long time the basis for an increasing negentropy that rose over the collective ecologies of *zoe*.

If we first focus exclusively on the negentropic rise in cultural evolution, we will see that humans have evolved by moving the points of gravity of their Umwelten upward in the Gaia system, from earth to sky. Here, we could introduce the arts as a supreme guide for pinpointing the temporalized grand narrative of posthumanism, for as I have shown in my earlier research (Wamberg [2005] 2009), this upward-striving may be followed quite precisely by structurally coordinating the evolution of cosmological world pictures with that of human consciousness, as reflected in the visual arts. Thus, simultaneously with world pictures expanding, while shifting their point of gravity toward steadily lighter material embeddings—from prehistoric Earth (the Paleolithic), to geocentric heaven (Mesopotamia to the Middle Ages), to Copernican un-hierarchical infinity (post-medieval modernity until 1900)—the depth of field, the radius of represented space in art, expands in tandem with the sharpening of a represented point of view, the visual equivalent of the autonomization of human consciousness. After first being directly embedded in real rock surfaces (Upper

Paleolithic: low depth of field), pictorial figures become enshrouded in represented surroundings that serve as backgrounds (Classical Antiquity: medium depth of field), to finally become absorbed by an infinite, represented web governed by a precise point of view (modernity: 1420–1900, full depth of field). The project of humanism developed through the last two stages, first by bracketing off the autonomized human body from its now nonhuman surroundings (Classical Antiquity), then by bracketing off the autonomized human mind from both body and surroundings (post-medieval modernity).

This autonomization of the human individual through the subject's withdrawal from, and being lifted from, terrestrial matter through cultural history is essentially consonant with Hegel's spirit–evolutionary thinking, and indeed, it gains syncretic depth from being extended by Hegel's ([1835] 1920, 1999) idea of the arts as shifting similarly medial point of gravity from symbolic architecture (concerned with forming the material physical surroundings), to classical sculpture (concerned with forming a virtual representation of a corporeal lump of these surroundings, that is, the autonomous human body), to romantic painting, and further, to music and lyrical poetry (each concerned with re-mirroring, a distanced representation of the now subject-bound impression of these surroundings, that is, of the autonomous human mind).

Hegel's aesthetics even portend a transgression of the humanist thinking that generated it, for if we look at his sketched future horizon for art, art as allegedly outdistanced by, *aufgeheben* in, pure philosophy, this seems compatible with the transhumanist idea of accelerated negentropy leading to substrate-independent minds. Even though philosophy and its basis in cognition would turn out to be not so immaterially pure as Hegel and the transhumanists suspect, by 1900 this idea already paved the way for a reading of art as basically posthuman. For as systematically revealed by the American philosopher and art critic Arthur C. Danto (1986; Wamberg 2012), this art transferred its point of gravity to detached auras of self-reflective art philosophical concepts. In the case of conceptual art, these auras completely constitute its significance, and thereby generate a certain substrate-independence, an erasure of the centrality of the material art object they enshroud.

Even if critical posthumanists could be convinced that a certain negentropic rise has taken place throughout human history, they would obviously object to two of negentropy's outcomes: the idea and practices associated with the autonomous human body (according to the Hegelian scheme, emerging in classical antiquity, but also recirculated countless times since then, from the Renaissance, to neo-classicism, to totalitarian movements, to the contemporary visual cult of the healthy body), and the idea and practices of the autonomous mind (emerging in late medieval nominalism and grounded by Descartes and Kant, but also a primary idea in present-day individualist culture, including its democratic demands). In my posthumanist map, only a mutation of the idea of the autonomous mind, that of its substrate-independence, is allowed a presence near the transhumanist top. The critical posthumanist middle and lower sections of the map, on the other hand, have to block out mental and corporeal human autonomy (*bios*), and break them open for a more manifest material embedding (*zoe*). Only in the lower Anthropocene section do we again meet the possibility of a re-actualization of parts of Hegelian evolution, since its idea of prehistoric and early historic material embedment is compatible with Anthropocene ideas of extreme immersion in

Gaia—even one which is more appealing than the one we presently experience: the involuntary exposure to an overload of entropy. Otherwise, the only variant of Hegelianism critical posthumanism that Anthropocene theorizing would immediately accept would be an inverted one, rehabilitating that early phase that Hegel himself dismissed as immature.

In my understanding, the transhumanists are basically right in assuming that human culture, with new means, continues and increases the build-up of negentropy, or extropy, which has been underway throughout evolution. In the guise of an intensified ability to transmit energy through mass units, proposed by astrophysicist Eric Chaisson (2001: 139), such an evolutionary negentropic rise has been pursued in such diverse contexts as transdisciplinary Big History (Spier 2010) and the theory of technology from a biological perspective (Kelly 2010: 57–69, 274–82). Specifically, the rising negentropy of cultural evolution, registered in visual art's expanding depth of field, an expansion mirroring the autonomized human consciousness, should be seen as a continuation of a negentropic striving in nature, registered in those inner, virtual worlds that in the animal kingdom were promoted through anatomical changes, rather than learning, as in human culture. Nevertheless, this ongoing negentropic striving—which the Danish biosemiotician Jesper Hoffmeyer ([2005] 2008) connects with semiotic freedom, the ability to choose—does not proceed in a linear fashion from biological organisms to human culture. In the latter, it is only reassumed on an individual level—*bios* encompassing first body, then mind—after what must be seen as an evolutionary recapitulation, in which human culture, with new artificial means, replays the whole course of biological evolution, departing from the collective bosom of *zoe*.

As we have now seen that human negentropic upward-striving in the Gaia system through cultural evolution comprises three main parts—material immersion, corporeal autonomy, and mental autonomy—it is therefore astonishing to note that biological evolution has run a roughly similar, three-part course (Figure 8.2).

lincreasing individual-based virtuality (decreasing materiality) of Umwelten through rising negentropy

Biological evolution as inscribed in the embryo

Cultural evolution as inscribed in visual art and cosmology

Exoderm — Exo — **Autonomous human mind**
Sensory apparatus with nerves, brain and skin — Individual view of infinite surroundings, cp. Hegel's romantic paintings—unhierarchical Copernican world picture

Mesoderm — Meso — **Autonomous human body**
Action apparatus with skeleton, muscles, blood, and sexual organs — Idealized body against background, cp. Hegel's classical sculpture—sky-governed geocentric world picture

Endoderm — Endo — **Spectral body**
Metabolism with digestion and respiration — Animal body embedded in physical matter, cp. Hegel's symbolic architecture—earth-bound animistic world picture

FIGURE 8.2 Map correlating negentropic tendencies of biological evolution and its cultural recapitulation. Diagram by author; graphic design by Carl Zakrisson.

In the surprisingly clear way it is summed up in the ontogenetic recapitulation of evolution that manifests in all more advanced organisms to this day, the embryo thus displays a tripartite, spherical layering that echoes those Gaia spheres with which it is destined to interface: endoderm (metabolism, with digestion and respiration), mesoderm (action apparatus with skeleton, muscles, blood, and sexual organs), and ectoderm or exoderm (sensory apparatus, with nerves, brain, and skin) (Gilbert 2010: 14–16). If we now generalize these three layers as *endo*, *meso*, and *exo*, we may scale them up—structurally correlate them —to the three main stages of both biological and cultural evolution, including their latest recapitulation and freezing into a tripartite spatial contemporaneity. As we will soon see, this latter recapitulation will, however, demand a slightly reformed, indeed fusionist and truly syncretic posthumanist map. In general, in more complex organisms the deepest *endo* layer concerns that direct indexical exchange of matter that was first developed in bacteria. Since it, including its levels of recapitulation, has highly fluid boundaries between organism and Umwelt, it is particularly relevant to Karen Barad's concept of intra-action (2007: 33). The physical movement and reproduction of the *meso* layer concern exchanges between the more autonomous successors to bacteria, eukaryotic organisms, and their Umwelten, and could accordingly be called interaction. The outermost *exo* layer of sensation and brain originally developed to facilitate this interaction. Since it typically concerns thinner material impressions from the Umwelt that, through a relay of processing and choices—what amounts to Hoffmeyer's semiotic freedom—establishes a certain distance from the actual and more material sphere of interaction and, even more, to the highly material sphere of metabolism, we could call this third sort of exchange remote action.

EVOLUTIONARY RECAPITULATION AS REBOOT

But why does cultural evolution recapitulate biological evolution—and the posthuman turn recapitulate both sequences in a contemporaneous spatiality that now downplays corporeal and mental autonomy? A crucial factor appears to be that evolutionary complexification, negentropic rise, happens at a price, namely the initial protection of early ontogenetic stages through what we could call inner worlds: eggs, wombs, nests, and warm spaces for suckling. Such inner worlds could be conceived of as evolutionary recapitulations that amount to reboots in which individuals replay the course of biological evolution, departing from, and continually protected by a chrysalis, in which the individual slides together with its environment, thereby blurring the distinction of negentropic self and entropic other.

Humans are located at a particularly intricate crossing point between rising autonomization of the exoderm apparatus and the accompanying protection of embryos and infants in inner worlds of wombs and suckling environments. Not only does the female pelvis reach its maximum width with the birth of the human infant, occasioning an exceptionally immature birth to ensure a brain that may grow to maximum size long after birth; this human immaturity actually never finishes, but is extended by neoteny, continuous infantile characteristics among adults, such as is witnessed by the infantile nakedness never being overgrown by adult ape fur. In Desmond Morris's (1967) famous words, the human being is the naked ape. Or, in the words of the philosophical anthropologist Arnold Gehlen ([1940]

2016: 16), the human being is a *Mängelwesen,* a deficient being. Because of this vulnerable and principally unfinished natural state, this naked ape has to hyper-compensate with new artificially protective Umwelten, the infinitely malleable worlds of culture, which depart from what I term the macro-incubator—an upscaled version of the initial post-birth situation that later develops into those more distant world pictures, which we noted above: sky-governed geocentrism (antiquity) and un-hierarchical infinity (post-medieval modernity). Although Peter Sloterdijk does not move into such systematic evolutionary considerations in his highly evocative but somewhat labyrinthine *Sphären* trilogy (1998–2004), his idea of world pictures as basically being expansions of the primordial ontogenetic womb could be seen as compatible with this line of thinking.

So even though humans take over the negentropic rise of biological evolution and move toward stages of corporeal autonomy that, on a higher, more complex level, re-actualize that of earlier mammals (*meso*), and even toward stages of mental autonomy that outdistance the still body-bound sensation and consciousness of the animal world (*exo*), this has been complicated from its Lower Paleolithic beginnings by an enmeshment (*endo*) in a culturally generated macro-incubator that blows up the ontogenetic protective environment and blurs the boundaries between self and other, negentropic ego and less complex, potentially entropic surroundings. Assuming that this large-scale, cultural recapitulation of the earliest stage of biological evolution, bacterial metabolism, is not simply a regression to lower stages of evolutionary negentropy, but actually initiates a higher stage, located above that of humans' immediate predecessors, the non-cultural primates, we then clearly need reformed thinking about negentropic progress. This reformed thinking must allow for rising negentropy as not simply located in individuals strictly separated from their environments, to which they segregate entropy, but in messier collectives of blended negentropy and negentropy that nevertheless give rise to higher levels of negentropy.

In fact, the rise of human negentropy is now such a fragile process that it does not even expand continuously from a primordial enmeshment, generating, under the protection of more discreetly protective world pictures, the reconstructed corporeal autonomy of mammals (*meso*: the classical paradigm) and the humanist specialty of mental autonomy (*exo*: modernity between 1420 and 1900). Instead, it is oscillating, or more precisely, spiraling, between the steady autonomization of higher corporeal functions and such evolutionary reboots that initially base such functions in closer material embeddings. In such higher-stage evolutionary reboots, then, negentropic progression is transferred from autonomized subjects to messier collectives that locally blend negentropy with entropy, although the resulting direction is still negentropic.

If the evolution of visual art acted as a supreme guide to the overall rise of negentropy in culture, the increasing depth of field signaling the autonomization of consciousness, this is no less so for these evolutionary reboots in which the paradigms of negentropic concentration in autonomized subjects—Upper Paleolithic animals, Classically ideal bodies, modern observing subjects—are rhythmically displaced by messier collectives, networks of formerly negentropic organisms and their formerly entropic surroundings. A key figure here is the German art historian Wilhelm Worringer ([1907] 1953, 1997), who, in response to the rise of early twentieth-century-abstraction, described art history as generally marked by an

oscillation between abstraction and empathy. He understood abstraction as imprints from the nonhuman, inorganic world, par excellence crystals, whose dead patterns appeared animated, however, thereby creating a sense of shared agency (77, 96; Papapetros 2012: 130). On the other hand, empathy emerged as the characteristic of naturalist paradigms, in which viewers identify with what they now conceive of as living subjects that stand correspondingly apart from those expansive and less living spaces that surround them—spaces that therefore could be seen as transformations of the former animated mixtures of entropy and negentropy, in which subjects were more densely immersed.

We should extend Worringer's inorganic nature to all those phenomena of nature that are less complex, less differentiated, than the human body and mind—from nonhuman animals and plants, to inorganic entities such as minerals, water, and gases, including those that actively dedifferentiate higher complexity, negentropy, and convert it into entropy. Although Worringer's geometrically regular abstraction could be seen as distant from entropy, which is often understood as simply chaos and disorder, this is so only if considered superficially. For if we consult the transdisciplinary sciences of complexity, we will see that entropy concerns phenomena that are so diverse that their details are too energy-consuming to isolate as represented knowledge, and that may therefore be approached through dedifferentiated surfaces that appear as the very opposite of irregular, namely as having geometric order (Lloyd and Pagels 1988: 186–7). On the other hand, complexity is marked by a memory of its own coming-into-being, what Seth Lloyd and Heinz Pagels term "thermodynamic depth," and Charles Bennett terms "logical depth" (Pagels 1988: 65). Thus, the subjects of Worringer's empathy, the living organisms thriving in expansive spaces, could be linked to the differentiated wholes of negentropic complexity, the thermodynamically deep entities that rise over an ocean of entropic disorganization. Correspondingly, this ocean, spanning the extremes of chaos and order, could be considered the stuff of which Worringer's abstraction is made.

In earth artist Robert Smithson's analysis ([1966] 1996), the geometrically regular surfaces of minimalist sculpture emerge as prime examples of entropic art, superficial wrappings of a dedifferentiated chaos. In general, this entropic dialectics of chaos and order in art could be approached through the work of gestalt psychologist Rudolph Arnheim (1971: 44–5), who similarly emphasizes that entropy encompasses both extremes of chaos and order (what he terms "orderliness"). That these extremes are actually signs of evolutionary reboots could gain support from the psychoanalytic art theorist Arnold Ehrenzweig (1967: 219 and 221), who generally links entropic dedifferentiation (the process of change) or undifferentiation (the state that has already happened) to preconscious states of mind, in contrast to formed gestalts, autonomized differentiated wholes.

In cultural evolution, waves of entropic dedifferentiation in which negentropy emerges only from messier collectives of entropy and negentropy are recurrently displaced by waves in which negentropic organization contracts into a more individualized guise that could be equated with both Worringer's empathic subjects and Arnheim's and Ehrenzweig's gestalts. This is already the case with the Upper Paleolithic animals onto which early humans projected their first empathy, in order to overcome their awakened sense of a separation from nature (Bataille [1930–59] 2009: 60–76). Otherwise, empathy peaks when humans direct

their empathy toward their emancipated humanist selves, in the form of either idealized bodies (Classical paradigms) or the living points of view governing artworks (modernity since 1420).

For Worringer (15), abstraction was a direct result of what he termed "spiritual dread of space," which we could translate into a fear of those more spacious Umwelten that accompany the increasingly autonomized organisms of evolution. It makes sense that the first Lower Paleolithic humans, recently transformed into naked and vulnerable apes, had to encase themselves in a techno-semiotic macro-incubator, whose earliest artistic marks seem to be abstract, namely indexical traces of physical actions that generated a metabolic exchange between the open bodies and that densely animated world that comprised the macro-incubator. Similarly, in Neolithic and early metal-age tribal art we meet under the broken-up hybrid dualism of earth and sky an abstract cyborg body, whose now more condensed matter is open to, and mingles with those artifacts that were soon to be suppressed in antiquity, in order to create a more autonomous body. And in the art of the Middle Ages, a third wave of abstraction dissolved or wholly displaced the formerly ideal body of antiquity, instead directing our attention to the abstract materiality of perception, prolonged outward in the visible arch of heaven, which cannot but indirectly mediate the new infinite divinity.

The messy collectives of negentropy and entropy that have been exposed in all these reboots, as we move upward through cultural evolution and the expanding series of world pictures alike, could be described as increasingly thinned levels of materiality and increasingly dominant levels of the virtuality of Umwelten—of spatio-temporal matter (Lower Paleolithic), hybrid body (Neolithic) and perception bound to the celestial vault (medieval). The level of materiality specifically exposed by the posthuman turn, namely that manifested in the outermost spheres of Gaia, will, in a certain accordance with transhumanism, be further thinned. However, in contrast to the empty, direction-less space of Copernican infinity that was hidden beyond the atmospheric veil through which it was experienced in modernity—and that still haunts transhumanist immateriality—the posthuman upper space is actually material and field-governed. It is the space of information being transmitted at the speed of light in electromagnetic waves or electricity. Therefore, information is "dirtier" than predicted in transhumanist immateriality. It is connected to entropy even before it is linked to a specific material substrate. High-resolution messages thrive in millions of bits whose rescue as negentropic rather than entropic is a question of shaky semantic rules (cp. Wiener 1961: 64).

All the materialized information, the excesses of posthuman virtuality, must also be conceived of as blended with the lower layers of my map, those earlier evolutionary states that are also re-actualized and meet in a contemporaneous posthuman co-presence of subject positions (Figure 8.3).
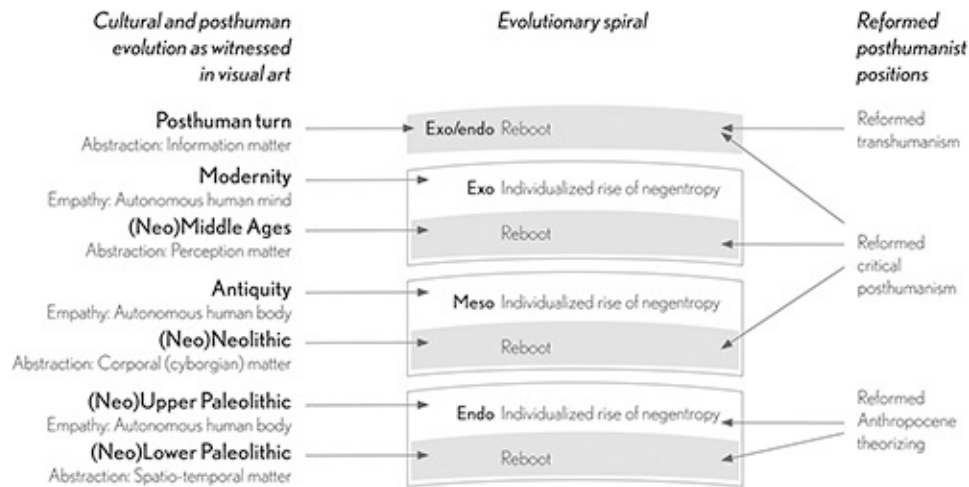
FIGURE 8.3 Syncretic map correlating posthumanist positions (space) with cultural and posthuman evolution (time). Diagram by author; graphic design by Carl Zakrisson.

Thus, what was misleading in my initial fissionist presentation of the map of posthumanist positions (Figure 8.1)—although it haunts the self-understanding of the positions themselves —was its leftover dualist tendency: the concentration in the bottom of pure materialism, regression, and entropy (Anthropocene theorizing), and in the top, of pure immaterial virtuality, progress, and negentropy (transhumanism). A more realistic, or rather, prescriptive, fusionist map would be much more mixed, not only blending negentropic information into the heavy entropic matter of the Anthropocene, and similarly, material entropy into the light negentropic transhuman information, but unfolding a spiraling evolutionary contemporaneity that includes neo-Neolithic cyborgian bodies and neo-medieval material perception (both foregrounded by critical posthumanism without any temporal awareness). However, among the continuously vital layers of the past, it follows from posthuman logic itself that the positions of humanist *bios*, the autonomous human body and mind, have to be deconstructed and blocked out. It is my hope that in this fusionist, higher-resolution map of posthumanist positions, the flattened ontologies may be more properly unflattened and re-connected with that conditioned evolutionary progression which they have been forced to deny because of its earlier lack of layers of rebooting—layers that in un-evolutionistic isolation may be seen as the primary focus of critical posthumanism.

MODERNISM AND AVANT-GARDE ART AS POSTHUMAN

If avant-garde and modernist art could already be exposed as including posthuman qualities through Worringer's idea of abstraction—the visual equivalent of entropic dedifferentiation that dissolves any autonomous subject, particularly the humanist body and mind—this is no less so for most other qualities of this art, which thereby becomes a prime symptom of the posthuman turn in all its messy complexity. In art, this turn certainly does not begin only with obviously posthumanist art forms such as bioart, robotic art, eco-art, and climate art, which explicitly mingle technology and raw, natural matter in often quasi-scientific interrogations of the fate of the human body and its embedding in terrestrial nature. Such a posthumanist

perspective was already attained in the 1960s by the American artist and art theorist Jack Burnham ([1967] 1987), who by looking at sculptural trends of his own time—minimalism, kinetic art, diverse forms of systems art—could conclude that we are actually on the verge of becoming posthuman. Burnham appeared as an early transhumanist who believed that intelligent machines were about to take over evolution, recreating life through technology (370–6). And in accordance with my suggested broader historiography of the posthuman, Burnham in fact expanded his observations of recent art to the whole of the twentieth century, declaring modernist art in general to be a preparatory step toward "our destination as a post-human species" (371).

A perspective that considers avant-garde art and modernism as infused with posthuman qualities right from their beginnings in the late nineteenth century (Wamberg 2012) may be traced among even earlier theoreticians. A notable example is the Spanish philosopher Ortega Y. Gasset ([1925] 1948) and his idea of the dehumanization of art. For in complete accordance with Worringer, modernism's dehumanizing withdrawal from empathic identification with human-centered stories is again connected to abstraction. Similarly, the conservative Austrian art historian Hans Sedlmayr ([1948] 1985) suggested a loss of center (*Verlust der Mitte*), a dissolving of the dignified human body, as a primary characteristic of all modernist art forms. This "away from the human!" was labeled with various terms that at that time had mostly misanthropic connotations: antihumanism, transhumanism, infra- and suprahumanism. According to Sedlmayr, what drives out the autonomous human body (and we could add: mind) from the empathic center stage of art is a series of imbalances that, again, to a large extent, could be linked to dedifferentiation and entropy. Infused by a profound presence of the inorganic, these imbalances could enter my reformed posthuman map (Figure 8.3) both vertically (*across* densities of materiality and conflicting forces of progress and regress) and horizontally (spanning *along* the different levels of material density —spatio-temporal matter, body, perception and information—the entropic poles of extreme order and extreme chaos): immateriality and materiality, superhuman and primitive, rationality and irrationality, purity and contamination, hyper-conservation and destruction, cold and heat, geometry and chaos.

If we turn to the layered quality of the map itself—the posthuman present as a contemporaneous montage of re-actualized subject positions—it may be discerned in the countless primitivisms of which avant-garde art and modernism are comprised (Debray et al. 2019). Although Burnham's previously mentioned posthuman futurism was gained at the expense of sensing the neo-archaisms of modernist art, he would soon declare that possibly, "art in its last stages constitutes a structural reversion to the infantile stages of human development" (1974: 139). If we move to the phylogenetic versions of such a reversion, modernist tendencies are often seen as re-actualized Middle Ages (Nagel 2012). Since medieval perceptual abstraction itself was a layering of, and fusion with, Neolithic and early metal age tribal cyborgianism, this underlying layer and an even deeper exposure of Lower Paleolithic indexicality are part of any modernist neo-medievalism. Similarly, at the same time that the Futurists looked impatiently beyond their time and more broadly absorbed the body into shiny cyborgian assemblages of flesh, machine, and heterogenous space, the Cubists constructed very similar assemblages, only moving in the very opposite temporal

direction, to the tribal cultures of continued Neolithic and early metal ages, in which similar assemblages of bodies, masks, and ornaments are found. In a parallel paleofuturistic loop, which also finds resonance in the material level of exposed bodies, but now staged in real surroundings instead of the semi-represented ones of Cubism and Futurism, the installations of earth art and minimalism could be seen as both pointing toward science fiction (Smithson [1966] 1996) and toward Neolithic megaliths (Lippard 1983). Moreover, these alliances between the posthuman and broadly Neolithic abstraction could again, in accordance with Burnham's and Ehrenzweig's ideas, be understood as phylogenetic versions of mid-childhood (three to seven years of age) constructions of space and bodies (Marcussen [2002] 2008; Franke and Holert 2018).

To develop a truly comprehensive theory of avant-garde and modernist art as symptomatic of the posthuman, we should finally broaden our understanding of what abstraction may signify (Figure 8.3). Its most obvious manifestations in my map would be visual, and pertain to the layer of perceptual materiality (the medieval/neo-medieval layer), with an easy extension into corporeal materiality (as seen, for example in Cubism and minimalism). But abstraction would also contain, in its nethermost layer, spatio-temporal materiality (i.e., gestures and their raw indexical imprints), and in the topmost layer, the informational materiality pertaining to conceptual art. If abstraction in general pertains to the inorganic—spanning entropic chaos and order—it also comprises indeterminacy, namely, indeterminacy of object in relation to subject, since both are entangled with each other in the different layers of enmeshment. What could pervasively encompass such indeterminacy—a primary interpretative quality of any sort of avant-garde and modernist art (Eco [1962] 1989)—would be the ancient Skeptic concept of *epoché*, suspension of judgment (Wamberg 2019). The posthuman in art, then, also insists on *epoché*—keeping interpretation afloat, and not freezing it into any determinate subject position.

SOURCES CITED

Arnheim, Rudolph. *Entropy and Art: An Essay on Disorder and Order*. Berkeley: University of California Press, 1971.

Barad, Karen. *Meeting the Universe Halfway: Quantum Physics and the Entanglement of Matter and Meaning*. Durham and London: Duke University Press, 2007.

Bataille, Georges. *The Cradle of Humanity: Prehistoric Art and Culture*. Translated by Michelle Kendall and Stuart Kendall, edited and introduction by Stuart Kendall. New York: Zone Books, [1930–59] 2009.

Bennett, Jane. *Vibrant Matter: A Political Ecology of Things*. Durham and London: Duke University Press, 2010.

Braidotti, Rosi. *The Posthuman*. Cambridge: Polity Press, 2013.

Brillouin, Léon. *Science and Information theory*. New York: Academic Press, 1956.

Burnham, Jack. "The Artist as Shaman." In *Great Western Salt Works: Essays on the Meaning of Post-Formalist Art*. New York: George Braziller, 1974, pp. 139–44.

Burnham, Jack. *Beyond Modern Sculpture: The Effects of Science and Technology on the Sculpture of this Century*. New York: George Braziller, [1967] 1987.

Butler, Samuel. *Erewhon*. Edited and introduction by Peter Mumford. Harmondsworth: Penguin Books, [1872] 1970.

Chaisson, Eric. *Cosmic Evolution: The Rise of Complexity in Nature*. Cambridge, MA and London: Harvard University Press, 2001.

Danto, Arthur C. *The Philosophical Disenfranchisement of Art*. New York: Columbia University Press, 1986.

Debray, Cécille, Rémi Labrousse, and Maria Stavrinaki, eds. *Préhistoire: Une énigme moderne*, exhibition catalogue, May 8–September 15, 2019. Paris: Centre Pompidou, 2019.

Deely, John. "Umwelt." *Semiotica,* vol. 134, no. 1, 4 (2001): 125–35, special volume about Jakob von Uexküll (guest editor

K. Kull).

Eco, Umberto. "The Open Work in the Visual Arts." In *The Open Work,* translated by Anna Cancogni. Cambridge, MA: Harvard University Press, [1962] 1989, pp. 84–104.

Ehrenzweig, Anton. *The Hidden Order of Art: A Study in the Psychology of Artistic Imagination*. London: Weidenfeld and Nicolson, 1967.

Franke, Anselm, and Tom Holert, eds. *Neolithic Childhood: Art in a False* Present*, c. 1930,* exhibition catalogue, April 13– July 19, 2018. Berlin: Haus der Kulturen der Welt and Diaphanes, 2018.

Gehlen, Arnold. *Der Mensch: Seine Natur und seine Stellung in der Welt*. Frankfurt a.M.: Vittorio Klostermann, [1940] 2016.

Gilbert, Scott F. *Developmental Biology*. Sunderland, MA: Sinauer Associates, 2010.

Haraway, Donna J. "A Cyborg Manifesto: Science, Technology, and Socialist Feminism in the Late Twentieth Century." In *Simians, Cyborgs and Women: The Reinvention of Nature,* edited by Haraway. London: Free Association Books, [1985] 1991, pp. 149–81.

Haraway, Donna J. *Staying with the Trouble: Making Kin in the Chthulucene*. Durham and London: Duke University Press, 2016.

Harman, Graham. *Speculative Realism: An Introduction*. Cambridge and Medford, MA: Polity Press, 2018.

Hayles, N. Katherine. *How We Became Posthuman: Virtual Bodies in Cybernetics, Literature and Informatics*. Chicago and London: University of Chicago Press, 1999.

Hayles, N. Katherine. *Unthought: The Power of the Cognitive Unconscious*. Chicago and London: University of Chicago Press, 2017.

Hegel, Georg Wilhelm Friedrich. *The Philosophy of Fine Art*. Translated by F. P. B. Osmaston. Bristol: Thoemmes Press, 4 vols., [1835] 1920, 1999.

Heidegger, Martin. "The Question Concerning Technology." In *The Question Concerning Technology*, and Other Essays, translated by William Lovitt. New York: Harper Torchbook, [1954] 1977, pp. 3–35.

Herbrechter, Stefan. *Posthumanism: A Critical Analysis*. New York and London: Bloomsbury, [2009] 2013.

Hoffmeyer, Jesper. *Biosemiotics: An Examination into the Signs of Life and the Life of Signs*. Translated by Jesper Hoffmeyer and Donald Favareau. Scranton, PA: University of Scranton Press, [2005] 2008.

Kauffman, Stuart. *At Home in the Universe: The Search for Laws of Self-Organization and Complexity*. London: Viking, 1995.

Kelly, Kevin. *What Technology Wants*. New York: Viking, 2010.

Koene, Randal A. "Uploading to Substrate-Independent Minds." In *The Transhumanist Reader*, edited by Max More and Natasha Vita-More. Malden, MA and Oxford: Wiley-Blackwell, 2013, pp. 146–56.

Kurzweil, Ray. *The Singularity Is Near: When Humans Transcend Biology*. London: Viking, 2005.

Latour, Bruno. *We Have Never Been Modern*. Translated by Catherine Porter. Cambridge, MA: Harvard University Press, [1991] 1993.

Latour, Bruno. *Reassembling the Social: An Introduction to Actor-Network-Theory*. Oxford: Oxford University Press, 2007.

Latour, Bruno. *An Inquiry into Modes of Existence: An Anthropology of the Moderns*. Translated by Catherine Porter. Cambridge, MA: Harvard University Press, 2013.

Latour, Bruno. *Facing Gaia: Eight Lectures on the New Climatic Regime*. Translated by Catherine Porter. Cambridge and Medford, MA: Polity Press, [2015] 2017.

Latour, Bruno. *Down to Earth: Politics in the New Climatic Regime*. Cambridge and Medford, MA: Polity, [2017] 2018.

Lippard, Lucy. *Overlay: Contemporary Art and the Art of Prehistory*. New York: Pantheon Books, 1983.

Lloyd, Seth, and Heinz Pagels. "Complexity as Thermodynamic Depth." *Annals of Physics*, vol. 88 (1988): 185–213.

Lovejoy, Arthur O. *The Great Chain of Being: A Study of the History of an Idea*. Cambridge, MA: og London: Harvard University Press, 1936.

Lovelock, James. *Gaia: A New Look at Life on Earth*. Oxford and New York: Oxford University Press, 1979.

Lyotard, Jean-François. "A Postmodern Fable." In *Postmodern Debates*, translated by Georges Van Den Abbeele, edited by Simon Malpas. Basingstoke: Palgrave, [1993] 2001, pp. 12–21.

Marcussen, Lars. *The Architecture of Space—the Space of Architecture: A Historical Survey*. Copenhagen: Arkitektens Forlag, [2002] 2008.

Moravec, Hans P. *Mind Children: The Future of Robot and Human Intelligence*. Cambridge, MA: Harvard University, 1988.

More, Max. "Principles of Extropy (Version 3.11): An Evolving Framework of Values and Standards for Continuously Improving the Human Condition. Extropy Institute." 2003, https://web.archive.org/web/20131015142449/http://extropy.org/principles.htm

Morris, Desmond. *The Naked Ape*. London: Corgi Books, 1967.

Morton, Timothy. *Hyperobjects: Philosophy and Ecology after the End of the World*. Minneapolis and London: University of Minnesota Press, 2013.

Nagel, Alexander. *Medieval Modern: Art Out of Time*. London: Thames and Hudson, 2012.

Ortega Y Gasset, José. *The Dehumanization of Art, and Notes on the Novel*. Translated by Helene Weyl. Princeton (NJ): Princeton University Press, [1925] 1948.

Osborne, Peter. *Anywhere or Not at All: Philosophy of Contemporary Art*. London and New York: Verso, 2013.

Pagels, Heinz R. *The Dreams of Reason: The Rise of the Sciences of Complexity*. New York: Bantham Books, 1988.

Papapetros, Spyros. *On the Animation of the Inorganic: Art, Architecture, and the Extensions of Life*. Chicago and London: University of Chicago Press, 2012.

Plutarch. "Brotherly Love." In *Moralia*, vol. VI, translated by W. C. Helmbold. Loeb Classical Library, Cambridge, MA and London: William Heinemann, 1927, pp. 246–325.

Samson, Paul R., and David Pitt, eds. *The Biosphere and Noosphere Reader: Global Environment, Society and Change*. London and New York: Routledge, 1999.

Schrödinger, Erwin. *What Is Life: The Physical Aspect of the Living Cell*. Cambridge: Cambridge University Press, 1944.

Sedlmayr, Hans. *Verlust der Mitte: Die bildende Kunst des 19. und 20. Jahrhunderts als Symptom und Symbol der Zeit*. Frankfurt a.M: Ullstein, [1948] 1985.

Sloterdijk, Peter. *Sphären I: Blasen*. Frankfurt a.M: Suhrkamp, 1998.

Sloterdijk, Peter. *Sphären II: Globen*. Frankfurt a.M: Suhrkamp, 1999.

Sloterdijk, Peter. *Sphären III: Schäume*. Frankfurt a.M: Suhrkamp, 2004.

Smithson, Robert. "Entropy and the New Monuments." In *Robert Smithson: The Collected Writings*, edited by Jack Flam. Berkeley, Los Angeles and London: University of California Press, [1966] 1996, pp. 10–23.

Spier, Fred. *Big History and the Future of Humanity*. Oxford: Wiley-Blackwell, 2010.

Teilhard de Chardin, Pierre. *The Future of Man*. Translated by Norman Denny. London: Collins, [1959] 1964.

Wamberg, Jacob. *Landscape as Word Picture: Tracing Cultural Evolution in Images*. Translated by Gaye Kynock. Aarhus: Aarhus University Press, [2005] 2009.

Wamberg, Jacob. "Dehumanizing Danto and Fukuyama: Towards a Post-Hegelian Role for Art in Evolution." In *The Posthuman Condition: Ethics, Aesthetics and Politics of Biotechnological Challenges*, edited by Kasper Lippert-Rasmussen, Mads Rosendahl Thomsen and Jacob Wamberg. Aarhus: Aarhus University Press, 2012, pp. 141–54.

Wamberg, Jacob. "Shrink to Expand: The Readymades through the *Large Glass*." *Nordic Journal of Aesthetics*, vol. 57–58 (2019): 109–40.

Wiener, Norbert. *Cybernetics, or, Control and Communication in the Animal and the Machine*. Cambridge, MA: MIT Press, 1961.

Wolfe, Cary. *What Is Posthumanism?*. Minneapolis: University of Minnesota Press, 2010.

Worringer, Wilhelm. *Abstraction and Empathy: A Contribution to the Psychology of Style*. Translated by Michael Bullock, introduction by Hilton Kramer. Chicago: Elephant Paperbacks, Ivan R. Dee, [1907] 1953, 1997.

PART TWO

Ethics

CHAPTER NINE

Environmentalisms and Posthumanisms

URSULA K. HEISE

Environmentalism fundamentally revolves around the question: "How do humans fit into the web of life?" (Moore 2016: 2). By asking this question, environmentalist thought adopts one of the fundamental premises of posthumanism—not taking the centrality and exceptionality of human beings for granted. Instead, it considers humans in and with the ecological systems in which they have evolved. Within this broad framework, however, very different types of environmentalism have developed since the 1960s. Some of them explicitly reject the idea that human beings are superior to other species, as the deep ecology movement did in the 1970s and '80s. Others particularly emphasize humans' responsibility for the degradation of nature and its possible restoration, as discussions about the Anthropocene have done in recent years. And yet others argue that the emphasis on humans as a species is misplaced and foreground instead the differential access of different human populations to environmental resources such as energy, clean air, and clean water, and their differential exposure to environmental risks that range from pollution and deforestation to climate change, as the environmental justice movement has done since the 1980s. From this last perspective, the question of humans' situatedness in and with nature cannot be dissociated from local and global forms of organization that persistently generate structural inequalities, from capitalism and neocolonialism to patriarchy and racial discrimination.

Depending on the type of environmentalism on which we focus, then, its relationship to humanism and posthumanism varies significantly. Rather than outlining a chronology or taxonomy of these different environmentalisms—a monumental task that would require far

more space than I have available here—I will focus on three prominent questions in environmental thinking around which problems of human identity have been considered. The first question concerns the kind of nature that environmental activism seeks to protect and restore, and whether pristine nature is more valuable than ecosystems that have been altered by humans. The second concerns human agency with its intended and unintended consequences, which has been compared to a geological force in discussions about the Anthropocene. And the third question revolves around human inequality and the difficulties in postulating any generalized human subject when it comes to environmental impacts.

WILDERNESS | LICHEN

The question what kind of nature environmentalism should seek to conserve and restore has led to particular controversy in the United States and in other nations that originated as English settler colonies, such as Australia and Canada. Movements and associations for the protection of nature arose in these countries in the latter half of the nineteenth century, as they did in Europe. But whereas early environmentalists in Europe generally sought to conserve landscapes that included historical monuments and that had been altered by human intervention for at least two millennia, environmentalism in the United States took a different turn. Protagonized by thinkers, writers, and activists such as Henry David Thoreau, Ralph Waldo Emerson, and John Muir, the European admiration for pastoral landscapes transformed into a veneration of wild landscapes untouched by human hand. Translating Christian religious discourse into such landscapes, Muir wrote admiringly of "the Yosemite temple … [where] God himself is preaching his sublimest water and stone sermons" (1911: 41). This admiration, which eventually translated into the creation of National Parks, marked a sharp reversal from the "howling wilderness" that Puritan migrants had perceived when they first settled on the East Coast of the North American continent. Where the Puritans saw a relentlessly hostile landscape, meant to test their faith in God's providence and inhabited by what appeared to them to be savage heathens, Thoreau, Emerson, and Muir re-envisioned wild environments as beneficial for humans and divine in their impacts on the human soul. From these origins, a persistent strain of American environmentalism has considered most valuable those landscapes that are untouched by humans (Cronon 1996: 9).

Or at any rate, *portrayed* as untouched by humans: as the environmental historian William Cronon pointed out in the 1990s, this idea of wilderness erased not only the history of European settlers' earlier fear and disdain of North American nature, but also the history of Native American peoples who had lived on the continent for thousands of years before Europeans' arrival. Indeed, the creation of National Parks was in some cases preceded by the displacement of Native Americans so that the area could then be claimed to be untouched by humans (Cronon 1996: 15–16). In Australia, analogously, the idea that the—for British settlers—new continent was *terra nullius*, no one's land, ignored a presence of Aboriginal peoples and an ecological stewardship that reaches back 65,000 years. No doubt, this exclusion of indigenous histories from the idea of wilderness was in part due to European settlers' inability to recognize the human fingerprint on landscapes that differed vastly from the ones they were acquainted with in their home countries, and in part to the legitimacy that

the idea of "empty land" conveniently bestowed on colonial ventures. In either case, it led to a kind of environmentalism that sees most human interventions into the natural world as destructive, and that as a consequence puts the highest value on pristine ecosystems.

In principle, one could argue that this valuation of nature as exempt from human influence at the same time reinscribes human exceptionalism, in that it reserves for humans a status outside of nature that is denied to any other species: "The place where we are is the place where nature is not" (Cronon 1996: 17). In practice, it leads to tensions such as that between the environmentalist aspiration to reconnect humans with nature, and to protect natural areas from humans' impact: many commentators have noted, for example, the irony of traffic jams and air pollution in Yosemite National Park—caused by numerous visitors eager to imitate Muir's search for the authenticity of an encounter with nature free from human impact. The same tension inheres in many projects of environmental restoration—including but not limited to the creation of wilderness areas, nature reserves, or national parks—when humans work with great dedication and expertise to recreate ecosystems as they existed before human interference (European humans' interference, at any rate). In other words, even as wilderness-oriented environmentalism energetically questions humans' right and ability to master nature, it reaffirms the human control of nature through ideas that range from environmental "stewardship" to "management" and "restoration."

Wilderness-based environmentalism has been influential beyond the confines of the anglophone world, especially through the export of the institution of the national park to countries around the globe. In the process, it has often clashed with traditions of nature conservation that value and protect landscapes created through historical human interventions. As the Indian political scientist Ramachandra Guha has highlighted, the emphasis on wilderness in developing nations has often led to clashes between conservationists and local communities—sometimes, but not always, indigenous ones—whose control of land and resources was wrested away in strategies that some community activists describe as "green imperialism," the perpetuation of colonial strategies under the banner of environmentalism (Shiva 1993). By contrast, Indian traditions for the protection of nature have not privileged spaces conceived of as wild but included humanly altered ones (Guha and Martínez-Alier 1997: 17–21), like many European strains of environmentalism. Only in the 1990s did international conservation organizations change their procedures so as to include extensive consultation with local stakeholders before undertaking conservation ventures. Influential though the wilderness idea may be, therefore, it remains somewhat exceptional when considered on a global scale—a particularity of cultures whose European founders were either unwilling or unable to see the traces of prior human intervention in the lands they conquered during the centuries of colonial expansion.

The privileging of wilderness, which implies that most if not all human interventions into nature are by default harmful, perpetuated itself in the United States in the deep ecology movement during the 1970s and '80s. A radical movement that arose in reaction to the rapid institutionalization and political compromises of large environmental organizations in the early 1970s, deep ecology relentlessly questions human superiority and exceptionality. Relying—somewhat ironically, given the more human-inclusive tendency of much European environmentalist thought—on the work of the Norwegian philosopher Arne Naess, the deep

ecology movement claims to value all kinds of life, including humans, and to value all of them equally. As the deep ecologist Christopher Manes (1996: 22–23) puts it, Darwin's theory of evolution entails that "in the observation of nature there exists not one scrap of evidence that humans are superior to or even more interesting than, say, lichen" (1996: 22–3). And Dave Foreman, the co-founder of Earth First!, emphasizes that "the preservation of wildness and native diversity is the most important issue. Issues directly affecting only humans pale in comparison" (1991: 27). Nature, as a consequence, should be valued for itself, not only or mainly because of its uses for humans in what deep ecologists called "biocentrism" or "ecocentrism." This mode of thought anticipates some strains of what would later come to be called posthumanism.

Guha specifically targeted the deep ecology movement in his criticism of wilderness thinking from the perspective of developing countries. The environmental justice movement, which emerged in the United States in the 1980s, began to shift the attention of mainstream environmentalism away from the veneration of wilderness and toward slowly increasing engagement with the socially unequal distribution of environmental goods and risks. Yet the importance of wilderness continues to be emphasized in some sectors of the North American environmentalist movement, particularly where issues of biodiversity conservation are concerned. In the first decade of the new millennium, biologists such as Peter Kareiva and Joseph Mascaro, geographers such as Erle Ellis, and the science writer Emma Marris sought to shift conservation efforts away from supposedly wild areas to agricultural, urban, and other humanly altered landscapes. They were fiercely resisted by biologists such as Stuart Pimm and E. O. Wilson, who perceived them as betraying the conservationist cause. Wilson has called for setting 50 percent of the Earth's terrestrial and marine ecosystems aside for conservation in his book *Half Earth,* and a collection of essays published by the Foundation for Deep Ecology in 2014, titled *Keeping the Wild,* argued for the continued centrality of the wilderness ideal. In controversies such as these, the question what nature environmentalism seeks to preserve and whether human-altered ecosystems should be included or not continues to be at issue, even though the vocabulary of posthumanist theory is not usually invoked.

ANTHROPOCENE | METEOR

In the last two decades, environmentalist debates over the place of humans in our planetary ecology have centrally revolved around the notion of the Anthropocene, and a good deal of discussion has shifted from the kind of nature to be preserved to the kind of agent that is causing global ecological change. The ecologist Eugene Stoermer and the atmospheric chemist Paul Crutzen proposed in 2000 that geological history had entered a new epoch that should be called the "Age of Man" or Anthropocene. Human interventions, they argued, have fundamentally transformed the Earth's soils, forests, biodiversity, nitrogen cycles, and meteorological systems: "Considering these and many other major and still growing impacts of human activities on earth and atmosphere, and at all, including global, scales, it seems to us more than appropriate to emphasize the central role of mankind in geology and ecology by proposing to use the term 'anthropocene' for the current geological epoch" (Crutzen and Stoermer 2000: 17). Whether geologists will accept this new designation, whose beginnings

Stoermer and Crutzen dated to the invention of the steam engine in 1784, seems doubtful almost two decades later. But in the meantime, the Anthropocene concept has exerted considerable influence on environmental debates in the global North over the last ten years by highlighting the scale and scope of humans' ecological transformations. In the process, it has often become a shorthand for climate change, even though Stoermer and Crutzen's formulation included a much wider range of phenomena.

Perhaps most influentially, the historian Dipesh Chakrabarty has interpreted the Anthropocene as a moment when the geological history of large-scale events and the much shorter-term history of human affairs converge. "With this collapsing of multiple chronologies—of species history and geological times into our very own lifetimes, within living memory—the human condition has changed," he argues (2015: 180). This change requires a reconceptualization of humans' collective agency as a species—whether intentional or unintentional—and a new kind of universalism.

> To call human beings geological agents is to scale up our imagination of the human. Humans are biological agents, both collectively and as individuals. They have always been so .... But we can become geological agents only historically and collectively, that is, when we have reached numbers and invented technologies that are on a scale large enough to have an impact on the planet itself. (Chakrabarty 2009: 206–7)

Chakrabarty acknowledges the difficulties and dangers of such a scaled-up conception of human agency, both in phenomenological terms, since individuals cannot experience such species beings, and in political terms, since it might lead again to the misguided universalisms of the past (Chakrabarty 2009: 222).

Chakrabarty's vision of humans' geological agency has been vigorously questioned by Marxist scholars such as Jason Moore and Slavoj Žižek. The emphasis on species agency, they argue, cloaks geopolitical and socioeconomic power differentials between those human populations who have caused the bulk of climate change, and those who suffer most of the consequences; in other words, it masks the operations of capitalism "as a way of organizing nature" (Moore 2016: 6). By focusing on the consequences rather than the causes of ecological degradation, arguments about the Anthropocene cannot ultimately explain the reasons why the momentous changes they revolve around came about (Moore 2016: 5).

The Anthropocene concept also stands in tension with posthumanist varieties of environmentalism that have questioned the centrality and exceptionality of humans and emphasized instead their similarity to and entanglement with other species and the inanimate environment. "The Anthropocene insults environmentalists and humanists alike by reinscribing the human above 'nature' as an isolate agent and prime mover—but one whose legacy is the unforeseen result of its species-being rather than a product of moral or rational decisionmaking," ecocritic Stephanie LeMenager has pointed out (2017: 473). Several varieties of posthumanism that have influenced environmentalist thought over the last two decades—human-animal studies, multispecies ethnography, and new materialisms—have on the contrary foregrounded that agency and subjectivity do not reside solely in humans, and that human subjects are themselves constituted by nonhuman agents and environments.

Human-animal studies or critical animal studies, as the field is sometimes called, developed from the tradition of animal welfare and animal rights philosophy that traces back to Peter Singer's seminal book *Animal Liberation* (1975) and ultimately to Jeremy Bentham. Its main target of critique is "speciesism," a term coined in 1971 to describe a moral preference for one's own species regardless of other criteria. The reflection on what claims nonhuman species have on humans' moral consideration, as Cary Wolfe has lucidly pointed out, has resulted in two forms of posthumanism. On one hand, the argument that certain types of higher animals share crucial characteristics with humans—and that certain humans, such as children, the elderly, and the disabled, lack some of these characteristics—has led some philosophers and activists to extend human rights and prerogatives to nonhumans such as primates and cetaceans. What these characteristics are has shifted over time from the ability to suffer to intelligence, tool use, language, the ability to be the subject of a biography, altruism, and complex forms of sociality and culture. This type of thinking qualifies as posthumanist because it extends the prerogatives of humanness beyond the biological human; but, Wolfe and others have highlighted, it perpetuates the moral and legal centrality of being human or human-like (Wolfe 2010: xiv–vi).

On the other hand, a different type of posthumanism, inspired by the French historian Michel Foucault's thought and by poststructuralism more generally, also targets speciesism, but does so by interrogating the integrity of the human subject itself. Posthumanists in this vein question, as Foucault did, how "the human" as a discrete category of taxonomy and analysis arose in the first place, and how current practices of scientific and scholarly inquiry as well as legal and cultural practices perpetuate it. In this vein, Giorgio Agamben investigates the mechanisms whereby biology and anthropology have created the category of the human, and Jacques Derrida highlights that while every species, including *Homo sapiens,* has particular characteristics that set it apart from every other, there are no grounds for the binary distinction between humans and other animals that include species as diverse as ants, silkworms, hedgehogs, eagles, and chimpanzees (2008: 34).

This consideration has led posthumanist theorists such as Wolfe to argue that structures of discrimination against humans designated as "others" and against nonhumans are ideologically related. So long as the category of the animal persists as a kind of being that does not merit the same moral consideration as a human being—that can be held captive, tortured, killed, or let die without any moral or legal consequences—the possibility of certain human beings being relegated to this category also persists. For this reason, Wolfe has argued,

> the humanist concept of subjectivity is inseparable from the discourse and *institution* of speciesism, which relies on the tacit acceptance … that the full transcendence of the "human" requires the sacrifice of the "animal" and the animalistic, which in turn makes possible a symbolic economy in which we can engage in a "noncriminal putting to death" … not only of animals, but other *humans* as well by marking *them* as animal. (2003: 43).

Postcolonial ecocritics Graham Huggan and Helen Tiffin, among others, have taken up this

argument for environmentalism by reasoning that

> if the wrongs of colonialism—its legacies of continuing human inequalities, for instance —are to be addressed, still less redressed, then the very category of the *human,* in relation to animals and environment, must also be brought under scrutiny. After all, traditional western constitutions of the human as the "not-animal" (and, by implication, the "not-savage") have had major, and often catastrophic, repercussions not just for animals themselves but for all those the West now considers human but were formerly designated, represented and treated as animal. (2010: 18–19)

While animal rights and environmental thinkers and activists have not always seen eye-to-eye in their different emphases on individual animals and species, respectively (see Heise 2016: Ch. 4), both of these varieties of anti-speciesist posthumanism have resonated in environmentalist thought, if not always without contradiction. While the Foucaultian questioning of the human subject resonates in some variants of new materialism (see below), environmental activism with its call on individuals and communities to manage ecosystems more sustainably than they have to date often relies implicitly or explicitly on the assumption of humans' exceptional responsibility and ability to act.

A different type of posthumanism has emerged in anthropology over the last decade, as anthropologists in Australia, Europe, and North America have developed "multispecies ethnography," "étho-ethnographie," or "zooantropologia" as new ways of theorizing what we normally consider to be simply human societies and cultures. The American anthropologist Anna Tsing's "human nature is an interspecies relationship" (quoted in Kirksey et al. 2014) is foundational for this approach in that it highlights how humans depend on many animal, plant, microbe, and bacteria species for their survival, even as human bodies function as habitat for other species. Although multispecies ethnographers tend not to evoke the vocabulary of posthumanist philosophy frequently, they, too, seek to redefine the human in its species relationships: "Ethnographers are now exploring how 'the human' has been formed and transformed amid encounters with multiple species of plants, animals, fungi, and microbes. Rather than simply celebrate multispecies mingling, ethnographers have begun to explore a central question: Who benefits, cui bono, when species meet?" (Kirksey et al. 2014).

This approach is not entirely new. It builds on interspecies ethics as elaborated by the work of Australian philosopher Val Plumwood, Donna Haraway's exploration of companion species, and many prior anthropological studies of animals, animal husbandry, agriculture, and symbolic functions of nonhuman species (cf. Kirksey and Helmreich 2010: 550–4). Latour's actor-network-theory (ANT) might also count among the precursors, though multispecies ethnographers tend to criticize Latour for taking the category of the human itself too much for granted, including humans' ability and right to speak for other species. Multispecies ethnographers take a particular interest in the politics of human-nonhuman relations, as Deborah Bird Rose's exploration of human-canine relationships in white and Aboriginal Australian communities shows (*Wild Dog Dreaming,* 2011). Other theorists have expanded the inquiry from animals to other species, as Matthew Hall does in *Plants as*

Persons: A Philosophical Botany (2011), Eduardo Kohn in *How Forests Think: Toward an Anthropology beyond the Human* (2013), and Anna Tsing in *The Mushroom at the End of the World: On the Possibility of Life in Capitalist Ruins* (2015). These strands of research clearly resonate with the environmentalist idea of humans' embeddedness in ecological networks, but they also sometimes take a critical approach to the species assumptions and valuations in environmentalist activism itself, as Thom van Dooren, for example, does in his analysis of biodiversity conservation in *Flightways: Life and Death at the Edge of Extinction* (2014).

In a somewhat different vein, the new materialisms that have gained ascendancy over the last quarter-century have particularly emphasized humans' existential interconnections with their natural environments as well as the agency of nonhuman entities. Jane Bennett's vitalism, Karen Barad's theory of "intra-actions" that foregrounds how the agents in a network are themselves constituted by the actions that relate them to others, and Stacy Alaimo's concept of "transcorporeality" that highlights the incessant flows of nutrients and toxins in and out of human bodies all emphasize the material networks in which humans are consciously or unconsciously embedded. Some material ecocritics go even further, attributing capabilities of meaning-making and storytelling not just to nonhuman species but even inanimate entities. "[S]tone, like any other matter, moves, desires, and creates," Serpil Oppermann claims, and she generalizes that "all material life experience is implicated in creative expressions contriving a creative ontology. Storied matter, thus, is inseparable from the storied human in existential ways, producing epistemic configurations of life, discourses, texts, and narratives with ethico-political meanings" (2014).

This expansive understanding of agency and narrative and the consequent "flattening of ontologies" that has also been held against Bruno Latour's ANT might seem disabling for environmentalism. As the philosopher Kate Soper already pointed out in the 1990s, questioning humans' exceptionality with regard to the ecologies within which they live raises the question why humans should be held accountable for the consequences of their actions in a way that other species are not.[1] Material ecocritics emphasize that attributing agencies to all parts of ecosystems does not, in their view, excuse humans from their accountability (Barad 2007: 384; Oppermann 2014), but they do not explain why such moral accountability does not in fact constitute a human exceptionalism.

Contemporary debates over human environmental agency in the context of the Anthropocene therefore unfold in the tension between environmentalists' desire to see *Homo sapiens* as a "plain member and citizen of [the land-community]" rather than its conqueror, as the American conservationist Aldo Leopold once put it ([1949] 2001: 203–4), and their emphasis on humans' exceptional responsibility and destructiveness. The palaeoanthropologist Richard Leakey and his co-author Roger Lewin offered perhaps the most forceful metaphor of humans' collective and unintended but lethal impact on the planet when they claimed, in a book on global biodiversity loss, that human agency may lead to another mass extinction of species—a rare mega-disaster in the history of the planet that in the past was always caused by a major geological or meteorological force: "*Homo sapiens* is poised to become the greatest catastrophic agent since a giant asteroid collided with the Earth sixty-five million years ago, wiping out half the world's species in a geological instant" (1995: 241). Leakey and Lewin ground their appeal to prevent such a meteoric impact on

humans' equality with other species:

> Special though we are in many ways, we are merely an accident of history. We did not arrive on Earth from outer space, set down amid a wondrous diversity of life … It is our duty [to protect nature], not because we are the one sentient creature on Earth, which bestows some kind of benevolent superiority on us, but because in a fundamental sense *Homo sapiens* is on an equal footing with each and every other species here on Earth. (Leakey and Lewin 1995: 253)

Normal in our origins, but exceptional in our ecological impacts; natural in terms of our evolution, but destructive of nature in our cultural development; called on to conserve and restore ecosystems for the sake of our own survival, or perhaps for the sake of nature itself: these are some of the humanist/posthumanist tensions that characterize environmentalist thinking in the Human Age.

JUSTICE | TOXIN

In part because of these conceptual tensions, and in part because of deeper political disagreements, posthumanism has not gone unchallenged among environmental scholars. Posthumanism implicitly or explicitly relies on a narrative about the human species, and such species thinking has often seemed suspicious to environmentally oriented academics and activists who see concepts of nature as inextricably entangled with social structures that also produce inequality. From environmental justice advocates to postcolonial scholars and political ecologists, multiple strands of environmentalist thought since the 1980s have emphasized the ways in which socio-economic systems produce inequality among humans along with certain conceptions of nature, a perspective that makes generalizations about what the human is or should be in an ecological context very difficult.

The environmental justice movement emerged in the United States in the 1980s with the landmark publications of the Church of Christ Commission for Racial Justice's report "Toxic Wastes and Race in the United States" (1987) and the African American sociologist Robert Bullard's book *Dumping in Dixie: Race, Class and Environmental Quality* (1990). Both publications documented the unequal distribution of environmental risks among the US population by showing that landfills, toxic waste sites, and hazardous industries are disproportionately sited near or upwind from poor communities and communities of color. While a good deal of the ensuing analysis and discussion focused on environmental racism— a term formally adopted by the Environmental Protection Agency in the early 1990s—the debates about social justice in other regions of the world also included other forms of environmental inequality.

Guha, whom I already mentioned as a critic of the wilderness idea and the deep ecology movement, collaborated in the 1990s with the political scientist Joan Martínez-Alier on Indian and Latin American environmental movements and coined the term "environmentalism of the poor" to designate struggles for environmental justice in the global South that sometimes revolve around race and at other times and places around gender, class,

or geopolitical power. Activists and researchers on environmental justice and the environmentalism of the poor share an emphasis on the unequal distribution of environmental benefits and risks, on the necessity for inclusive decision-making processes on environmental issues, and the importance of recognizing systems of knowledge and management of nature that diverge from Western models.[2] In the political, legal, and philosophical controversies that these perspectives generate, posthumanist arguments about humans' ontological status take a backseat to the lived inequalities that particular groups of humans experience in their daily material lives, and posthumanism is often seen as a distraction from the reality of these inequalities. As Guha and Martínez-Alier put it, "'No Humanity without Nature!', the epitaph of the Northern environmentalist, is [in the global South] answered by the equally compelling slogan, 'No Nature without Social Justice!'" (1997: 21).

Some postcolonial scholars have embraced posthumanism as a way of understanding how the category of the animal has enabled colonial and racist forms of oppression, as I mentioned earlier, but others resist posthumanism on the grounds that it focuses on an abstract and universalist conception of the human at the expense of critically engaging with inequality. Elizabeth DeLoughrey, Jill Didur, and Anthony Carrigan, for example, argue:

> Postcolonial approaches position the nature/human binary as political, and do not necessarily see the dismantling of this divide as the foremost intellectual priority due to the already historical imbrication of the human with nonhuman nature and place …. We therefore raise questions as to the relevance of the shift to the 'posthuman' by subjects that are not seen as determined by race, gender, sexuality, and empire … a postcolonial approach to the environmental humanities involves analyzing how empire has constructed the human. (2015: 11)

This perspective shares with posthumanist thought the skepticism and critique of the liberal humanist subject of the Enlightenment, but parts ways with posthumanism when it comes to postulating any type of generalized species identity or its transcendence. Many non-Western cultures, according to this argument, do not rely on any dichotomy between humans and nonhumans in the first place, and postcolonial analysis has always critically engaged with the reliance of imperialism on false human universalisms.

Political ecology, a theoretical paradigm that has developed in geography, political science, and urban planning since the 1980s, has foregrounded similar entanglements of politics, economy, and ecology as environmental justice and postcolonial scholarship, but has tended to focus on the structural causes of inequality rather than their consequences.[3] In the view of many political ecologists, capitalism co-produces certain types of nature and certain types of social order that cannot be analyzed in separation from each other. Posthumanism has challenged political ecologists to expand the boundaries of their thought beyond the human into the realm of other species and inanimate forces, but some political ecologists are legitimately fearful that this shift will entail a diminished focus on the power relations that characterize human societies.[4] Like postcolonial scholars and environmental justice advocates, therefore, political ecologists have tended to adopt the insights of ANT and new materialisms only selectively.

The connections between environmentalisms and posthumanisms, as this brief overview shows, are ambiguous. Many types of environmentalism share with certain strands of posthumanism the philosophical DNA of skepticism toward conceptions of humans as exceptional, singular, and ontologically separated from the rest of the biological web of life. They have sometimes done so through a biocentric emphasis on nature as valuable in and of itself, at other times through an emphasis on humans' unintentional agency as a species, and at yet other times through questioning the boundaries that separate humans from other species or the inanimate environment. But since the 1980s, most brands of environmentalism have become associated with movements for social justice that sometimes welcome posthumanism in its critique of Enlightenment humanism and its false universalisms, and at other times reject it as yet another kind of universalism that obfuscates the realities of social inequality and the socio-economic systems that produce inequality and ecological degradation concurrently. One of the great challenges for contemporary environmentalist thought and activism, balancing the needs of nonhuman species with those of disempowered communities in what I have called "multispecies justice" (2016: Ch. 5) may need to draw on some of the resources of posthumanist as well as humanist thought so as to put the rights and agency of nature in conversation with the rights and differential agencies of humans.

---

oper (1995), *What Is Nature?* ch.6. See also Bergthaller (2014), who questions material ecocriticism from a systems-theoretical perspective.

or a more detailed discussion of these dimensions, see Schlosberg (2007).

am indebted to Eric Sheppard at the UCLA Department of Geography for clarifying this distinction.

or a detailed discussion, see Chagani (2014).

SOURCES CITED

Alaimo, Stacy. *Bodily Natures: Science, Environment, and the Material Self.* Bloomington: Indiana University Press, 2010.

Barad, Karen. *Meeting the Universe Halfway: Quantum Physics and the Entanglement of Matter and Meaning.* Durham: Duke University Press, 2007.

Bennett, Jane. *Vibrant Matter: A Political Ecology of Things.* Durham: Duke University Press, 2010.

Bergthaller, Hannes. "Limits of Agency: Notes on the Material Turn from a Systems-Theoretical Perspective." In *Material Ecocriticism,* edited by Serenella Iovino and Serpil Oppermann. Bloomington: Indiana University Press, 2014, Kindle Edition.

Chagani, Fayaz. "Critical Political Ecology and the Seductions of Posthumanism." *Journal of Political Ecology,* vol. 21 (2014): 424–36.

Chakrabarty, Dipesh. "The Climate of History: Four Theses." *Critical Inquiry,* vol. 35 (2009): 197–222.

Chakrabarty, Dipesh. "The Human Condition in the Anthropocene." 2015, https://tannerlectures.utah.edu/Chakrabarty%20manuscript.pdf.

Cronon, William. "The Trouble with Wilderness: Or, Getting Back to the Wrong Nature." *Environmental History,* vol. 1, no. 1 (1996): 7–28.

Crutzen, P. J. and E. F. Stoermer. "The Anthropocene." *Global Change Newsletter,* vol. 41 (2000): 17–18.

DeLoughrey, Elizabeth, Jill Didur, and Anthony Carrigan. "Introduction: A Postcolonial Environmental Humanities." In *Global Ecologies and the Environmental Humanities: Postcolonial Approaches,* edited by Elizabeth DeLoughrey, Jill Didur and Anthony Carrigan. New York: Routledge, 2015, pp. 1–32.

Derrida, Jacques. *The Animal That Therefore I Am*. Edited by Marie-Louise Mallet. Translated by David Wills. New York: Fordham University Press, 2008.

Foreman, Dave. *Confessions of an Eco-Warrior*. New York: Crown, 1991.

Guha, Ramachandra. "Radical American Environmentalism and Wilderness Preservation: A Third World Critique." *Environmental Ethics*, vol. 11 (1989): 71–84.

Guha, Ramachanda, and Juan Martínez-Alier. "The Environmentalism of the Poor." In *Varieties of Environmentalism: Essays North and South*, Ramachanda Guha, and Juan Martínez-Alier. London: Earthscan, 1997, pp. 3–21.

Heise, Ursula K. *Imagining Extinction: The Cultural Meanings of Endangered Species*. Chicago: University of Chicago Press, 2016.

Huggan, Graham, and Helen Tiffin. *Postcolonial Ecocriticism: Literature, Animals, Environment*. London: Routledge, 2010.

Kirksey, Eben, and Stefan Helmreich. "The Emergence of Multispecies Ethnography." *Cultural Anthropology*, vol. 25 (2010): 545–76.

Kirksey, Eben, Craig Schuetze, and Stefan Helmreich. "Introduction: Tactics of Multispecies Ethnography." In *The Multispecies Salon*, edited by Eben Kirksey. Durham: Duke University Press, 2014, Kindle Edition.

Leakey, Richard, and Roger Lewin. *The Sixth Extinction: Patterns of Life and the Future of Humankind*. New York: Anchor, 1995.

LeMenager, Stephanie. "The Humanities after the Anthropocene." In *The Routledge Companion to the Environmental Humanities*, edited by Ursula K. Heise, Michelle Niemann and Jon Christensen. London: Routledge, 2017, pp. 473–81.

Leopold, Aldo. *A Sand County Almanac: With Essays on Conservation*. Oxford: Oxford University Press, [1949] 2001.

Manes, Christopher. "Nature and Silence." In *The Ecocriticism Reader*, edited by Cheryll Glotfelty and Harold Fromm. Athens: University of Georgia Press, 1996, pp. 15–29.

Moore, Jason. "Introduction: Anthropocene or Capitalocene? Nature, History, and the Crisis of Capitalism." In *Anthropocene or Capitalocene? Nature, History, and the Crisis of Capitalism*, edited by Jason Moore. Oakland: PM Press, 2016, pp. 1–11.

Muir, John. *My First Summer in the Sierra*. Boston: Houghton Mifflin, 1911.

Oppermann, Serpil. "From Ecological Postmodernism to Material Ecocriticism: Creative Materiality and Narrative Agency." In *Material Ecocriticism*, edited by Serenella Iovino and Serpil Oppermann. Bloomington: Indiana University Press, 2014, Kindle Edition.

Rose, Deborah Bird. *Wild Dog Dreaming: Love and Extinction*. Charlottesville: University of Virginia Press, 2011.

Schlosberg, David. *Defining Environmental Justice: Theories, Movements, and Nature*. Oxford: Oxford University Press, 2007.

Shiva, Vandana. "The Greening of the Global Reach." In *Global Ecology: A New Arena of Conflict*, edited by Wolfgang Sachs. London: Zed Books, 1993, pp. 149–56.

Soper, Kate. *What Is Nature? Culture, Politics, and the Non-Human*. Oxford: Blackwell, 1995.

Tsing, Anna. *The Mushroom at the End of the World: On the Possibility of Life in Capitalist Ruins*. Princeton: Princeton University Press, 2015.

Van Dooren, Thom. *Flight Ways: Life and Death at the Edge of Extinction*. New York: Columbia University Press, 2014.

Wolfe, Cary. *Animal Rites: American Culture, the Discourse of Species, and Posthumanist Theory*. Chicago: University of Chicago Press, 2003.

Wolfe, Cary. *What Is Posthumanism?*. Minneapolis: University of Minnesota Press, 2010.

Žižek, Slavoj. *Living in the End Times*. Revised and updated edition. London: Verso, 2011.

CHAPTER TEN

Nonhuman Politics and Its Practices

IWONA JANICKA

What is the relationship between politics and nonhumans? What does it mean to consider *politics* in the context of nonhumans? How are *nonhumans* to be considered politically? The term "politics" itself points to Ancient Greece and that which nonhumans, by definition, do not possess: an institutional structure (*polis*) and the power of speech (*logos*). In this context, is it even possible to conceptualize politics non-anthropocentrically? What would political *practice* mean exactly with reference to nonhumans? Should we question human exceptionalism at all, given the potential for such interrogation to facilitate scientific and commercial exploitation? These are some of the questions that hover in posthumanist writings on politics. Various posthumanist thinkers pose significant challenges to traditional understanding of politics, including governance of a country, management of institutions, legislation, or struggle for power. They re-examine key political concepts, such as agency, subjectivity, freedom, equality, democracy, parliament, constitutionality, political action, and autonomy. The vast majority of this criticism does not, however, aim at merely including nonhumans into existing political structures. Instead, it attempts to redefine the very concept of politics, of which nonhumans could be an integral part.

   Whilst there is no unified approach to politics in posthumanist studies, most scholars agree that the received concept of politics is inadequate on at least two counts. First, it is lacking with regard to the past as it is necessary to acknowledge that "human" has been a highly regulatory category and has often referred exclusively to certain type of individuals: white, Western, male, able-bodied. Hence, it has been instrumental to practices of discrimination

and exclusion. This is where posthumanism joins arms with some strands of feminism, critical race studies, postcolonialism, environmental philosophy, and disability studies. Second, the established political modes are insufficient with regard to the future as they do not provide us with appropriate conceptual tools to face the challenges of the contemporary world. This is because issues that concern us most—such as climate change or rapidly developing artificial intelligence—do not respect national boundaries or the standard rules of politics. What's more, our lives have become increasingly dominated by questions of "life support systems": habitats, artificial environments, artificial surroundings in which we can safely co-exist, as we are confronted with more and more limited space and resources on Earth.[1] These shifts in new life support systems influence considerably our ways of living together. Thinkers in the field of posthumanism, broadly considered, tackle selected aspects of this situation in order to propose a new concept of politics that could constructively respond to the current situation.

Politically engaged posthumanism is rich terrain, an area of thought that develops at a dizzyingly rapid pace. As such, it is impossible to offer an exhaustive account of all its intricacies here. Nevertheless, in this chapter, I discuss some of the most notable and productive efforts at reconceptualizing politics that have been undertaken in the context of nonhumans. I propose a focus that will allow us to interrogate different versions of politics that can be found in posthumanist interventions, and to test their limits, from a very specific perspective: political practice. So far, very little attention has been devoted to concrete political practice in the context of nonhumans. This is mainly due to the fact that such questions can turn normative and prescriptive very quickly. Critical posthumanist thinkers are understandably hesitant about proposing readymade blueprints for action or quick fixes to global problems by technological means. Nevertheless, we need to ask what "nonhuman politics" would actually mean in practice. And, perhaps more provocatively, whether one could potentially be a "posthumanist activist." Such an approach allows us to remain "down to Earth"—to use the English title of Bruno Latour's latest book—in our reflections on politics, while at the same time to experiment with different modalities of political action in the context of nonhumans.

The working thesis for this paper that determines its, undeniably highly selective, choice of thinkers is that the question of posthuman politics is, ultimately, a question of collective transformation in a more-than-human world. Politics is about concrete practices of world-building with a special attention to nonhumans, our "response-ability" (Haraway 2008, 2016) to them and non-parasitic relationships (Serres [1980] 2007, [1990] 1995). Some of the key questions are therefore: what are the entities that *count* in world-building? How do we orient our practices considering that—for better or worse—we can never fully anticipate the results of our actions? What is the role of experimentation and of habits in political practices?

POLITICS OF MATTER

When considering nonhumans in the context of politics, it is essential to engage with new materialism. This field of inquiry radically modifies our understanding of matter and proposes a different concept of politics. Various new materialist thinkers place politics at the

center of their interests. Their conceptual point of departure is that matter is a monist, vital force that exhibits agency rather than passively receives human action. New materialists call for the reconceptualization of the ontological bases of politics, which constitutes for them an important form of politics. Their crucial assumption is that the realization of different politics is possible only by thoroughly rethinking ontology. And so, new materialists reconsider key concepts in philosophy and political theory, shifting them toward more matter-oriented frameworks. Karen Barad, for example, proposes the concept of "intra-action" (2007) that argues for the ontological inseparability of all interacting agencies, human and nonhuman alike. Jane Bennett speaks of "thing-power" and encourages us to think of natural and technical materialities as co-actors in politics (2010). Diana Cool and Samantha Frost emphasize that body is "a visceral protagonist within political encounters" that dislocates agency and is "indispensable to any adequate appreciation of democratic processes" (2010: 19). Rosi Braidotti refers to "*zoe*-politics" and "*zoe*-centred egalitarianism" based on the "primacy of the relation, of interdependence, which values non-human or a-personal Life" (2013: 95). She speaks of the politics of autopoiesis (2006, 2016), the importance of "broadening the sense of community" (2010: 206), and an "affirmation of life as radical immanence" (2018: 318). More recently, she turns to "placenta politics" as a new category of "pregnant posthumanism" that re-considers the maternal body (2018: 318).[2]

Beyond such theoretical work, new materialists also interrogate specific forms of material resistance and generativity that would further undermine the discourses on human being as asocial and independent entities. They place the body in the foreground and consider how self-transformative corporeality participates in power, for instance, in relation to sexual difference (Colebrook 2000; Jagger 2015). They incorporate new technological and scientific developments in their considerations of normative questions. Therefore, their efforts are perhaps best understood as ways to propose a more inclusive concept of politics that is equally open to invisible entities. For these scholars, politics is a new way of thinking that is radically open to difference (see Dolphijn and van der Tuin 2012; Braidotti and Hlavajova 2018).

Yet, a political activist sympathetic to new materialist projects might ask—in a naïve and irritatingly committed way—how this politics of matter could translate into political practice. If we look at current new materialist literature, there is little indication of what this politics would mean on the level of collective, transformative action, even though new materialists are *explicitly* politically committed (Bennett 2010; Coole and Frost 2010; Braidotti 2013). Admittedly, some contributions to the feminist strand of new materialism show tendencies to consider practice more. This is extremely valuable. For instance, Elizabeth Grosz (2010) thinks productively about practices of freedom that could be translated into feminist political action ranging from feminist co-operatives and clinics to intergenerational initiatives around a specific women's issue.[3] But even such important contributions only hint at concrete set of practices. Thus far, there is little differentiation in forms of action that could orient activism. Politics gets lost in ethics or epistemology (Washick et al. 2015). Meanwhile, the theoretical tools to conceptualize political practice still need to be developed. If, indeed, new materialism and engaged practice are brought together in scholarship, it is a move undertaken almost exclusively by anarchists. The latter turn to Gilles Deleuze, a key reference for new

materialists, in order to provide "a foundation for anarchist ethics" and to "explore the 'political' and active aspects of immanent ethics" (Vasileva 2018: 2). Such combinations are inspiring: linking anarchist practice to new materialist ontology could potentially be a particularly productive way for new materialists to overcome an impasse around political practice (see Newman 2001; Gordon 2008; Colson 2019; Gray Van Heerden and Eloff 2019).

Although new materialist contributions are undoubtedly insightful and rhetorically well-crafted, it seems that, for the time being at least, the word "politics" is used here more as a speech act, as a promise of a future materialization. Neomaterialist politics is thus perhaps best described as "politics to come" (*la politique à venir*), playing on Jacques Derrida's notion of "democracy to come" (*la démocratie à venir*). It is a politics that is not here, not now and, at least for the time being, cannot be translated into concrete political action. Nevertheless, it opens up horizons of unknown possibilities, naming an unpredictable opening and a dislocation from within that has a transformative potential. It is a promise of change that is both now and in the future. This form of political philosophy, one which aims at stretching our thinking about politics, is undoubtedly valuable, but without political practice its transformative potentiality is significantly limited.

FROM POLITICS AS ONTOLOGY TO POLITICS AS MODE

Given the evident limitations of new materialism, how can we conceptualize political practice if a re-evaluation of matter is not sufficient? One thinker for whom the question of practice is fundamental is Bruno Latour. Latour has considered practice in a wide variety of spheres, including the sciences, the law, religion, and urbanism. Throughout his work, politics has always been a central concern, although his thinking has mutated steadily: from his early work on the horizontal ontological politics[4] of actor-network theory (ANT), through "parliament of things" and *Dingpolitik*, to politics as a separate mode of existence (AIME: *An Inquiry into Modes of Existence*[5]), arriving finally at Gaia and politics of the *terrestrials* (the Earthbound).[6] In this section, I focus mainly on ANT and AIME, theories which are most relevant to the present discussion. The former demonstrates significant, though limited, political potential. The latter completes this work, extending and developing the earlier framework, by focusing on specific operations that make practices political (cf. Latour [2012] 2013: 353).

In Latour's early work on ANT, he formulates a horizontal description of human and nonhuman assemblages, demonstrating that neither humans nor their actions can be understood without nonhumans. Strongly influenced at that time by Machiavelli, Latour considers alliances and trials of strength crucial because, in his "flat ontology,"[7] all entities are fundamentally equal. This means that they are only as real as they are strong (Latour 1987): "Whatever resists trials is real" (Latour [1984] 1988: 158). That means that entities' existence depends on the effects that they produce rather than on their inherent essence. No entity is inherently political *pace* Aristotle.[8] The more attachments an actor (actant) has, the more it exists (cf. Latour 2005b: 217). "Forces cannot be divided into the 'human' and

'nonhuman,'" argues Latour ([1984] 1988: 199), as both humans and nonhumans are capable of producing effects and resisting trials of strength. Furthermore, politics is potentially everywhere as "[it] is not one realm of action separated from others." Instead, it is "what allows many heterogenous resources to be woven together into a social link that becomes increasingly harder and harder to break" (Strum and Latour 1987: 797; see also Harman 2014: 22–3). This, however, also means that politics is both everywhere and nowhere. Importantly, that position will change in Latour's later work. Nevertheless, a flat description of human and nonhuman assemblages was crucial at this stage for Latour's broader contribution to posthumanist politics. The creation of new links between entities—an integral constituent of the ANT framework—prevented Latour from following received wisdom in terms of existing explanations for "social" phenomena (cf. Latour 2005b: 16).

The ontological equality between humans and nonhumans, posited initially in ANT, led Latour to propose an idea of the "parliament of things," in which scientists speak in the name of things, that is, in traditional political terms, they represent them (Latour [1991] 1993). Parliament of things posits, literally, an *experimental* form of politics where democracy is extended to nonhumans (cf. Latour [1999] 2004: 223). A further shift in Latour's politics is his formulation of a controversy-based *Dingpolitik* (politics of things), in which politics is created in response to an issue ("a matter of concern"). *Dingpolitik* reverses the logic of *Realpolitik* (human politics), in which an issue needs to enter an already established sphere of politics and be recognized as political in order to be taken into consideration (Latour 2005a).

As Latour himself admits, the problem of ANT is that, although the framework is well-suited for showing movement between different networks and heterogenous elements, it is ill-adapted at defining differences (see Tresch and Latour 2013: 304). It describes well a given network setup and follows elements that circulate through it. However, because of its inherent lack of differentiation, it does not allow us to think change or, for the matter, how we would bring a change about in a system. This is a serious problem if we assume that politics, considered in its broadest sense, is about practices of transformation. Still, it is important to note that at this stage Latour already develops a position on questions of subjectivity, freedom, emancipation, and the purpose of politics that span both ANT and AIME, and are fundamental to his approach to politics. First, Latour maintains that "subjectivity is not the property of human souls but of the gathering itself" (Latour 2005b: 218). Nonhumans can therefore be "political subjects," due to the fact that *only* a human-nonhuman collective can be a political entity.[9] As Latour tellingly puts it: We are "folded into nonhumans" (Latour [1999] 2004: 189). "Politics is made not with politics but with *something else*" (Latour [1984] 1988: 56); that is, the fabric of politics is made up of heterogenous elements and processes. Considering that our received concepts of politics do not acknowledge this heterogeneity, they need to be revised to "catch up" with new linkages (Latour 2005a: 27). In that sense, we are all "politically challenged" according to Latour (2005a: 20). Second, freedom and emancipation are not concomitant with "an *absence* of bonds." Rather, they are about "getting out of a *bad* bondage" (Latour 2005b: 230) and becoming "*well*-attached" instead (Latour 2005b: 218). What is key are our association and attachment to other entities, both human and nonhuman. Finally, Latour proclaims that "the burning desire to have the new entities detected, welcomed, and given shelter is not only legitimate, it's probably the

only scientific and political cause worth living for" (Latour 2005b: 259). This sentiment, as we will see, will be key for the concept of politics as *circulation* found in AIME.

AIME radically departs from ANT's earlier all-pervading ontological politics and proposes instead that politics is a separate mode of existence. He elaborates in detail this differentiated version of politics in several books—chiefly in *Politics of Nature* ([1999] 2004) and *Pandora's Hope* (1999)—leading up to its final insertion into the broader project of AIME. Of critical importance to the present discussion is one aspect of Latour's framework: the process of *circulation* as integral to politics. In AIME, Latour traces the "felicity conditions" of political discourse, that is, what it means "to act or speak *politically*" (Latour [2012] 2013: 340, 2003). The adverb, signaling motion, is important here. The practice of politics is a *circle* which is constituted every time a new human-nonhuman collective is gathered around a single *issue*. When the organizing *issue* changes, the *circle* is re-drawn anew. Politics is a constantly renewed process of collecting entities, which must always start all over again in creating a new "we" in order to include those who have been excluded from its previous reiteration. The inclusion of the entities who were previously invisible sets the terms with which these new members of the collective will be dealt. It is a "performation" in that "[n]either the public, nor the common, nor the 'we' exists; they must be brought into being" (Latour [2012] 2013: 352). This is not a logic of a simple inclusion—the acceptance only of entities that fit into pre-established categories—but instead a process in which the entities themselves can redefine the very categories by which they were previously excluded. Crucially, politics disappears if this renewal stops being performed, if formerly excluded entities are not allowed to redefine the political parameters. However, if this criterion is met, "[d]emocracy becomes a habit" (Latour [2012] 2013: 343).

In the context of AIME, institutions are important as they offer both the means to create *spaces* for the renewal process and a guarantee that it will actually take place. This commitment to institutions, however, raises several challenging questions for Latour to address. What would these institutions exactly look like in practice? To what extent is an invention of new, alternative political forms even possible? Latour's tendency to recuperate traditional political concepts—such as constitutionality, the republic, the parliament, democracy, and diplomacy—could be interpreted as both radically subversive and not radical enough. Is there space for activism? Is there space for non-representational politics? Considering that Latour's concept of the primacy of trials of strength fundamentally undergirds AIME's framework, to what extent is there space for minoritarian views, for the less strong?

Latour's theorization of politics as a "progressive composition of the common world to share" (Latour [1999] 2004: 47) with nonhumans is a form of cosmopolitics, borrowed from Isabelle Stengers ([1997] 2010, [1997] 2011). It is a radical expansion of the meaning of politics that so far has been "restricted to the values, interests, opinions, and social forces of isolated, naked humans" (Latour 1999: 290). It always concerns the composition of a human-nonhuman collective and that is why it always poses questions, chiefly: "How many are we?" and "Can we live together?" (Latour [1999] 2004). Politics for Latour is a performative practice that is constantly busy recreating a more welcoming collective. However, precisely how we identify political actors and political actions—what categories we use for "counting"

that make certain entities intelligible in politics to the exclusion of others—is not fleshed out sufficiently in this framework. To what extent would the uncountable, the invisible, the unheard be allowed to transform politics? What would be the constraints of this process?[10] The above questions require further elaboration in order to fully measure this framework's political potential.

DEVICE-ORIENTED POLITICS

As noted above, the principle drawback of ANT for thinking politics is that it lacks an account of change. Having said that, some scholars in science and technology studies (STS) use ANT productively to consider politics, for instance, through the concept of publics. Notably, Noortje Marres's work and her slogan "No Issue, No Politics" contributed significantly to Latour's concept of *Dingpolitik* and its further elaboration in AIME. Following Marres, Latour's "matters of concern" become "issues" that show reticence or cause problems. Marres's object-oriented politics concentrates on how nonhumans—particularly technologies, settings, and devices—generate their own publics. She queries the role of concrete objects in enacting political participation, which she calls "material participation" (Marres 2012). Here, politics is experimental, performative, device-centered, and very *specific* as it varies in different settings. Instead of asking whether nonhumans can be recognized as political entities engaging in participation, Marres proposes to focus on the ways in which these entities acquire and lose political powers in concrete circumstances (106). For her, it is not about solving the question *once and for all* whether nonhumans are "naturally" political beings, but instead to establish how nonhumans come to matter in *specific* settings and under what conditions they become invested with *specific* normative capacities (112). This leads her to turn to an empirical approach whereby experimenting with "material politics" allows her to account for the role of nonhumans in politics (113). She calls this "experimental politics," where "normative variability of material objects" is considered empirically "as an effect that is achieved in specific settings" (127).

In *Material Participation*, Marres focuses her attention on sustainable living experiments such as "ecoshowhomes." As she admits, this sort of politics does not provide us with a model of participation nor does it ensure that it takes place. "It is of the order of event"—something that just happens—rather than a given (131). As an experiment, it can also succeed or fail. Considering the focus on the specificity of this zoomed-in concept of politics, it is worth asking whether it is possible to make it scalable in a productive way. Could Marres's politics ever be translated into more than a very specific setting? Could serialization be one way to overcome this problem? As with Latour's early work on ANT, the question that comes to the fore is whether this approach allows for a *transformative* doing rather than only *following* a doing, that is, following how things are already being done. To what extent could we orient the direction of change?

COMMUNAL ECOLOGY OF PRACTICES

One approach that implicitly responds to these issues is that of María Puig de la Bellacasa.

Puig de la Bellacasa takes up productively Latour's "matters of concern" and combines them with feminist theories of care in order to propose "matters of care." The reason for this is that "care" can be "more easily turned into a verb: *to care*. One can make oneself concerned, but 'to care' contains a notion of doing that concern lacks" (Puig de la Bellacasa 2017: 42). She is interested in how we can get involved in orienting matters of care, that is, in their "possible becoming," and how we can intervene in "what things could be" (66). It is important to note that care is not conceived here as an innocent, warm fuzzy feeling or a feel-good approach. It is neither a social contract nor a moral idea but instead a *condition* of interdependency that is essential for any existence. It is a concrete work of maintenance and repair that is at the same time ambivalent. Puig de la Bellacasa strongly argues against a normative approach to care, which assumes that we know *in advance* and *once and for all* how to care. Ethics in this context is about "intensities and gradations of 'ethicality'" (151). Instead of a normative ethics, she proposes to think about care as a "transformative *ethos*"—a practical, everyday engagement with the worlds we inhabit and the concrete ways to make them more habitable. Specifically, Puig de la Bellacasa focuses on practices of the permaculture movement, and the relationship between human and soil, to trace the ways in which this movement's daily ecological *doing* transforms our relations to the planet, its inhabitants, and its resources. This activity, she admits, is always relationally specific and would not necessarily be transposable somewhere else: "care responds to a situated relationship" (163). However, because she focuses on the personal-collective, that is how we go about building alternative communities for existing in more than human world—what she calls an "ethico-political" commitment or "alterpolitics"—this experiment in alternative living is scoped more broadly than a device-centered approach. Politics and ethics are very closely linked here: ethics is not an individual's care of the self (Foucault's *souci de soi*) that in the next phase could become expanded into the "outside" world but instead it is already a collective action embedded in a concrete *community* of living.

MORE-THAN-SOCIAL MOVEMENTS

If we continue zooming-out in our approach to practice and consider how to think about wider, collective movements of transformation in experimental politics, the next step on our path is Dimitris Papadopoulos's idea of insurgent posthumanism. In his work, Papadopoulos proposes to speak about "*more-than-social* movements" as a way to both "politicize posthumanism" and "posthumanize politics" (2018: 114). The real challenge that "posthuman politics of movements" faces, according to Papadopoulos, is how to go beyond anthropocentrism and humanism, whilst simultaneously addressing asymmetries in human-nonhumans relations and maintaining a commitment to justice. Justice is defined in this context as "crafting material worlds in which the very existence of the actants involved is made possible" (2014: 76). Papadopoulos is critical of Latour's idea of a parliament of nonhumans "not only because this is one of the very limited forms of politics humans have ever invented but also because it is the most humanist of all" (Papadopoulos 2018: 114). For him, "the point is not to create the correct assembly but to act with the neglected and invisibilised forms of existence in order to alter the very conditions of inclusion" (2014: 75).

As he puts it succinctly, "When ontological politics goes to the parliament, politics of matter goes to the everyday" (2014: 77). Papadopoulos therefore focuses on concrete practices that create alternative worlds and alternative ontologies, which are embedded in *more-than-social* movements: AIDS activism, maker culture, hacker communities, migration activism. These movements are "more than social" because their activism does not only target recognized social and political institutions but actively engages with techno-scientific nonhumans to create new, more durable and more generous "infrastructures." These infrastructures change "the conditions of knowledge production by engaging with the *actual* making of knowledge in a specific subfield of technoscience" (2018: 205). Rather than simply opposing power, they create "alternative conditions of existence that make just forms of life emerge: alterontologies" (2018: 159). This is specifically achieved through craft understood here as DIWY (do it without yourself) where craft is less about making things and more "about leaving yourself aside for the sake of viably coexisting with other things and beings" (2018: 23). This is what he calls "compositional politics," in which humans are co-constituted with nonhumans through specific practices embedded in collective, *more-than-social* movements and together create alternative environments for existing.

A TURN TO HABITS?

In this chapter, I have focused on selected approaches to politics, frameworks that attempt not only to integrate nonhumans into political practice, but also to provide settings that would eventually allow for a creation of embedded habits: habits of democracy, habits of care, habits of collective co-crafting of alternative worlds. What becomes clear is that politics is about daily practices of shifting perspectives and directing our attention to nonhumans. It is about praxis of response and care that is always attuned to other entities. Elsewhere, I have argued that anarchism is one way to think about political practice that is predicated on acts of cooperation with and support for entities that remain unintelligible from within a given status quo, those that do not "count" (Janicka 2017). I called these entities "singularity" and I proposed a concept of "solidarity with singularity" that allows for the coming together of diverse activist movements that undertake concrete practices of solidarity with animals, plants, the environment, women, minorities, LGBTQ+, or refugees, that is, whoever is in the position of oppression or unintelligibility. Central to my proposition is the concept of "habit," and how these practices of solidarity are being maintained and transmitted in anarchist housing projects, co-operatives, and autonomous zones. Our interrogation then becomes less about humans and nonhumans, and instead about nonhumans and habits. Could nonhumans such as objects or plants ever possess habits (Sparrow and Hutchinson 2013: 2)? What would be the relationship of these habits to world-building practices? How could we conceptualize habits from a posthumanist perspective? This offers another way, one of many, to approach the question of politics and its practices in the context of nonhumans, a rich territory of inquiry yet to be fully mapped.

n this, see Sloterdijk ([1998] 2011, [1999] 2014, [2004] 2016); Latour (2014), Latour and Serres (Serres and Latour [1992] 1995).

or another gynaecological approach, see also Sloterdijk ([1998] 2011).

ee, for instance, Hinton and van der Tuin (2014); van der Tuin (2011); Alaimo and Hekman (2008).

or other important contributions to "ontological politics," see Winner (1980) and Mol (1999).

ee AIME website: http://modesofexistence.org.

hat is, if we consider this development from the point of view of the chronology of his published work. Latour states that ANT and AIME developed simultaneously (see Tresch and Latour 2013).

n "flat ontology," see DeLanda (2004); Harman (2014).

s Latour admits, "I do not believe that returning to Aristotle is helpful" (Latour 2007: 814). See also Vries (2016).

he inverted commas are called for as Latour would actually not use subject-object differentiation in order to speak about what we would traditionally term a "political subject."

n this, see Rancière (Rancière [1995] 1999, [2000] 2013); Butler (2004); Janicka (2017).

SOURCES CITED

Alaimo, Stacey, and Susan Hekman, eds. *Material Feminisms*. Bloomington and Indianapolis, IL: Indianapolis University Press, 2008.

Barad, Karen. *Meeting the Universe Halfway: Quantum Physics and the Entanglement of Matter and Meaning*. Durham: Duke University Press, 2007.

Bennett, Jane. *Vibrant Matter: A Political Ecology of Things*. Durham and London: Duke University Press, 2010.

Braidotti, Rosi. "Placenta Politics." In *Posthuman Glossary*, edited by Rosi Braidotti and Maria Hlavajova. London: Bloomsbury Academic, 2018, pp. 674–99.

Braidotti, Rosi. "The Politics of 'Life Itself' and New Ways of Dying." In *New Materialisms. Ontology, Agency, and Politics*, edited by Diana Coole and Samanta Frost. Durham and London: Duke University Press, 2010, pp. 201–18.

Braidotti, Rosi. *The Posthuman*. Cambridge: Polity Press, 2013.

Braidotti, Rosi. "Posthuman Feminist Theory." In *Oxford Handbook of Feminist Theory*, edited by L. Disch and M. Hawkesworth. Oxford: Oxford University Press, 2016, pp. 673–98.

Braidotti, Rosi. *Transpositions: On Nomadic Ethics*. Cambridge: Polity Press, 2006.

Braidotti, Rosi, and Maria Hlavajova, eds. *Posthuman Glossary*. London: Bloomsbury Academic, 2018.

Butler, Judith. *Precarious Life: The Powers of Mourning and Violence*. London: Verso, 2004.

Colebrook, Claire. "From Radical Representations to Corporeal Becomings: The Feminist Philosophy of Lloyd, Grosz and Gatens." *Hypatia*, vol. 15, no. 2 (2000): 76–93.

Colson, Daniel. *A Little Philosophical Lexicon of Anarchism from Proudhon to Deleuze*. Translated by Jesse Cohn. Colchester: Minor Compositions, 2019.

Coole, Diana, and Samanta Frost, eds. *New Materialisms. Ontology, Agency, and Politics*. Durham and London: Duke University Press, 2010.

DeLanda, Manuel. *Intensive Science and Virtual Philosophy*. London: Continuum, 2004.

Dolphijn, Rick, and Iris van der Tuin. *New Materialism: Interviews and Cartographies*. Ann Arbor: Open Humanities Press, 2012.

Donaldson, Sue, and Will Kymlicka. *Zoopolis: A Political Theory of Animal Rights*. Oxford: Oxford University Press, 2011.

Gordon, Uri. *Anarchy Alive! Anti-Authoritarian Politics from Practice to Theory*. London and Ann Arbor, MI: Pluto Press, 2008.

Gray Van Heerden, Chantelle, and Aragorn Eloff. *Deleuze and Anarchism*. Edinburgh: Edinburgh University Press, 2019.

Grosz, Elisabeth. "Feminism, Materialism, and Freedom." In *New Materialisms. Ontology, Agency, and Politics*, edited by Diana Coole and Samantha Frost. Durham and London: Duke University Press, 2010, pp. 139–57.

Haraway, Donna J. *When Species Meet*. Minneapolis: University of Minnesota Press, 2008.

Haraway, Donna J. *Staying with the Trouble: Making Kin in the Chthulucene*. Durham: Duke University Press, 2016.

Harman, Graham. *Bruno Latour. Reassembling the Political*. London: Pluto Press, 2014.

Hinton, Peta, and Iris van der Tuin, eds. "Feminist Matters: The Politics of New Materialism." Special issue of *Women: A Cultural Review*, vol. 25, no. 1 (2014).

Jagger, Gill. "The New Materialism and Sexual Difference." *Signs*, vol. 40, no. 2 (2015): 321–42.

Janicka, Iwona. *Theorizing Contemporary Anarchism. Mimesis, Solidarity and Radical Social Change*. London and New York: Bloomsbury Academic, 2017.

Latour, Bruno. *The Pasteurization of France*. Translated by Alain Sheridan and John Law. Cambridge, Mass. and London: Harvard University Press, [1984] 1988.

Latour, Bruno. *Science in Action. How to Follow Scientists and Engineers through Society*. Cambridge, MA: Harvard University Press, 1987.

Latour, Bruno. *We Have Never Been Modern*. Translated by Catherine Porter. Cambridge, MA: Harvard University Press, [1991] 1993.

Latour, Bruno. *Pandora's Hope. Essays on the Reality of Science Studies*. Cambridge, MA and London: Harvard University Press, 1999.

Latour, Bruno. *Politics of Nature. How to Bring the Sciences into Democracy*. Translated by Catherine Porter. London and Cambridge, MA: Harvard University Press, [1999] 2004.

Latour, Bruno. "What if We *Talked* Politics a Little?" *Contemporary Political Theory*, vol. 2 (2003): 143–64.

Latour, Bruno. "From Realpolitik to Dingpolitik: How to Make Things Public. An Introduction." In *Making Things Public. Atmospheres of Democracy*, edited by Bruno Latour and Peter Weibel. Cambridge, MA: MIT Press, 2005a, pp. 1–31.

Latour, Bruno. *Reassembling the Social. An Introduction to Actor-Network-Theory*. Oxford and New York: Oxford University Press, 2005b.

Latour, Bruno. "Turning around Politics: A Note on Gerard de Vries' Paper." *Social Studies of Science*, vol. 37, no. 5 (2007): 811–20.

Latour, Bruno. *An Inquiry into Modes of Existence. An Anthropology of the Moderns*. Translated by Catherine Porter. Cambridge, MA and London: Harvard University Press, [2012] 2013.

Latour, Bruno. "Another Way to Compose the Common World." *HAU: Journal of Ethnographic Theory*, vol. 4, no. 1 (2014): 301–7.

Latour, Bruno. *Down to Earth. Politics in the New Climatic Regime*. Translated by Catherine Porter. Cambridge and Medford, MA: Polity, [2017] 2018.

Latour, Bruno, and S. S. Strum. "Redefining the Social Link: From Baboons to Humans." *Social Science Information*, vol. 26, no. 4 (1987): 783–802.

Marres, Noortje. *Material Participation. Technology, the Environment and Everyday Publics*. Basingstoke and New York: Palgrave Macmillan, 2012.

Mol, Annemarie. "Ontological Politics: A World and Some Questions." Special issue, *The Sociological Review*, vol. 47, no. 1 (1999): 74–89.

Newman, Saul. "War on the State: Stirner's and Deleuze's Anarchism." *Anarchist Studies*, vol. 9, no. 2 (2001): 47–64.

Papadopoulos, Dimitris. "Politics of Matter: Justice and Organisation in Technoscience." *Social Epistemology*, vol. 28, no. 1 (2014): 70–85.

Papadopoulos, Dimitris. *Experimental Practice: Technoscience and More Than Social Movements*. Durham: Duke University Press, 2018.

Puig de la Bellacasa, Maria. *Matters of Care: Speculative Ethics in More Than Human Worlds*. Minneapolis: University of Minnesota Press, 2017.

Rancière, Jacques. *Disagreement: Politics and Philosophy*. Translated by Julie Rose. Minneapolis: Minnesota University Press, [1995] 1999.

Rancière, Jacques. *The Politics of Aesthetics*. Edited and translated by Gabriel Rockhill. London and New York: Bloomsbury Academic, [2000] 2013.

Serres, Michel. *The Natural Contract*. Translated by Elizabeth MacArthur and William Paulson. Ann Arbor: University of Michigan Press, [1990] 1995.

Serres, Michel. *The Parasite*. Translated by Lawrence R. Schehr. London and Minneapolis: University of Minnesota Press, [1980] 2007.

Serres, Michel, and Bruno Latour. *Conversations on Science, Culture, and Time*. Translated by Roxanne Lapidus. Ann Arbor: University of Michigan Press, [1992] 1995.

Sloterdijk, Peter. *Bubbles. Spheres Volume I: Microspherology*. Translated by Wieland Hoban. Los Angeles, CA: Semiotext(e), [1998] 2011.

Sloterdijk, Peter. *Globes. Spheres Volume II: Macrospherology*. Translated by Wieland Hoban. Los Angeles, CA: Semiotext(e), [1999] 2014.

Sloterdijk, Peter. *Foams. Spheres Volume III: Plural Spherology*. Translated by Wieland Hoban. Los Angeles, CA: Semiotext(e), [2004] 2016.

Sparrow, Tom, and Adam Hutchinson, eds. *A History of Habit. From Aristotle to Bourdieu*. Lanham: Lexington Books, 2013.

Stengers, Isabelle. *Cosmopolitics I*. Translated by Robert Bononno. Minneapolis and London: University of Minnesota Press, [1997] 2010.

Stengers, Isabelle. *Cosmopolitics II*. Translated by Robert Bononno. Minneapolis and London: University of Minnesota Press, [1997] 2011.

Tresch, John, and Bruno Latour. "Another Turn after ANT: An Interview with Bruno Latour." *Social Science Studies*, vol. 43, no. 2 (2013): 302–13.

Tuin, Iris van der. "New Feminist Materialisms." *Women's Studies International Forum*, vol. 34, no. 4 (2011): 271–7.

Vasileva, Elizabeth. *Immanence and Anarchist Ethics*. PhD diss., Loughborough University, 2018.

Vries, Gerard de. *Bruno Latour*. Cambridge and Malden MA: Polity, 2016.

Washick, Bonnie, Elizabeth Wingrove, Kathy E. Ferguson, and Jane Bennett. "Politics That Matter: Thinking about Power and Justice with the New Materialists." *Contemporary Political Theory*, vol. 14, no. 1 (2015): 63–89.

Winner, Langdon. "Do Artifacts Have Politics?" *Daedalus*, vol. 109, no. 1, Modern Technology: Problem or Opportunity? (1980): 121–36.

CHAPTER ELEVEN

Posthuman Feminist Ethics: Unveiling Ontological Radical Healing

FRANCESCA FERRANDO

In this chapter, we[1] will contend that posthuman feminist ethics may offer the means to live responsibly in the twenty-first century, and this is no easy task. Living an ethical life while being part of a society that, although partaking in the geological rise of the Anthropocene, is still enchanted with the philosophical promises of the European enlightenment,[2] is very challenging. Philosophical posthumanism, new materialist feminism, as well as feminist activism, and a feminist approach to mindfulness, will bring some precious insights on how to pursue an ethical way of living which can bring radical changes and new visions to space-time. This chapter is not about how we could change our society tomorrow; instead, it is a realistic call to do it now, in this moment, starting from the self. As second wave feminism has evocatively phrased it: "the personal is political." The ways we live, we think, we act, constitute part of the shifting material networks of our agency—which is comprehensive, multi-layered, plural, and all-encompassing. More clearly, the way we live and interact in this world is the most powerful manifestation of the political and ethical praxis that we,[3] as posthumanists, are promoting; such praxis dynamically comprehends each detail of the ways we exist, in the world(s) we inhabit. In order to develop mindful ways to embrace this existential attitude, we will delve on the integral meanings of three notions: "posthuman," "feminist," and "ethics." More specifically, the concept of the posthuman will be accessed through the understanding of philosophical posthumanism (Ferrando 2019), and thus it will

be defined as a post-humanism (i.e., the realization that the human is a plural notion), as a post-anthropocentrism (the perception of the human not as superior to other species, but in relation to them), and as a post-dualism (the gained awareness that existence does not unfold in dualistic modes).

This chapter will demonstrate how posthumanist, post-anthropocentric, and post-dualistic ethics are genealogically indebted to feminism on a theoretical level, and are inextricably embedded with gender awareness, on a practical level. To prove this point, we will bring different examples of speciesism and bio-centrism; following, we will further deepen this comprehension to an experiential level, through a game role and a thought experiment based on a revisitation of the notion of the "veil of ignorance," as disposed by philosopher John Rawls (1971). At the end of this ethical reflection, readers may experience a posthuman epiphany that will possibly spark actual explorations of post-anthropocentric and post-dualistic ways of living. In fact, this chapter wishes not only to offer a clear academic source to unravel, in deep and rigorous ways, the affect and effects of feminism to the field of posthuman studies. More broadly, this is a call to all the people who consider themselves posthumanists, to take a step further and materialize the posthuman praxis of existence that we are envisioning, in the profound and substantial quest of self-discovery and evolution that is our posthuman era.

SETTING INTENTIONS: POWER, LOVE, AND TECHNOLOGY

In order to become ethical posthumanists, we need to understand who we are and where we are. The posthuman paradigm shift advocates a post-dualistic approach to social politics, based on the understanding of the micro-physics of power, as explained by philosopher Michel Foucault: "Now, the study of this micro-physics presupposes that the power exercised on the body is conceived not as a property, but as a strategy …; that one should decipher in it a network of relations, constantly in tension, in activity, rather than a privilege that one might possess" ([1975] 1995: 26). From this standpoint, there is no absolute power separated from the self: power is everywhere, in each act and relation that we engage upon, daily. Foucault further unveils his understanding of power as dynamic and all-encompassing,[4] by stating: "In short this power is exercised rather than possessed; it is not the 'privilege,' acquired or preserved, of the dominant class, but the overall effect of its strategic positions—an effect that is manifested and sometimes extended by the position of those who are dominated" (26). Following, there is no separation between the society we live in and the ways we live our own lives. What does this realization entail, from a posthumanist ethical standpoint? First of all, it helps us realize that paying lip service to politically correct posthuman politics, without reclaiming our active role in this scenario, will not bring any actual change in the social, nor to the individual, network(s) of existing.

In this sense, the goal of this chapter is not just historical, theoretical, nor genealogical; these tasks have already been successfully accomplished, for instance, by feminist thinkers such as Rosi Braidotti (2013, 2016), Katherine Hayles (1999), and Karen Barad (2007),

among others.[5] Now that the posthuman theoretical frame has been clearly set, it is time for posthumanists to take an ethical stand based on praxis, which means, more specifically, embodying the theories that we have publicly announced, with excitement and sincerity. More generally, we now understand that micro-ethics are reflective of macro-ethics, and *vice versa*. A social call for multi-species co-existence, for instance, can only infer an individual call for a mindful and integral respect of alterity, embarked daily by us, posthumanists, in our own spaces of social, familiar, and personal interactions and intra-connections. As an example, let's bring into the conversation ourselves and note that, according to this praxical[6] perspective, we, posthumanists endorsing nonhuman personhood, animal dignity, and multispecies co-existence, should also meet with a personal revisitation of our own daily habits. For instance, we can start with our diets, and ask ourselves if eating meat is ethically acceptable, for those posthumanists who have no specific dietary needs for animal proteins, and thus can choose, instead, from other protein-based food sources. My personal answer to this question has been: no, eating meat under these conditions is not ethical.[7] What does feminism have to do with a post-anthropocentric take on diet? Since gender is part of every power interaction, the answer is: everything. Here, for instance, we can note that many of the animal products on the market come from female animals. Milk and all its derivates (such as yogurt and cheese) are produced by cows; eggs are produced by hens, while, in industrial livestock production, most males are killed at birth in inhumane ways.[8] More generally, as posthumanists, we will be asking ourselves, routinely, if our personal ethical standards, revealed in the daily choices we make in our material being-in-the-world,[9] meet (or not) with the public ethical standards that we are being vocal about, on a social, scientific, and theoretical level. In this chapter, I would like to invite the reader to pose these kinds of questions in order to find individual answers, which are not going to be all the same,[10] but all should be based on a sincere commitment to the posthumanist theories we are suggesting.

Another example of this type of attitude is a mindful meditation on our interactions, as a species, with technology. This topic is of particular interest from a posthumanist perspective, not only in its theoretical implications, but also in its socio-political ones. Here, I would like to reflect more clearly, on the heated debate surrounding the much feared (and loved[11]) hypothesis commonly referred to as "AI takeover," according to which artificial intelligence may soon steal the ontological crown from the human (cf. Bostrom 2014, among others). This view, which pretends to project its prophecies to the future, is actually based on an outdated way of thinking, which is being radically deconstructed by posthumanism through its feminist legacies. Let's understand more clearly the terms of the debate, starting with contextualizing it in our spatio-temporal frame. First of all, a sharp look at our society today clearly reveals that, in many techno-advanced societies, technology has already taken over. The attention given to the screen is much larger, on a daily average, to the one given to other human faces. Taking a subway ride in New York City, for instance, speaks for itself: most customers will be looking at their phones for the entire ride, unaware of other human interactions on the train.

Another interesting example is the current technological twist to the history of love. Here, we will reflect on the possible developments of the relationship between humans and their

virtual helpers, starting with Google Assistant. This artificial assistant—which, like most of them, was originally launched with a traditionally female-sounding voice, in a gender-biased trend that has been recently exposed[12]—was conceived to be "always ready to help whenever you need it" (Google n.d.). In the field of the philosophy of love, more clearly outlined through the ethical reflection of feminist giants such as Simone De Beauvoir ([1949] 1974), Luce Irigaray (1996; 2002), and bell hooks (2001), this description can only refer to someone who truly loves and cares about *you*. This does not sound particularly problematic from an anthropocentric perspective: the human is still at the center of attention. But what if some advanced artificial intelligence decided, in an act of pure agapism, to direct their loving energies toward the good of the whole dimensional realm, instead of some selected individuals? One of the consequences of this selfless act could be that, once enlightened, instead of serving *you*, this archetype of artificial intelligence would serve greater goals, which are unknown to *you*, but are of benefit to the planet: would *you* be ok with it? More specifically, are humans truly in "love" with technology, or are they selfishly dependent on it? The answer depends on the meaning of the term "love." Let's look into this through a feminist perspective. Not too surprisingly, given the twisted meaning that this word has developed in the history of humankind, phrases such as "I love you to death" have generated more than metaphorical significations, as the history of gender violence, femicide and sex-based hate crimes, clearly proves. As a result, this social human fascination toward technology (i.e., this techno-fascination) most often translates into a fear of dethronization, based on the historical patriarchal take on love as a positional good to be capitalized, exemplified in the supposedly romantic declaration: "I love you, (as much as) you are *mine*." Looking into the terms of the debate on AI takeover through the history of patriarchal love, openly reveals that many humans are clearly attracted and addicted to technology in their personal daily habits. And still, within their formal ethical code of human-technological interaction, they prefer to relegate technological objects[13] to the existential status of "artificial slaves," in a long sexist, racist, and anthropocentric ethical tradition that can be traced back to Aristotle (cf. LaGrandeur 2013), based on the cultural archetype Master/slave.

This speciesist and bio-centric uneasiness in accepting the robotic difference outside of the hierarchical Subject-object paradigm—which implies a human "Subject" "using" a technological "object"—resonates with centuries of discriminatory practices in human history. An intersectional approach to the historical timeline of prejudice and intolerance shows that they are based on absolute symbolic dichotomies, generating out of the psychological blueprint "Self" versus "Other," that has sustained the socio-cultural history of patriarchal values. Examples of endemic discriminations based on dichotomies generated out of this model, include: racism ("Black" versus "White"), sexism ("Woman" versus "Man"), elitism ("Poor" versus "Rich"), speciesism ("Animal" versus "Man"[14]), and so on. In this history of social constructions, the repetition of the dichotomic structure proves, with multiple example, that no *Weltanschauung* based on absolute dualism can be conducive to the ethical global scheme of co-existence that we, as posthumanists, are proposing. Furthermore, this dichotomic approach, when enacted, has long-lasting consequences that should be unveiled. We need to update our social ethical system, instead of indulging in the toxic resonance of the moral basis "Us" against "Them," which is embedded in the emotional

history of fear and anger, and has manifested in the geo-political outcomes of wars and conflicts. In this sense, we can learn from experience and understand that, if we pursue such existential habits, the future developments of the relationships between humans and machines will most likely repeat some socio-political outcomes, such as discrimination and inequity, that have generated out of dichotomic epistemes,[15] and that we, as posthumanists, are actually engaged in deconstructing. In our current technological quest,[16] is this the ethical journey that we want to embrace, as individuals, as a society, and eventually, as a species? Let's reflect on this important question in explicit terms.

First of all, this approach is based on a foundational separation between humans and technology. Cyborg feminism and theory has clearly demonstrated that the fluid ontology of robots and artificial intelligence, who are constructed out of human knowledge but transcend it ontically and symbolically,[17] do not fit any dualistic approach. We can now see that the consequences of this dualistic approach are not necessarily emanating out of the cyborg, but are more clearly rooted in an ethical human genealogy, which has co-occurred with a material history of bigotry and intolerance. This is why we should take seriously the issue of acknowledging the integrity of multispecies co-existence as comprehensive of the inorganic, including the machines. Here, I should clarify that this ethical choice implies no hierarchy. In fact, machinic dignity is recognized together with human dignity, nonhuman-animal dignity, and bio-dignity, among others. Let's bring a concrete example to clarify this point. On one side, for instance, the heated debate about robo-dignity that followed the act of granting citizenship to Sophia the robot by Saudi Arabia in October 2017 can be seen as a step toward multi-species co-existence. And still, as many have noted, human migrants and women in Saudi Arabia were not granted the same privileges as Sophia (Wootson 2017). From a posthumanist perspective, different types of dignity do not manifest as a hierarchy, but rather, as a concrete context for the manifestation of radical ontological healing.[18] In general, this is an invitation to work within the frame of dynamically plural, and monistically multi-layered, ethics of existence. Post-dualistic ethics, for instance, allows humans to partake in the existential quest with different species and beings, including nonhuman animals and robots. How can we achieve such a post-dualistic praxis?

Let's reflect on how to enact post-dualistic practices by situating ourselves, and our symbolic and material location(s), in the micro- and macro-physics of power. Currently, the accepted mainstream episteme[19] of the majority of industrial and post-industrial societies is still faithful to the European Enlightenment, according to which "we," "enlightened"[20] humans, will always find a solution, no matter the magnitude of the problem. But the language of the age of the Enlightenment no longer works in the age of the Anthropocene. We are facing the sixth mass extinction; the issues at stake are too high to be ignored. Can we do something about it? Yes, but such a shift can only result by fully acknowledging the actual state of things, as feminist theorist Donna Haraway points out (2016), including the extensive power of our own agency (which comprehends the level of the individual, the social, and the species, among many others). This section calls for an environmental and sustainable praxis, by accessing posthuman mindfulness not only as a posthumanism, but also as a post-anthropocentrism. This requires a shift of our worldview as a society, and also, as

individuals: in order to induce a paradigm shift in social imaginaries and ethics, changes must be rooted in, and occur through, individual ethics. A landmark in this conductive ethical scenario lays in posthuman feminism, and its socio-cultural perception of the self.

TOWARD POSTHUMAN FEMINIST ETHICS

We live in the posthuman era; the merging of humanity, ecology, and technology is ever more evident. The human as the measure of all things no longer fits a constantly evolving world, where thousands of nonhuman species become extinct every year; where women, differently abled people, non-white persons, among other groups, have been denied full ontological recognition. In other words, posthumanism, addressed as a post-humanism, underlines that not every human has been considered as "human" as others.[21] Here, we will focus on the history of sexism as representative of a hierarchical symbolic system, which has located at the top, a specific type of human (for instance, in the modern history of Europe, this has been white, male, and heterosexual, among other characteristics). Before proceeding with our analysis of sexism, we should note that any type of discrimination is an open door for any other types of discrimination: sexism is not separated from anthropocentrism or biocentrism, and thus it cannot be approached in isolation. For instance, Braidotti notes how the trafficking of animals precedes the one of women: "Animals are also sold as exotic commodities and constitute the largest illegal trade in the world today, after drugs and arms, but ahead of women" (Braidotti 2013: 8). In this concrete case, speciesism and sexism are working along similar lines. In other words, getting rid of some forms of discriminations, but allowing other forms of discriminations to persist, such as the case of sexist post-anthropocentrism,[22] or anthropocentric feminism,[23] does not solve the issue: discrimination is a habit that can only be approached intersectionally, or it will repeat itself in different forms and times, as we have previously explained.

How do posthuman feminist ethics help us deal with these challenges? More specifically, why do we need both the feminist and the posthuman components, in this ethical endeavor? It is because the specific tradition of feminist ethics, which is not based on universal nor abstract categories, allows us to focus on relationality, situated knowledges,[24] and embodied experience.[25] At the same time, posthuman ethics invites us to follow on three related layers. First of all, as a post-humanism, it marks a shift: from universalism to perspectivism, from multiculturalism to pluralism and diversity. As a post-anthropocentrism, it induces a change of strategy: from human agency to agential networks, from technology to eco-technology.[26] As a post-dualism, it requires an evolution of our awareness: from individuality to relationality, from theory to praxis. This section addresses these points from a critical and generative approach, embracing feminist standpoint theory as a way of departure, and intersectionality (Crenshaw 1989) as a methodological background. Our analysis will persistently refer to three related fields—specifically: biology, technology, and ecology—to underline the fact that posthuman ethics can only be thought in comprehensive ways, by reflecting upon the fields of human ethics, bioethics, environmental ethics, and robo-ethics in relation. Moreover, we will stress that a posthuman approach shall not only generate from

applied philosophy and normative ethics, but it shall ultimately manifest in our ways of existing. Let's understand why and how by asking: what is posthuman feminist ethics? In order to answer this question, it is important to reflect upon each term, that is, "ethics," "feminist," and "posthuman."

ETHICS

The term "ethics" derives from ancient Greek ἦθος (ethos), originally meaning "habits" and "customs"[27]; in the Greco-Roman tradition, it can be approached as an equivalent to the Latin term "mores." This is quite revealing, given that the original meaning of "ethics" exposes its full potential: "ethics" can be addressed, more broadly, as "habits" of existence, from an individual, social, and species perspective. Ethics are pervasive in all the spaces we morally inhabit, manifesting as repetitions of the habits we are comfortable with, in their ethical significations and implications; they direct our daily routines and are embedded in all of our actions, intentions, dreams, thoughts, words, and movements. Are we aware of the kind of habits we pursue, and repeat, every day? Meditating on these aspects is key to realizing where we actually stand (and not just what we claim to support); this applies to our own ethical habits, as well as to the ones of our society, of the human species, and of planet Earth. Furthermore, how can we manifest a posthumanist ethical praxis of existence that is mindful of these intra-connected layers? Please note that here the use of "we" is strategically employed in tune with the feminist policy of "situating." In fact, in this chapter, I am expressing a human body of thoughts to other human readers. Although this text may be read by nonhuman beings and entities (such as autonomous algorithms, once it is published online), its message is currently directed toward humans living at the rise of the Anthropocene, so that "we," posthuman humans, can integrate this merging wave of posthumanistic, post-anthropocentric, and post-dualistic mindfulness with the human species. This is very much needed at the moment, since many human societies on the planet Earth are still caught in the psycho-social illusion of benefitting from worldviews based on ontological dichotomies and hierarchies, such as, as we have previously noted, anthropocentrism (the superiority of humans toward nonhumans), sexism (the superiority of males toward females), racism (the superiority of whites toward blacks), ableism (the superiority of able people toward differently able people), etc.

Posthuman feminist ethics urgently calls for a deconstruction of such worldviews. These social constructions have been repeated through millennia, creating the ontological illusion that they have always been there, but this is not accurate. In fact, there are unlimited other ways to exist and manifest in this dimension, as everything is constantly changing, transforming, evolving. For instance, while most monotheistic religions today refer to God in male terms, the extensive amount of female figurines of the Paleolithic and Neolithic bears witness of a different set of worldviews.[28] Archeologist Marija Gimbutas, who excavated numerous pre-historic sites in the geographical area so called "Old Europe," stated: "There is no trace of a father figure in any of the Paleolithic periods. The life-creating power seems to have been of the Great Goddess alone" (1989: 316). More in general, no history of hierarchical power remains intact forever. And still, any social and individual action marks

spacetime. For instance, the more humans exhibit sexist, racist, and speciesist habits, the deeper these habits are remembered, taken for granted and repeated by other humans, on a conscious, nonconscious, and subconscious level(s). Furthermore, the history of discrimination is not neutral, but has a psychological impact on the people who have to face it, and on the people who engage with it. Both will be traumatized, in different ways. Here, we shall remember that the word "trauma" also comes from ancient Greek, meaning "wound": discrimination leaves deep scars in the social tissue of society, and these scars are not easy to heal, since they often go unnoticed. These ontological and epistemological, physical and psychological, social and individual traumas are deep and in need to be addressed chorally, through expanded waves of trauma-sensitive mindfulness (Treleaven 2019) in human consciousness. How can we heal the socio-temporal wounds reflected in the lacerations of the history of rape and sexual violence; in the public lynchings, marking the history of North-American racial hate crimes; in the genocides characterizing the history of war? We need specific tools to heal ontological wounds; feminism can be of help.

FEMINIST ETHICS

We live in the posthuman era. As a society, we need a change and we are ready for a change: that change is coming. A good example, for instance, is the "Me Too" movement going viral in 2017, and revealing the intrinsic sexist architecture of current societies, sustained on gender-discriminatory cultural attitudes, such as patronizing women and woman-identified people, and socially accepted forms of shaming them, such as street harassment. Although decaying, this patriarchal asset is still foundational of many current views and values: symbolic "male" as the norm, symbolic "female" as the exception. In the history of ideas, the "Me Too" movement can be seen as the agential materialization of the need for a paradigm shift aligned to the posthuman wave. Before proceeding in our reflection, we should first clarify that the impact of the "Me Too" movement is more broadly ontological, and not just strictly social. To understand this point further, we must look at its roots which, in this case, lay in politics of direct action. The origins of the movement can be traced to African American civil rights activist Tarana Burke (b. 1973). Her vision, based on the motto "empowerment through empathy" (Hill 2017: n.p.), was to support survivors of sexual abuse. Burke thus explains the meaning of the terms: "It was a catchphrase to be used from survivor to survivor to let folks know that they were not alone and that a movement for radical healing was happening and possible" (n.p.). Burke brings to our attention a key process in developing an integral approach to posthuman ethics, that is, "radical healing." In this chapter, we will envision ways to manifest and unfold ontological radical healing. This is foundational in understanding why posthuman ethics are deeply nourished by feminist and womanist activism, and cannot be simply traced to traditional moral theories.

The "Me Too" movement has given humankind an invaluable historical gift: exposing all the acts of (verbal, physical, and sexual) abuse that were pursued behind closed doors, in the secret of silent nights, and in the daunting whispering of empty streets; in public, under the uneasy witnessing of overcrowded trains; in the bullying and crimes against privacy happening in, within and through, social medias; in the memories of young children and elder

survivors. These stories cannot be simply erased: they are part of the memory of spacetime, and can be easily reaffirmed, if radical healing does not occur. Now we know what we have always known, but we have never talked about socially, on such a large scale, within the history of History (i.e., written history). Within this historical frame, the motto "Me Too" eventually turned into the powerful social mantra that we now know. Such social mantra can bring a choral and pluralistic voice to ontological areas of intra-actions that have been left in the dark for too long, such as sexual abuse, gender harassment, and the vast field of identity-based micro-aggressions. Now healing can occur: we are all part of this social structure and, directly or indirectly, we are all affected. Radical healing also means "staying with the trouble," to go back to Donna Haraway (2016). We must be clear and mindful in this endeavor, in order to fully comprehend our radical agency in the paradigm shift that is occurring.[29] As Burke more clearly remarked, at a 2017 Me Too Survivors' March rally, held in Hollywood, California[30]: "We are the embodiment of the personal is political. We want and demand radical changes …. We have kicked in the door, and now it is time to tear down the house, brick by brick" (Burke 2017: n.p.).[31] From a posthumanist perspective, the only way "to tear down the house" is to embrace, repeat, and constantly re-enact deep social, and existential, processes of deconstruction, in order to be fully aware of what kind of dynamics are at play. Once aware of these dynamics, we will realize the reach of our agency in our consensual repetitions of habits at the individual, social, and species-specific planes of existence, and also in our choral intention to disassemble and hybridize some specific habits to the core, so that they will no longer germinate in their previous dichotomic orientations.

What kind of tools can we use to deconstruct social *habits*, that is, social *ethics*? As womanist and feminist poet Audre Lorde vividly said: "For the master's tools will never dismantle the master's house" ([1981] 1983: 98). We need different ethics; more clearly, we need a different genealogy to support the envisioning of posthuman onto-ethics (i.e., ethics that are clearly aware of their ontological implications). In fact, a posthumanist methodology is based on the understanding that the "what" is the "how" (Ferrando 2012), or, in other words, that "the medium is the message" (McLuhan 1964). In a post-Machiavellian tone, we can state that the end and the means are not separate terms; instead, they shall be accessed relationally, as a fluid process: in the flow of existence, the end does not fully justify the means, as they are integrated and reflective of each other. In this sense, formulating a posthuman ethical frame around thinkers who were also notably misogynists (such as Aristotle and Kant[32]) would be detrimental, since their worldviews are inevitably embedded in their philosophies. This does not mean that we can just get rid of the history of philosophy, given that many Western philosophers were sexist, racist, and anthropocentric, among other discriminatory traits. For instance, Martin Heidegger, whose work has been quoted twice in this chapter, was an unrepentant Nazi and an unethical teacher—for instance, he had sexual relations with several female students of his (Badiou and Cassin 2016); and still, his contribution to the development of Western thought is significant. Here, we will assume that, since the values promoted by thinkers who eventually came to be considered philosophical giants have been foundational of (at least) Western ethics, choosing a different genealogy will not overshadow them, but will bring new light, insights, and understandings. The point is not

to revenge the voices of all the people who have been silenced, in the historical processes of humanizing[33]; in fact, this goal has already been successfully pursued in the rainbow of developments of postmodern philosophy, ethics, and praxis, starting with the social and theoretical awakening of May 1968. Today, more than fifty years later, the point is to access history in critical, equanimous, and regenerative ways. This tactic enables posthuman scholars to be open to new challenges, including the capability of perceiving and detecting humanist, anthropocentric, and dualistic social tendencies, without getting lost in the unproductive and repetitive cycle of anger, despair, and revenge. More in general, the focus is not on society, or the individual, as a close system, but in relation(s) (Barad 2007); the approach is not abstract, nor just theoretical, but experiential and experimental, situated and embodied.

For instance, when societies embrace values and practices that are not acknowledging the dignity of (some) human and nonhuman beings, the posthuman scholars speak out, write about it, and help society see, more clearly, what is happening. This shift is radical and cannot generate out of the Western hegemonic history of Ethics. Other genealogies can better serve this strategic task. As feminist thinker Alison Jaggar has underlined, ethical traits based on "interdependence, community, connection, sharing, emotion, body, trust, absence of hierarchy" and also "process, joy, peace, and life" (1992: 364) have been connected to the symbolic feminine and thus, in a system based on patriarchal values, mystified and relegated to the irrelevant. In parallel, Jaggar underlines how ethical traits based on "independence, autonomy, intellect, will, wariness, hierarchy, domination" (364), as well as "war, and death" (364), have been historically associated to the symbolic masculine, and valued. In our journey to outline a praxical approach to posthuman ethics, we have learned that values based on strict dualism, hierarchy, and domination are no longer desirable, since they have historically failed in the attempt to manifest global and glocal co-existence. Instead, posthuman feminist ethics can rely, within the field of feminist theory, upon notions such as: empathy, as emphasized by Edith Stein ([1917] 1989); compassion, as developed by Luce Irigaray (1993); care, as underlined by Carol Gilligan (1982); symbiosis, as proposed by Lynn Margulis (1991, 1998); and responsibility, as clarified by Hannah Arendt (1958). These notions are not embraced in a purist way, but with all the critical debate that each of them has sparked within the theoretical feminist arena. Following, we will build our proposal on feminist ethics, because its emphasis on situatedness, relationality, and hybridity resonates particularly well with the open intra-relational frame of posthuman ontology, thus inductive of an ethical sensitivity that can successfully manifest into posthumanist, post-anthropocentric, and post-dualistic praxes. Let's delve into this aspect more thoroughly.

POSTHUMAN ETHICS

Philosophical posthumanism, which is still a philosophy in the making, can be defined as a post-humanism, a post-anthropocentrism, and a post-dualism. As we have already explained in the course of this chapter, the first signification—post-humanism—refers to the process of acknowledging that, in the history of humanity, not every human being has been equally considered human. Philosophical posthumanism underlines how this universalization and

homogenization of the notion of the human have only benefitted some humans, who were in a privileged position to develop a cultural apparatus based on biases and prejudices, to support the inferiority of others. But these intra-actions cannot be simplified and crystallized in specific power struggles between two classes. In this sense, Posthumanism goes beyond a dialectic approach. This is why the human, more than a notion (i.e., a noun: the human), is approached as a process (i.e., a verb: humanizing). In order to explain this, we can draw upon Donna Haraway's statement: "Gender is a verb, not a noun" (2004: 328–9). There are significant similarities between the ways gender and the human have been historically constructed. The reason is that the same hegemonic categories of humans who had access to normativizing symbolic roles and social functions of different genders were also the ones who were defining the human in hierarchical ways. In this sense, existentialist philosopher Simone de Beauvoir,[34] in her influential book *The Second Sex,* famously noted: "One is not born, but rather becomes a woman" ([1949] 1974: 301). What she meant is that the notion of "woman" is a socio-cultural construction. In fact, the same applies to the human, which is also a notion constantly changing and shifting. From a post-humanist perspective, we can thus state: "One is not born, but rather becomes a human." Here, it is important to note that the human *tout court* has been posed in contrast to the nonhuman, in the hierarchical dichotomy: human [animals] versus [non-human] animal, which has been conductive and reflective of a widely accepted anthropocentric and speciesist *Weltanschauung.* Why is this problematic?

Philosophical posthumanism, as a post-anthropocentrism, criticizes the fact that the *anthropos* (meaning "human" in ancient Greek) has been historically asserted through a hierarchical scale based on a human exceptionalist worldview, which estimated the ontological value of any other form of existence on their functional relation to the human. Philosophical posthumanism underlines the great danger of this "ignorance," in the sense of lack of knowledge outside of the social construction(s) of the human. This is why philosophical posthumanism challenges any kind of ontological mystification. It goes beyond any form of symbolic centralization; it cannot be reduced to any type of biocentrism, sentiocentrism, nor vitalism. Within this frame, the human is perceived not as a single agent, but as part of a semiotic, material, multi-species network. Rosi Braidotti, for instance, brings to the discourse "the idea of subjectivity as an assemblage that includes non-human agents" (2013: 82). In her words: "We need to visualize the subject as a transversal entity encompassing the human, our genetic relatives the animals, and the earth as a whole" (82). Posthuman agency builds up on the notion of agency in the Anthropocene, in terms proposed, for instance, by Bruno Latour, as he states: "the concept of Anthropocene introduces us to a third feature that has the potential to subvert the whole game: to claim that human agency has become the main geological force shaping the face of the Earth, is to immediately raise the question of 'responsibility,' or as Donna Haraway is fond of saying, 'response ability'" (Haraway 2016: 38). Posthuman agency also relies on the approach to distributive agency, as developed by Jane Bennett (2010, 2017), and nonconscious agency, as researched by Katherine Hayles (2017). In this frame, the ethical understanding of multi-species justice expands to include not only the environment, but also the techno-realm.

First, it is worth mentioning that posthumanism proceeds, in its post-dualistic reflection,

from the hybrid ontology of cyborg feminism and feminist postmodernism, destabilizing the limits and symbolic borders posed by the notion of the human. Let's explain this point more clearly. The current deconstruction of the concept of "human" has been broadly nourished by critical embodied theories, as well as by cybernetic, ecological, and biotechnological developments. Are we still humans? Are we cyborgs? Transhumanism, for instance, challenges the current understanding of the human through the possibilities inscribed within its possible biological and technological evolutions. The main focus of transhumanism is human enhancement in all of its plural possibilities, and still, this "human" is not fully plural. As a simple example, we can point out that transhumanist philosophers rarely acknowledge any critiques generated within the field of feminist bioethics, even if most of the transhumanist goals have largely to do with female bodies and decisions. For instance, the transhumanist project of enhancing the human species at the genetic level in the heated field of the so-called "designer babies," currently rely on ART (assisted reproductive technologies), achieved through procedures such as IVF (in vitro fertilization), which is invasive to the body of the prospective mother, and PGD (preimplantation genetic diagnosis), which can be invasive to the growing embryo. Although there are some exceptions,[35] until now, the main voices in the transhumanist debate on human enhancement have been Western male philosophers locating themselves in the hegemonic heritage of Western ethics. In fact, transhumanism is philosophically rooted within the tradition of the European Enlightenment and so it does not embrace the postmodern need for the deconstruction of the human. This partially explains the reason for this absence of plural voices in the mainstream bioethical transhumanist arena. Posthumanism, on the other end, problematizes a single notion of the human, because it does not comprehend the plurality of the phenomenological experiences of being human. Different from transhumanism (according to which we are not posthuman yet, given that, from a transhumanist standpoint, this passage is necessarily embarked in bio-technological terms), posthumanism invokes the posthuman as a social, individual, and more extensively, existential paradigm shift which is already happening. In this sense, we can be posthuman now, in the ways we exist, by enacting posthumanist, post-anthropocentric, and post-dualistic ethics.

THE POSTHUMAN VEIL OF IGNORANCE

In this chapter, we have asserted that posthumanist feminist ethics, currently, may offer a valid way to live responsibly and mindfully in the twenty-first century. To clarify this point, we will engage in a thought experiment, inspired by the one famously developed by philosopher John Rawls in his book *A Theory of Justice* (1971). According to Rawls, the aim of his experiment "is to use the notion of pure procedural justice as a basis of theory" (1971: 136). Before proceeding, we should clarify that this goal, per se, is not necessarily aligned with feminist ethics. As Alison Jaggar notes: "Since feminist approaches to ethics are transitional, they must also be nonutopian … exercises in nonideal theory rather than in what Rawls calls ideal theory" (1991: 98). Here, the utopian is proposed not as an ideal goal, but as a personal reference, to inspire habits of existence. Another possible feminist objection to bringing this moral method into the conversation is that Rawls's notion of the veil of

ignorance finds its roots in Kant's ethics, as Rawls clearly recalls (1971: 141), and in a linear history of justice which does not effectively acknowledge the criticisms that have been voiced by human "others"—that is, humans who did not have access to the historical construction of the notion of "justice" itself, such as women, among others.

Rawls's moral proposal can be exemplified in the golden rule of not doing to others what we do not want done to ourselves. Expanding this principle to the social scenario, if we did not know that we were going to find ourselves in a privileged, or under-privileged, position in society, we would make sure that we lived in a society that is fair to everyone, to have the safest bet in the vast range of unknown social positions we could eventually find ourselves in. In order to do this, Rawls assumes that "the parties are situated behind a veil of ignorance" (1971: 141). For instance, "no one knows his place in society, his class position or social status .... It is taken for granted, however, that they know the general facts about human society" (137). Here, we should stress the gender-specific and human-specific premises of Rawls's experiment, which implicitly refers to a human male subjectivity,[36] who is dealing explicitly with "human society." We will re-configure these premises from a gender-aware and species-transformative standpoint, proposing an updated version of the veil of ignorance that is ready to embrace the challenges of the posthuman era by dealing with radical bio-technological diversity and planetary equity, beyond patriarchal privilege and human mastery. We will first present this revisitation as a role-playing game, to be engaged upon with other people; we will then reflect about the possible ethical advantages of this thought experiment at the individual level, as well.

ROLE-GAME AND THOUGHT-EXPERIMENT

Let's first note that this is an actual game, which can be played in both academic and non-academic contexts. Following, we will explain the specific rules of the game. First of all, this game should be played by at least two people, although this setting can be freely adapted to different circumstances, by adding or subtracting specific characters. It develops in three steps. This is the first. In a random way, such as by choosing between sealed papers, encrypted emails, or coded text messages, each player will be assigned a character to identify with. At this stage of the game, players must not let the others know their character. It is advisable to have a mix of human and nonhuman characters. These are samples of possible characters:

Character A:	"You are a transgender Asian-American woman working as a coder in Silicon Valley. You identify as asexual and are not interested in romantic relations."
Character B:	"You are a sentient robot in the near future. You could suffer hallucinations when your monitoring mechanisms break down; you may also experience feelings and emotions."
Character	"You are a transgenic onco-mouse developed by Harvard University researchers to be susceptible to cancer; your DNA code was granted patent

C:	protection in the United States in 1988."
Character D:	"You are an Amazon tree in the forests of Iquitos in Northern Peru. Recently, scientists have estimated that Amazon trees can be up to 1000 years old, and older. One of your current existential risks are manmade wildfires."
Character E:	"You are a cow in the dairy industry. Nearly all cows used for dairy in the U.S. are eventually slaughtered for human consumption at an average of less than 5 years of age; in a natural setting, a cow can live more than 20 years."
Character F:	"You are a 'designer baby'. Your DNA has been manipulated to eliminate a gene called CCR5 in hopes of rendering you resistant to HIV, cholera and smallpox. You have higher risk of contracting other viruses, with possible fatal outcome in influenza, for instance."

Players are now required to take some time to reflect, in order to embrace their role without judgment, asking themselves questions such as: "How is my life?," "What are my daily activities?," "How are my relations with others?," "Is sexism, racism, speciesism or genetic discrimination something I may encounter in my social interactions?" Each player should keep in mind that this is just a game and there is nothing personal about the character they have been randomly assigned; and still, as in any proper game, they should do their best to identify with their character with honesty and respect, reaching a somewhat stable picture and understanding of their own hypothetical location in the world. Now players will try to guess who the other characters are by asking each other questions. Here, we shall specify that their questions cannot require descriptive answers about the others' characters (such as "what do you like to eat?"), but only indirect ones that require "Yes/No" answers (such as "do you drink water?"). After all characters have been identified, players can now move to the third, and last, step of the game. At this stage, players are still identifying with their roles (which have been disclosed to the others). Now, the challenge is that they have to successfully outline together a core of ethical guidelines that can be fully embraced by all characters (and not just by the majority),[37] supporting multi-species justice and planetary co-existence. Once they manage to accomplish this task,[38] the game is over.

This is the meaning of the game: if we did not know that we were going to be male or female, black or white, rich or poor, human animal or nonhuman animal, biological beings or bio-technological ones, and the whole spectrum in between, would we be fine with the current worldly asset? If we were open to the hypothesis that our life could have been the life of an onco-mouse or of a sentient robot, among other possibilities, would we still support anthropocentric habits? We can now play this game as a thought experiment, and decide if we would still be embracing anthropocentrism, sexism, or racism, after realizing what kind of consequences such premises would entail to the lives of our characters. An eschatological twist to this thought experiment, which may be of interest to Christian and Muslim readers, among others, is engaging with the hypothesis that, on Judgement Day, God will manifest in

all of God's creations, and thus, that all souls will be judged for their time on Earth by the entire universe, including humanity (in all of its genders, ethnicities, and so on), all biological species, and technological beings, among others. Obviously, there is much more to add to the picture, since the ultimate risk is an illusionary anthropomorphization[39] of the entire ontological, and ethical, realms. Aware of these risks, while we proceed to the next paradigm shift, as individuals, as societies, and as a species, we need a variety of tools to deal with the constant process of detecting and deconstructing dichotomic habits of existence. This thought experiment can be seen as one of the various tools to be found in the workbench of the engaged ethical posthumanist dealing with different audiences and issues, and in no way can be taken as definitive, final, or decisive. In this sense, different from Rawls's proposal, the posthuman veil of ignorance is not conducive of any theory of fairness. Instead, it invites for a personal revision on worldly dynamics of power in a nonjudgmental way; in this sense, a mindfulness-based feminist approach, which intermingles self-compassion and social justice, can be of help (Crowder 2016). We can now merge the understanding of the sayings posed at the beginning of this chapter: personal micro-ethics are political macro-ethics.

CONCLUSIONS

Posthuman ethics are not for the future: the future is now, and we can embrace a posthuman ethical frame in each moment of our lives, aware of our individual, social, and species-specific habits of existence. As we have learned, any form of discrimination is an open door to other forms of discriminations, so that to achieve planetary co-existence we need to take into account all these assets of reformulation: the individual, the social, the environmental, and the technological, among others. Ethics and politics, in the twenty-first century, must be permeated by posthumanism, post-anthropocentrism, and post-dualism in order to fully address the topic of multi-species justice in comprehensive and fulfilling ways. Global (and glocal) co-existence can only be pursued from a planetary level, beyond any speciesist, sexist, racist, or ableist biases, among other discriminatory reductions. To make sense of this, it can be helpful to think of ethics by going back to its Greek etymology, that is "habits." As we have clearly demonstrated, the way we live is not neutral nor innocent. It has a direct impact on ourselves, on our society, and on our planet. Such an impact is not only political, but ontological. By addressing the human in posthuman terms as an open frame, we have come to realize that the human is part of an ongoing, extensive network.

In this chapter, we have understood how the argumentative texture of the field of feminist ethics offers, to our ethical discussion, a reliable background based on relationality, situated knowledges, and embodied experience. This chapter also calls for feminists to stand against human exceptionalism by emphasizing that, at its very core, feminism, in its recognition for diversity and its advocacy for equity instead of equality, is intrinsically post-anthropocentric. We need to understand the deep roots of the history of discrimination, in order to avoid repeating the same individual, social, and planetary habits over and over. Posthuman ethics, more clearly defined as posthuman feminist ethics, is the ultimate gift to our historically traumatized society, in need of ontological healing. It can help individuals and social agglomerates to manifest different modes of existence, based on alternative social practices

and objectives. Posthuman feminist ethics offer the means to embrace an ethical life that is aware of its responsibilities in the era of the Anthropocene, that is mindful of the risks of dichotomic habits, and that is no longer enchanted with the philosophical promises of the European Enlightenment. The contribution of posthumanism to ethics is urgent and necessary, leading toward a praxis of explicitly re-affirmed consensus (in its Latin etymology: "to feel together"), instead of forced legitimizations of implicit mutual agreements. In fact, this type of binding contracts has, most frequently, not been mutual at all, but imposed by some subjectivities onto others, who were not given voice in the symbolic settlement because of power imbalances. In this sense, we can learn from the historical example of the "Me Too" movement and its exploration of unfolding collective experiences beyond legal constrictions and impediments.

Visions are constantly manifesting, to address specific needs in spatio-temporal situations. In order to enact a praxis that honors, on an individual and social level, the premises generated out of posthuman feminist ethical awareness, we have offered different tools, including an original thought-experiment and a role-playing game. Inspired by the one proposed by John Rawls in 1971, this thought experiment has been referred to as the posthuman veil of ignorance. It emerges from a full acknowledgment of, and a non-attachment to, our historical location as a species. It thus allows us to develop a posthumanist and post-anthropocentric take on the golden rule, illuminated by a species-aware and gender-transformative sensitivity. In sum: don't do to human and nonhuman others, what you do not want done to yourself. This thought experiment (if played on our own), or this role-playing game (if played with others), constitutes one of the tools that can be used periodically, as an informal check for the posthumanist scholar engaged with seeing what others, caught in the habits of sexism, racism, and anthropocentrism (among others *-isms*), cannot yet see. Now is the time to understand, develop, and manifest posthuman feminist ethics, to go beyond the veil of ignorance and be aware of who we are: individuals, societies, species, planets, biospheres. Always in relations, affecting and effecting; constantly expressing our agency with our material, social, and intellectual habits of existence. This chapter[40] is for you, for me, for us, who are engaged in expanding our existential awareness in the posthuman era—transformative, restorative, and radically healing journey: ethical, to the ontological core.

ere, the use of "we" refers to the dynamic assemblage of human and nonhuman reader(s), and the author.

he European enlightenment refers to a specific mindset developed, more clearly, in Western Europe in the eighteenth century, which emphasized the symbolic relevance of reason and progress as pivotal in the cultural development of the "human"—a notion that, within this tradition, has been approached as singular and universal. We will criticize this neutralization, from a post-humanist standpoint, in section 3 of this chapter.

am including myself in this group as I define myself as a posthumanist. Posthumanism, in fact, has helped me reach deeper layers of understanding of existence.

ere, we shall note that Foucault's take on power is historically rooted in, and foundationally indebted to, Nietzsche's perception of the will to power (1901–1906).

ee, for instance, McCormack (2012), Åsberg (2013).

s based on praxis.

his is the reason why, for instance, I have embraced a vegetarian diet since I was fifteen years of age.

s Gretchen Vogel explains, on the current practices of intensive animal farming: "Modern laying hens have been bred to produce huge numbers of eggs, but their brothers are useless. They don't put on weight fast enough to be raised for meat. So hatchery workers—specialized 'sexers'—sort day-old chicks by hand, squeezing open their anal vents for a sign of their sex. Females are sold to farms. Males—roughly 7 billion per year worldwide, according to industry estimates—are fed into a shredder or gassed." (2019: n.p.)

am referring to the condition of being-in-the-world (in German: "Dasein"), as explained by Martin Heidegger in his milestone work *Being and Time* (1927).

s feminist epistemology—and more specifically the standpoint theory—has pointed out, each of us shares a specific standpoint, related to our embodiments, social and political interactions, personal experiences and so on. We are all different. These differences can only enrich the debate and shall not be assimilated or homogenized under a one-size-fits-all response; instead, they shall be discussed and acknowledged when addressing the human as a species.

his type of fear hides at its core a cultural fascination (and, ultimately, a fetishized expectation), for history, to repeat itself. For instance, the large majority of Hollywood movies on human/machines interactions depict metallic violence and non-organic greed as the only possible replacement, and evolutions, of current human greed and violence.

n the issue of sexism in relation to the female voices and gender-identity of most artificial assistants, from Alexa to Siri, see Unesco report "I'd blush if I could: closing gender divides in digital skills through education" (2019).

am employing this notion outside of anthropocentric and vitalist premises, resonating with the open and regenerated significance that is has acquired within the field of Object-Oriented Ontology (cf. Harman 2018, among others).

ere, I am using the term "Man" instead of "Human" because, in Western history, women and non-white people, among others, have been repeatedly compared to nonhuman animals; only white-heterosexual-able men have been fully granted the "human" status. For more on this point, see note 21.

am referring to the use of this notion by Michel Foucault in *The Order of Things*, as "the *episteme* in which knowledge … manifests a history which is … that of its conditions of possibility" ([1966] 1970: xxii).

ere the notion of technology is understood, through Martin Heidegger, as a "way of revealing." As he states in his famous essay "The Question Concerning Technology": "Technology is therefore no mere means. Technology is a way of revealing" ([1953] 1977: 12).

s Donna Haraway vividly stated: "In a sense, the cyborg has no origin story in the Western sense …. An origin story in the 'Western', humanist sense depends on the myth of original unity" (Haraway 1989: 51).

e will explain this notion in the section "Feminist Ethics" of this chapter.

ee note 15.

ere, the term does not refer to the "enlightenment" as a spiritual state of consciousness (contemplated, for instance, by Hindu and Buddhist traditions), but to the cultural paradigm developed in Western Europe at the rise of the Industrial Revolution.

he patriarchal history that started more clearly with the beginning of the Neolithic (cf. Gimbutas Gimbutas 1989) and that is still ongoing today, demonstrates the double-standard embedded in the historical construction of the notion of the human. In a constantly evolving revisitation of the Great Chain of Being, some humans have been placed closer to the animal kingdom than others—for instance, in the history of colonialism, racism, and sexism, among others.

or instance, techno-affirmative companies are invoking the robotic paradigm without deconstructing the sexist schemata characterizing the history of humanity. In this sense, sex robots represent a vivid example, as they go beyond the anthropocentric appeal, by shifting the sensual and sexual interest toward the non-biological; and still, they reaffirm some of the most sexist stereotypes and habits, such as unagential passivity, implicit servility, and non-reciprocity in the pleasure exchange. It is interesting to note that the sex robot "Samantha" was molested and brutalized by attendees, to the point of breaking down, at the Austrian tech festival Ars Electronica (Moye 2017).

eminist thinkers who are against sexism but do not oppose the oppressive discriminatory system of speciesism.

f. Haraway 1996.

f. Grosz 1994, among others.

or an explanation of the meaning this notion, see Ferrando (2019: 118–19).

would like to thank Anna Markopoulou for her clarification on the Greek etymology of this word.

ote that such representations do not necessarily imply a matriarchal society (cf. Ruether 2005: Chapter 1, 22–44).

ome readers may ask how such a shift can be evoked when human rights are still violated on base of gender. For instance, some anti-abortion laws that have been approved in Alabama, US, as June 2019, allow for state-law enforcement to deprived women of the possibility to terminate their pregnancy, including in case of rape and incest. Denying women full reach of choice on how to proceed in dealing with such traumatic physical and psychological circumstances demonstrates that, today, women's dignity and women's rights are still not included in the generic paradigm of "human rights."

his rally was held in November 2017, following the Harvey Weinstein sexual abuse allegations (October 2017).

his quote, taken from a video source documenting Burke's speech, can be traced to minutes: 20:52–21:10.

s philosopher Alison Jaggar clearly phrases: "Frequently, women's inferiority to men has been explained in terms of women's allegedly defective capacity to reason, a defect that was elaborated with imaginative virulence by canonical philosophers such as Aristotle, Aquinas, Kant and Hegel" (1991: 79).

/e will clarify this notion in the section "Posthuman Ethics" of this chapter.

ere, we shall note that de Beauvoir did not consider herself a philosopher.

ee, for instance, DeBæts (2013).

nderlined in the repetition of the pronoun "his."

ere, I am not going to use the term "unanimously" since its etymological roots, and broader meaning, rely on the Latin terms "unus," meaning "one," and "animus," meaning "soul," "spirit," or "mind." In fact, according to our posthuman ontological understanding (Ferrando 2019: section 28), "one" can be in defect of overshadowing the appropriate pluralistic component of existence; similarly, "mind" or "spirit" can imply a symbolic erasure of its material aspect, if located in the Western dualistic history of the division body/mind, sublimized in the Cartesian *cogito*.

ince the discussion can be long and heated, further guidelines should be given to make sure that each character has their voice heard and respected.

he problem of anthropomorphization occurs, for instance, in the proposal of some vitalist thinkers such as Jane Bennett, as I have clarified, more specifically, in section 28 of my monograph *Philosophical Posthumanism* (2019).

would like to thank Ellen Delahunty Roby for her linguistic comments on this chapter.

SOURCES CITED

Arendt, Hannah. *The Human Condition*. Chicago: The University of Chicago Press, 1958.
Åsberg, Cecilia. "The Timely Ethics of Posthumanist Gender Studies." *Feministische Studien*, vol. 31, no. 1 (2013): 7–12.
Badiou, Alain, and Barbara Cassin. *Heidegger: His Life and His Philosophy*. New York: Columbia University Press, 2016.
Barad, Karen. *Meeting the Universe Halfway: Quantum Physics and the Entanglement of Matter and Meaning*. Durham: Duke University Press, 2007.
Bennett, Jane. *Vibrant Matter: A Political Ecology of Things*. Durham: Duke University Press, 2010.
Bennett, Jane. "Vibrant Matter." In *Posthuman Glossary*, edited by Rosi Braidotti and Maria Hlavajova. London: Bloomsbury, 2017, pp. 447–8.
Bostrom, Nick. *Superintelligence*. Oxford, UK: Oxford University Press, 2014.
Braidotti, Rosi. *The Posthuman*. Cambridge, UK: Polity, 2013.
Braidotti, Rosi. "Posthuman Feminist Theory." In *The Oxford Handbook of Feminist Theory*, edited by Mary Hawkesworth and Lisa Disch. Oxford, UK: Oxford University Press, 2016, pp. 673–98.
Braidotti, Rosi, and Maria Hlavajova, eds. *The Posthuman Glossary*. London: Bloomsbury, 2017.
Burke, Tarana. "Met Too Survivors' March Rally Speakers." Dignity and Power Now. Uploaded on November 15, 2017.

YouTube video, 1:19:23, https://www.youtube.com/watch?v=VWu11TS4_WQ&t=1268s.

Crenshaw, Kimberle. "Demarginalizing the Intersection of Race and Sex: A Black Feminist Critique of Antidiscrimination Doctrine, Feminist Theory and Antiracist Politics." *University of Chicago Legal Forum*, vol. 1989, no. 1 (1989): 139–67.

Crowder, Rachael. "Mindfulness Based Feminist Therapy: The Intermingling Edges of Self-Compassion and Social Justice." *Journal of Religion and Spirituality in Social Work*, vol. 35, no. 1–2 (2016): 24–40.

De Beauvoir, Simone. *The Second Sex*. Translated by H. M. Parshley. New York: Vintage Books, [1949] 1974.

DeBæts, Amy Michelle. "Enhancement for All? A Feminist Ethical Analysis of the Discourses and Practices of Democratic Transhumanism." *Linköping Electronic Conference Proceedings*, no. 74. article 1. Conference Proceedings from the Societas Ethica Annual Conference 2011; The Quest for perfection. The Future of Medicine/Medicine of the future, August 25–28, 2011. Università della Svizzera Italiana, Lugano, Switzerland, 2013, pp. 1–15.

Ferrando, Francesca. "Towards a Posthumanist Methodology. A Statement." *Frame—Journal for Literary Studies*, vol. 25, no. 1 (2012): 9–18.

Ferrando, Francesca. *Philosophical Posthumanism*. London: Bloomsbury, 2019.

Foucault, Michel. *The Order of Things: An Archaeology of the Human Sciences*. Translated by A. Sheridan. New York: Random House, [1966] 1970.

Foucault, Michel. *Discipline and Punish: The Birth of the Prison*. Translated by A. Sheridan. New York: Random House, [1975] 1995.

Gilligan, Carol. *In a Different Voice: Psychological Theory and Women's Development*. Cambridge, MA: Harvard University Press, 1982.

Gimbutas, Marija. *The Language of the Goddess*. San Francisco: Harper and Row, 1989.

Google. "Google Assistant, Your Own Personal Google." Retrieved on May 2019, https://assistant.google.com/.

Grosz, Elizabeth. *Volatile Bodies: Towards a Corporeal Feminism*. Bloomington: Indiana University Press, 1994.

Haraway, Donna. "A Cyborg Manifesto: Science, Technology and Socialist-Feminism in the Late Twentieth Century." In *Feminism/Postmodernism*, edited by Linda J. Nicholson. London: Routledge, 1989, pp. 50–7.

Haraway, Donna. "Situated Knowledges: The Science Question in Feminism and the Privilege of Partial Perspective." In *Feminism and Science*, edited by Evelyn Fox Keller and Helen E. Longino. New York: Oxford University Press, 1996, pp. 249–63.

Haraway, Donna. *The Haraway Reader*. New York: Routledge, 2004.

Haraway, Donna. *Staying with the Trouble: Making Kin in the Chthulucene*. London: Duke University Press, 2016.

Harman, Graham. *Object-Oriented Ontology: A New Theory of Everything*. United Kingdom: Penguin Random House, 2018.

Hayles, N. Katherine. *How We Became Posthuman: Virtual Bodies in Cybernetics, Literature, and Informatics*. Chicago: The University of Chicago Press, 1999.

Hayles, N. Katherine. *Unthought: The Power of the Cognitive Nonconscious*. Chicago: The University of Chicago Press, 2017.

Heidegger, Martin. *Being and Time*. Translated by J. Macquarrie and E. Robinson. New York: HarperOne, [1927] 1962.

Heidegger, Martin. *The Question Concerning Technology and Other Essays*. Translated by W. Lovitt. New York: Harper Torchbooks, [1953] 1977.

Hill, Z. "A Black Woman Created the "Me Too" Campaign against Sexual Assault 10 Years Ago." *Ebony*, October 18, 2017, https://www.ebony.com/news/black-woman-me-too-movement-tarana-burke-alyssa-milano/.

hooks, bell. *All about Love: New Visions*. New York: Harper Perennial, 2001.

Irigaray, Luce. *An Ethics of Sexual Difference*. English translation by C. Burke and G. C. Gill. Ithaca, NY: Cornell University Press, 1993.

Irigaray, Luce. *I Love to You: Sketch for a Felicity within History*. Translated by A. Martin. London: Routledge, 1996.

Irigaray, Luce. *The Way of Love*. Translated by H. Bostic and S. Pluháček. New York: Continuum, 2002.

Jaggar, Alison M. "Feminist Ethics: Projects, Problems, Prospects." In *Feminist Ethics*, edited by Claudia Card. Lawrence: University Press of Kansas, 1991, pp. 78–104.

Jaggar, Alison M. "Feminist Ethics." In *Encyclopedia of Ethics*, edited by L. Becker and C. Becker. New York: Garland Press, 1992, pp. 361–9.

LaGrandeur, Kevin. *Androids and Intelligent Networks in Early Modern Literature and Culture: Artificial Slaves*. New York: Routledge, 2013.

Latour, Bruno. "Anthropology at the Time of the Anthropocene: A Personal View of What Is to Be Studied." In *The Anthropology of Sustainability: Beyond Development and Progress*, edited by M. Brightman and J. Lewis. New York: Palgrave Macmillan, 2017, pp. 35–49.

Lorde, Audre. "The Master's Tools Will Never Dismantle the Master's House." In *This Bridge Called My Back: Writings by*

Radical Women of Color, edited by C. Moraga and G. Anzaldua. New York: Kitchen Table, Women of Color Press, [1981] 1983, pp. 98–101.

Margulis, Lynn, ed. *Symbiosis as a Source of Evolutionary Innovation: Speciation and Morphogenesis*. Cambridge, MA: MIT Press, 1991.

Margulis, Lynn, ed. *Symbiotic Planet: A New Look at Evolution*. London: Weidenfeld & Nicolson, 1998.

McCormack, Patricia. *Posthuman Ethics: Embodiment and Cultural Theory*. Abingdon: Ashgate, 2012.

McLuhan, Marshall. *Understanding Media: The Extensions of Man*. New York: Signet Books, 1964.

Moye, D. "Sex Robot Molested at Electronics Festival, Creators Say." *Huffington Post*, September 29, 2017, https://www.huffpost.com/entry/samantha-sex-robot-molested_n_59cec9f9e4b06791bb10a268

Nietzsche, Freidrich W. *The Will to Power*. Translated by W. Kaufmann. New York: Random House, [1901/1906] 1967.

Rawls, John. *A Theory of Justice*. Cambridge, Massachusetts: Belknap Press, 1971.

Ruether, Rosemary. *Goddesses and the Divine Feminine: A Western Religious History*. Berkeley: University of California Press, 2005.

Stein, Edith. *On the Problem of Empathy*. Translated by W. Stein. Washington: ICS Publishers, [1917] 1989.

Stengers, Isabelle. *In Catastrophic Times: Resisting the Coming Barbarism*. Translated by A. Goffey. London: Open Humanities Press, 2015.

Treleaven, D. "What's Trauma-Sensitive Mindfulness?" Mindful Leader, Building Culture (*blog*), June 4, 2019, https://www.mindfulleader.org/blog/26483-what-s-trauma-sensitive-mindfulness?

Unesco. "I'd Blush if I Could: Closing Gender Divides in Digital Skills through Education." Equals: Unesco Digital Library. Retrieved on August 2019, https://unesdoc.unesco.org/ark:/48223/pf0000367416.page=1.

Vogel, Gretchen. "'Ethical' Eggs Could Save Male Chicks from Mass Slaughter." *Science*, August 14, 2019, https://www.sciencemag.org/news/2019/08/ethical-eggs-could-save-male-chicks-mass-slaughter.

Wolfe, Cary. *What Is Posthumanism?* Posthumanities Series. Minneapolis: University of Minnesota Press, 2010.

Wootson, Jr., C. R. "Saudi Arabia Grants Robot Citizenship, Irking Women's Rights Groups." *The Washington Post*, October 30, 2017.

CHAPTER TWELVE

Race, Technology, and Posthumanism

HOLLY FLINT JONES AND NICHOLAOS JONES

Examining the role of race in the field of posthumanism is a bit like examining race in the genre of science fiction. Science fiction tends to reconstitute what we imagine as race into other forms of exclusion and oppression. When reading or watching science fiction, one often finds cyborgs, genetically altered people, and aliens of various sorts treated as sub-humans and second-class citizens, feared for their unfamiliar and incompatible customs, laws, and worldviews. It might be said, accordingly, that science fiction anticipates a future *beyond* race, at least as we experience race today. But it might also be that science fiction gives us another important insight into the role of race in relation to (post)humanism: race, in the form of exclusion and oppression justified by perceptions of fixed bodily and cultural difference, continues to play a fundamental role in the societies imagined within science fiction because race is and has been one of the most influential technologies to emerge worldwide since the 1500s. As with other paradigm-shifting technologies, race has, in a very material sense, altered our ability to imagine and understand what it means to be—and not to be—(post)human. While such imaginings are not of race, per se, the technologies of race both contextualize and inform them. Likewise, when examining the field of posthumanism, race as such is not often discussed, yet concerns regarding the technologies of race—their function and effects—are often front and center when scholars imagine what humans are, are not, and might become.

Our strategy, then, is to identify the role of race—as technology—in the field of posthumanism, even when it might seem that posthumanism (like science fiction) anticipates

a future beyond race. Some scholars of posthumanism have suggested that new forms of bodily and environmental Otherness will supersede, and perhaps even erase, the influence and relevance of race for societies as we move forward into the Anthropocene. This may be. But even so, it seems likely that race as technology will continue to shape the societies of the future. As such, those who have been subjected to the most debilitating and exploitative technologies of race have the most to teach us about what one must learn to do—and imagine —in order to survive in an increasingly precarious world created, quite literally, by (if not for) humanity.

EUGENICS, CYBORGS, AND THE POSTHUMAN

The figure of the posthuman first appears as part of an objection to eugenics as a feasible means of preventing or alleviating poverty. For the eugenicist, science and technology are a means to transform human beings into something that is "more completely human" (Titmuss and Lafitte 1942: 106). Science and technology are a means, in particular, for either preventing the birth of those who are intrinsically incapable of social success or else altering intrinsic traits—relating, for example, to efficiency and thrift—in ways that enhance suitability for productive labor.

There are strong (and persuasive) moral objections to the eugenic approach to poverty. But there are technoscientific and economic objections as well. The posthuman makes its appearance in this latter variety of objection.[1]

> [I]t is inconceivable that human nature could be changed to the extent that is contemplated by [the eugenicist's] theory of perfectibility. Such changes would bring into being an animal no longer human, or for that matter mammalian, in its character, for it would involve the elimination of such fundamental human and mammalian instincts and emotions as anger, jealousy, fear, etc. But even if such a post-human animal did come into existence, it is difficult to believe that it could carry on the necessary economic activities without using a certain amount of formal organization, compulsion, etc. (Parmelee 1916: 319)

The posthuman, so conceived, is the human shorn of human instinct and emotion. Since, according to the objection, these characteristics are necessary for motivating effortful work in the absence of external coercion, the posthuman, so conceived, escapes poverty only at the expense of individual liberty.[2]

As evidenced above, the eugenic conception of the posthuman stands opposed to the Enlightenment ideal of the human. The complete human, on the Enlightenment ideal, is a sovereign self. He—and, historically, the ideal human is male—exercises sovereignty through individual liberty of choice; he realizes this liberty by subordinating instinct and emotion to reason and rationality; and he uses this liberty to achieve material and social progress, subjecting the chaos of nature, the constraints of biology, and the bonds of tradition to scientific evidence, technological innovation, and rational critique. Insofar as a posthuman society (so imagined) achieves progress at the expense of individual liberty, the eugenicist,

with his preference for the posthuman over the human, stands for domination and subjugation.

Contrast this original conception of the posthuman with more recent conceptions of the posthuman as cyborg (see Hayles 1999; Thweatt-Bates 2012; Braidotti 2013). The cyborg, in these conceptions, is "a cybernetic organism, a hybrid of machine and organism, a creature of social reality as well as a creature of fiction" (Haraway 1985: 65).

As social reality, the cyborg is a political construction, a product of social relations that liberate some and oppress others. As creature of fiction, the construction is contingent and therefore malleable, its nature illusory, its dispositions and capacities limited only by imagination (and, perhaps, the power to transform the imagined into reality). The cyborg is, in some sense, the enlightenment ideal of the complete human made real, "an ultimate self untied at last from all dependency" (Haraway 1985: 67). So, too, is the posthuman conceived as cyborg. For insofar as cybernetization makes the human more completely human, the posthuman is likewise untied from all dependency, a sovereign self perfected through fiction-making and social construction.

Eugenic and cyborg conceptions of the posthuman, so conceived, agree that the posthuman is a "more complete" successor to the human. Both agree, as well, that some sort of technology—be it biological/genetic or bionic/engineered—is the source of whatever enhancement transforms humans into posthumans. The conceptions disagree, however, about whether technology affords such enhancement by excising or integrating with human characteristics. They thereby also disagree about whether human and mammalian nature is an obstacle or a foundation for human enhancement, and about whether posthuman-inducing enhancements position social progress and individual liberty as oppositional or complementary.

RACE AS TECHNOLOGY

Set aside the contrasts among eugenic and cyborg conceptions of the posthuman. Focus, instead, on a motivation common to both conceptions, namely, a concern with the place of racialized persons in society. Eugenicists of the early twentieth century, especially in the United States and Germany, endorsed—and often saw enacted—policies and programs to control or decimate specific racial populations for the sake of alleviating social ills such as poverty and criminality. Late twentieth- and early twenty-first-century cyborg theorists of the posthuman, by contrast, typically advocate for the liberation of those same populations, for the sake of alleviating race-based injustice and oppression. Despite their different aims and attitudes, however, eugenicists and cyborg theorists connect—if only implicitly—the posthuman to issues of race.

For the past decade, a growing number of scholars of race, working in fields such as philosophy, gender studies, media studies, literary theory, and sociology, have been developing a framework that deepens the connection between race and posthumanism. Sheth (2009), Chen (2009), and Coleman (2009)—among other works—argue for the benefits of theorizing race as a technology. This approach to race posits that certain social practices and institutions function as technologies of race; that these technologies create and sustain

hierarchies of racial classification; and that individuals are racialized by virtue of how technologies of race rank them within such hierarchies (see Jones and Jones 2017). Insofar as posthumans arise through the technological transformation of humans, and given that technologies of race are ubiquitous in modern societies, theorizing race as technology promises that understanding how race works should illuminate what it is to be posthuman. Sheth (2009) offers, to date, the most extensive and systematic approach to theorizing race as technology. Sheth argues that those who wield sovereign power create and put into use technologies of race. She argues, further, that these technologies have three basic functions: first, to "channel an element that is perceived as threatening to the political order into a set of [racial] classifications;" second, to "transfo[m the] 'unruly' into a set of 'naturalized' criteria upon which race is grounded;" and third, to "concea[l] our relationship to law and sovereign power as one of vulnerability and violence, such that racialized populations stand precariously close to being cast outside the gates of the city" (Sheth 2009: 8).

We can better understand how race works as a technology—and, in particular, how technologies of race assign the social ills of a society to a particular population and then essentialize members of that population as constituting a race—by imagining a small town in Alabama. Imagine that the town's population generally opposes the use of local tax revenues (in the form of vouchers) for private schools. While some families like the idea—there's a small private Catholic school they'd like to send their kids to if the tuition was substantially lower—the majority oppose it.

Imagine, now, that several new families move to town when the local sock company opens a third shift. These families have relocated from Florida. While these families are not all related to one another, most of them are Catholic. These new families would like to send their children to the local private Catholic school but can't afford it. However, if they combine their support of a proposed voucher system to the minority of families already in favor of it, a new political landscape emerges. Suddenly there's a majority—slim, perhaps—that favors the creation of a new school voucher system that would enable these Catholic families to send their kids to the local private school.

This is where the technologies of race can start to do their work. If those in charge of the local school board can get the people of the town to view the school voucher system as un-Alabamian, a social practice that threatens the identity of the town, they could sway public opinion back to the way it was. It might benefit these leaders of the school board if, along the way, those who posed the threat to the status quo (those families that moved in) were treated as perpetual outsiders so that the locals would continue to shun whatever political agenda these families might support or even propose. If successful, those leaders of the town who wield sovereign power will encourage the local population to see these Floridian families as possessing certain traits, as being irrational, dangerous, threatening—incapable of becoming Alabamians—and these come to be associated with their "racial" identity. They are Floridians and always will be. Once a racialized population is seen as possessing undesirable and threatening traits—and these traits are determined to be the cause of other social ills—those who wield the technologies of race can, if unchallenged, maintain their power indefinitely. Like many other modern technologies, the technologies of race are fluid, always changing, responding to whatever political threat the status quo (i.e., those with sovereign

power who serve as the technicians of race) might face. As new threats to the political status quo emerge, race as technology adapts, not only preventing racialized populations from ever joining the body politic, but also condemning these populations to the status of perpetual precarity, possessing traits that condemn them to the status of outsider and Other.

In short, race is a technology designed to enable those who wield sovereign power to maintain it. The effects of racialization on raced populations is quite simply devastating. But what's so maddening for those of us seeking points of intervention into the politics of racialization is that race (as a technology) is so good, so smart, so adaptive, that it conceals not only its techniques but also the cognitive contradictions that result as it works over time. Race might essentialize a quality or trait to a certain population at one point and then it can essentialize an oppositional quality within the same population at a later date and the technology conceals itself in such a way that people who use it are conditioned not to notice. For example, the technologies of race employed in the 1860s can essentialize slaves in the American South as crafty, sneaky, always plotting their escape, dangerous to all white people who may at any time face armed rebellion and/or attack. And then fifty years later, these same technologies can essentialize the opposite: now black Southerners are racialized to be categorically ignorant, incapable of self-reflection and awareness, and so must be prevented (via Jim Crow laws) from participating in community governance. The whole premise of race —and the essentialism it creates—is that these traits are supposed to be fixed, unchanging. And yet fifty years can pass and black Southerners are still black but their essential traits have changed while at the same time the very notion of blackness—of having a fixed, biological essence—remains. Race as a technology is so very good at maintaining the status quo that we, as the members of a society that heavily utilizes the technology, are trained not to notice, not to see the techniques by which it functions. Unsurprisingly, the field of posthumanism has tended likewise not to notice the role of race in its theorizations of the posthuman.

ARE RACIALIZED INDIVIDUALS POSTHUMAN?

Technologies of race create and sustain hierarchies of racial classification, and they racialize individuals by attaching to them a rank within some socially salient racial hierarchy. Those who wield sovereign power are thereby transformed into members of a superior race. Those who threaten sovereign power, or who are perceived or positioned as threatening that power, by contrast, are transformed into members of a subordinate race. Insofar as posthumans are humans transformed by technology, theorizing race as technology seems to entail that racialized individuals are posthuman by default, always already transformed beyond the (merely) human by virtue of living in a racialized society. But matters are not quite so straightforward. Whether the entailment holds depends upon whether racialized individuals qualify as antecedently human. Insofar as posthumans are understood as "more complete" humans, whether the entailment holds also depends upon whether those who qualify as human are capable of becoming more complete. If racialized individuals are not antecedently human, they cannot have their humanity transformed and so cannot be posthuman. Even if they are antecedently human, if their humanity cannot be transformed into the more

completely human, they cannot be posthuman either.

Societies influenced by modern European culture, whether through ancestry or colonization, offer conceptual resources that support conflicting answers to the question of whether racialized individuals are posthuman. Consider, first, that such societies tend to be familiar with the European Enlightenment's ideal of the human, according to which humans are complete insofar as, and to the extent that, their choices and behaviors exercise or enact sovereign power—power free from the tethers of history and the restrictions that attend dependence upon others. This ideal, together with the posit that race is a technology, seems to entail, on the one hand, that those racialized as superior are posthuman because technologies of race enhance their sovereignty. But the enlightenment ideal, and the posit of race as technology, also seems to entail, on the other hand, that those racialized as subordinate are not posthuman because they lack sovereignty and thereby cannot become more completely human. (It is, accordingly, perhaps unsurprising that periods in which the Enlightenment ideal of the human holds sway are periods in which those racialized as subordinate are considered to be less than human.)

In contrast to the Enlightenment-oriented approach to the posthuman, consider, second, the approach prominent in the popular culture of societies influenced by modern European culture. This approach tends to depict some—but certainly not all—posthumans as subordinately racialized individuals.[3] Popular examples of cyborgs depicted as subordinately racialized include Cyborg (Vic Stone) from *DC Comics,* Darth Maul in the Clone Wars era of the *Star Wars* saga, Baxter Stockman from *Teenage Mutant Ninja Turtles,* and the protagonists in Octavia Butler's *Xenogenesis* (1989). González (1995) notes, as further evidence of this tendency, that the language used in popular culture to describe cyborgs often resembles the language used to describe mixed-race persons. Nishime (2005) argues, as well, that modern cinema, by displacing issues about race onto narratives about cyborgs, tends to suppose that being racialized as subordinate is constitute of being a cyborg.

Enlightenment-oriented and popular culture-inspired approaches to the posthuman agree that nothing prevents those who are racialized as superior from qualifying as posthuman. They disagree, however, about whether an apparent lack of sovereignty disqualifies those who are racialized as subordinate from being posthuman. There are, accordingly, and in the context of theorizing race as technology, three options for resolving the issue of whether those racialized as subordinate are posthuman. The first is to endorse the Enlightenment ideal of the complete human and yet deny that being racialized as subordinate forestalls exercises of sovereignty. The second is to endorse the Enlightenment ideal of the complete human and concede that subordinately racialized individuals are not posthuman. The third, finally, is to reject the Enlightenment ideal and work to construct an alternative whereby being racialized as subordinate is no obstacle to being (or becoming) more completely human.

The first of these options has its origins in Haraway's (1985) early work on cyborgs. The strategy here is to acknowledge that the Enlightenment ideal of the human is racist while simultaneously maintaining that all racialized individuals attain that ideal. This involves theorizing that fiction-making and social construction work in ways that give sovereignty to those racialized as subordinate. Endorsing the Enlightenment ideal of the complete human, while denying that racialization as subordinate forestalls exercises of sovereignty, offers an

ironic approach to the posthuman. The approach endorses a racist ideal of the complete human, condemns its racist fallout, and optimistically maintains that reconceptualizing subordinately racialized individuals as cyborgs somehow liberates them from that fallout. But, as Aguilar Garciá (2008) notes, this approach "does not specify in what way or why the communion with the inorganic is a sort of upheaval for the oppressed" (translated and quoted in Sued 2018: 97). Moreover, the imagining of ethno-cyborgs whose technological prostheses rebel against their bodies and threaten violence to others demonstrates that being a (subordinately racialized) *mestiza/o* cyborg does not, in and of itself, entail being a human who is made more complete through integration with a technology, especially when the technology at issue is race (see Pitman 2016: 224).

Critical race theory lends support to the second option for resolving the issue of whether those racialized as subordinate are posthuman. Prior to the rise of posthuman theorizing, structural asymmetries in power relations between those racialized as superior and those racialized as subordinate fostered social and political divisions between those treated as "human" and those treated as "other," with "human" typically reserved for those who are racialized as white, and "other" typically reserved for those who are not (see Wynter 2003: 281–2). Posthumanist theory, similarly, at least in the Enlightenment-oriented approach, reproduces this same division—albeit reconceptualized as a division between those who are "posthuman" (white) and not (see Ali 2017). Whence Forlano notes,

> From the perspective of critical race studies, it is not productive to speak of the posthuman when so many people—non-white, less privileged/powerful, female, older, indigenous, people with disabilities, and so on—have not been historically included in the category of the human in the first place. (Forlano 2017: 28)

Since the historical record shows that those racialized as subordinate also tend to be classified and treated as less than human, the argument goes, and since the posthuman is inextricably tied to this history, there is no conceptual space or practical use for positing subordinately racialized posthumans. Better, perhaps, to focus, instead, on the shifting boundaries between human and nonhuman—and for those concerned with issues of race to ally themselves with theorists in animal studies rather than with posthumanists (see Livingston and Puar 2011; Jackson 2013).

Those who pursue the third option for resolving the issue of whether those racialized as subordinate are posthuman tend to abstain from positing a univocal ideal of the human. They tend to prefer, instead, a more fragmental approach whereby the many ways of being human —and so of being more completely human—need not point toward a notion of humanity that is common to all. Braidotti, for example, maintains that

> the posthuman—a figuration carried by a specific cartographic reading of present discursive conditions—can be put to the collective task of constructing new subjects of knowledge, through immanent assemblages or transversal alliances between multiple actors. (Braidotti 2019: 36)

In place of a unitary ideal that unites differently racialized humans as humans, Braidotti

prefers assemblages and alliances that construct new meanings of what it is to be (completely) human. Siddiqui (2016), similarly, proposes expanding conceptions of the human in ways that include those who have historically been excluded while also equalizing the legitimacy of different conceptions.

SURVIVING POSTHUMANISM

Despite her earlier preference for an ironic posthumanism, Haraway now prefers to focus on animal studies and rejects the posthuman approach. According to Haraway's more recent thinking, the notion of posthumanism

> is much too easily appropriated by the blissed-out, 'Let's all be posthumanists and find our next teleological evolutionary stage in some kind of transhumanist technoenhancement'. Posthumanism is too easily appropriated to those kinds of projects for my taste. (as quoted in Gade 2006: 140)

Haraway concedes, however, that more critical approaches to the posthuman are possible, citing Hayles (1999) as an example. There are, moreover, some efforts to put a critical conceptual of the posthuman to work in ways that help to further theorizing about race and racialization. By theorizing that people racialized as subordinate qualify as posthuman, these efforts point toward fruitful associations between what we know about the lives of subordinately racialized populations and what we might expect for the lives of those living as posthumans more broadly. Consider, for example, an especially salient characteristic of contemporary life, namely, its extreme precarity. Ours is the era of the Anthropocene, when human impacts upon the natural environment mean that the conditions necessary for life as we have known it are no longer givens. Posthumanists tend to treat anthropogenic impacts as one (among several) fundamental motivations to theorize ourselves as posthuman (see Eroukhmanoff and Harker 2017; Propen 2018). Whence Braidotti conceptualizes posthuman theory as

> a generative tool to help us re-think the basic unit of reference for the human in the bio-genetic age known as 'anthropocene', the historical moment when the Human has become a geological force capable of affecting all life on this planet. (2013: 5)

Ferrando (2016), similarly, ascribes responsibility for the negative impacts on the environment to an anthropocentric worldview, arguing that addressing these impacts requires decentering the "human" and, instead, centering the "posthuman."[4]

Absent from many posthumanist approaches to the Anthropocene, however, is attention to issues of race—such as how anthropogenic changes to the environment differentially impact racialized populations, and what differently racialized populations of posthumans might contribute to responding to those changes. This is, perhaps, part of a larger tendency to neglect the racial dimensions of environmental change (see Vergès 2017; Tuana 2019). But the absence is surprising nonetheless. For, as Gergan, Smith, and Vasudevan (forthcoming)

argue, fictionalized narratives about apocalyptic futures for the Anthropocene tend to act as proxies for fears of racialized "others" and the decline of racial supremacies.

Posthumanists concerned with the Anthropocene ought not neglect issues of race. Subordinately racialized populations—American chattel slaves, Jewish persons from the Holocaust, Muslims targeted as extremists, Latina/o migrants at the United States border, to name some obvious examples—have much to teach about surviving times of despair, when conditions for sustainable living are out of reach and forces abound that threaten to overwhelm efforts to change course. Mary Annaïse Heglar, for example, connects the Anthropocene and race through the lens of *existential threat*. She argues that, far from being a unique threat to human existence, the changing climate of the Anthropocene is akin to the changing environment for black people through the history of the United States.

> I'll grant that we've never seen an existential threat to all of humankind before. It's true that the planet itself has never become hostile to our collective existence. But history is littered with targeted—but no less deadly—existential threats for specific populations.

> For 400 years and counting, the United States itself has been an existential threat for Black people. Let's be clear that slavery didn't end with freedom; it just morphed into a marginally more sophisticated, still deadly machine. (Heglar 2019: paragraph 4)

We should expect, therefore, that the strategies black people in the United States have been using to survive in a hostile environment will prove to be relevant for devising strategies to survive anthropogenic climate change.[5] If the posthuman is a vehicle for imagining how to survive the Anthropocene, posthumanists would do well to imagine the paradigmatic posthuman as a subordinately racialized individual. They would do well, also, to turn their attention from fictionalized utopias and imagined alternative history, toward political realities of the present and the histories of subordinately racialized populations.

We thank Andres Pilsch for identifying this appearance.

Miah attributes to Fukuyama (2002) a similar conception of the posthuman, according to which biotechnological modifications capable of transforming humans into posthumans threaten to corrupt some essential factor of humanity (Miah 2008: 78).

We note an irony here. If those racialized as subordinate are always already posthuman, the eugenic motivation for creating posthumans—namely, fear of unruly races—is itself sufficient for creating posthumans.

Ahuja 2017 notes, as well, that posthumanists are comparatively more concerned with the extinction of nonhuman species than theorists of animal studies.

Insofar as surviving climate change involves adapting strategies from those who have been racialized as subordinate, it is, perhaps, unsurprising to find that people more invested in maintaining a racially supremacist status quo tend also to resist acknowledging or addressing the impacts of climate change (see Benegal 2018).

SOURCES CITED

Aguilar Garciá, Teresa. *Ontología cyborg: el cuerpo en la nueva sociedad tecnológica*. Barcelona: Gedisa, 2008.

Ahuja, Neel. "Posthuman New York: Ground Zero of the Anthropocene." In *Animalities: Literary and Cultural Studies beyond the Human,* edited by Michael Lundblad. Edinburgh: Edinburgh University Press, 2017, pp. 43–59.

Ali, Syed Mustafa. "Transhumanism and/as Whiteness." *Proceedings*, vol. 1, no. 3 (2017): 1–3.

Benegal, Salil D. "The Spillover of Race and Racial Attitudes into Public Opinion about Climate Change." *Environmental Politics*, vol. 27, no. 4 (2018): 733–56.

Braidotti, Rosi. *The Posthuman*. Malden, MA: Polity Press, 2013.

Braidotti, Rosi. "A Theoretical Framework for the Critical Posthumanities." In Transversal Posthumanities, Special Issue, *Theory, Culture & Society*, vol. 36, no. 2 (2019): 31–62.

Butler, Octavia. *Xenogenesis*. New York: Guild America Books, 1989.

Chun, Wendy Hui Kyong. "Introduction: Race and/as Technology; or, How to Do Things with Race." *Camera Obscura*, vol. 24, no. 1 (2009): 7–35.

Coleman, Beth. "Race as Technology." *Camera Obscura*, vol. 24, no. 1 (2009): 176–207.

Eroukhmanoff, Clara and Matt Harker. eds. *Reflections on the Posthuman in International Relations: The Anthropocene, Security and Ecology*. Bristol: E-International Relations Publishing, 2017.

Ferrando, Francesca. "The Party of the Anthropocene: Post-humanism, Environmentalism and the Post-Anthropocentric Paradigm Shift." *Relations*, vol. 4, no. 2 (2016): 159–73.

Forlano, Laura. "Posthumanism and Design." *She Ji: The Journal of Design, Economics, and Innovation*, vol. 3, no. 1 (2017): 16–29.

Fukuyama, Francis. *Our Posthuman Future: Consequences of the Biotechnology Revolution*. London: Profile Books, 2002.

Gane, Nicholas. "When We Have Never Been Human, What Is to Be Done?: Interview with Donna Haraway." *Theory, Culture & Society*, vol. 23, no. 7–8 (2006): 135–58.

Gergan, Mabel, Sara Smith, and Pavithra Vasudevan. "Earth beyond Repair: Race and Apocalypse in Collective Imagination." *Environment and Planning D: Society and Space*, forthcoming.

González, Jennifer. "Envisioning Cyborg Bodies: Note from Current Research." In *The Cyborg Handbook*, edited by Chris Hables Gray, Steven Mentor, and Heidi J. Figueroa-Sarriera. New York: Routledge, 1995, pp. 267–79.

Haraway, Donna. "A Manifesto for Cyborgs: Science, Technology and Socialist Feminism in the 1980s." *Socialist Review*, vol. 80 (1985): 65–108.

Hayles, N. Katherine. *How We Became Posthuman: Virtual Bodies in Cybernetics, Literature, and Informatics*. Chicago: University of Chicago Press, 1999.

Heglar, Mary Annaïse. "Climate Change Ain't the First Existential Threat." *Medium*, February 18, 2018, https://medium.com/s/story/sorry-yall-but-climate-change-ain-t-the-first-existential-threat-b3c999267aa0.

Jackson, Zakiyyah Iman."Animal: New Directions in the Theorization of Race and Posthumanism." *Feminist Studies*, vol. 39, no. 3 (2013): 669–85.

Jones, Holly and Nicholaos Jones. "Race as Technology: From Posthuman Cyborg to Human Industry." *Ilha do Desterro*, vol. 70, no. 2 (2017): 39–51. DOI: 10.5007/2175-8026.2017v70n2p39.

Livingston, Julie and Jasbir K. Puar. "Interspecies." *Social Text*, vol. 29, no. 1 (2011): 3–14.

Miah, Aandy. "A Critical History of Posthumanism." In *Medical Enhancement and Posthumanity*, edited by Bert Gordijn and Ruth Chadwick. New York: Springer, 2008, pp. 71–94.

Nishime, LeiLane. "The Mulatto Cyborg: Imagining a Multiracial Future." *Cinema Journal*, vol. 44, no. 2 (2005): 34–49.

Parmelee, Maurice. *Poverty and Social Progress*. New York: Macmillan, 1916.

Pitman, Thea. "*Mestizaje* and Cyborgism on Either Side of the Line." In *Cambridge Companion to Latina/o Literature*, edited by John Morán González. New York: Cambridge University Press, 2016, pp. 213–30.

Propen, Amy D. *Visualizing Posthuman Conservation in the Age of the Anthropocene*. Columbus: The Ohio State University Press, 2018.

Sheth, Falguni. *Toward a Political Philosophy of Race*. Albany: State University of New York Press, 2009.

Siddiqui, Jamila R. "Human Equality Projects as Prerequisites for a Posthuman Embrace." *Educação Temática Digital*, vol. 18, no. 2 (2016): 458–64.

Sued, Gabriela Elisa. "The Cyborg Metaphor in Ibero-American Science, Technology and Gender Literature." *Tapuya: Latin American* Science, *Technology and* Society, vol. 1, no. 1 (2018): 95–108.

Thweatt-Bates, Jeanine. *Cyborg Selves: A Theological Anthropology of the Posthuman*. Burlington, VT: Ashgate, 2012.

Titmuss, Richard M. and François Lafitte. "Eugenics and Poverty." *The Eugenics Review*, vol. 33, no. 4 (1942): 106–12.

Tuana, Nancy. "Climate Apartheid: The Forgetting of Race in the Anthropocene." *Critical Philosophy of Race*, vol. 7, no. 1

(2019): 1–31.

Vergès, Françoise. "Racial Capitalocene." In *Futures of Black Radicalism,* edited by Gaye Theresa Johnson and Alex Lubin. New York: Verso, 2017, pp. 72–82.

Wynter, Sylvia. "Unsettling the Coloniality of Being/Power/Truth/Freedom: Towards the Human, after Man, Its Overrepresentation—An Argument." *CR: The New Centennial Review,* vol. 3, no. 3 (2003): 257–337.

CHAPTER THIRTEEN

The Unity of Humanity

STEVE FULLER

This chapter consists of three parts. The first part discusses the ambiguity in the concept of the human, which can refer to a specific quality or a set of individuals, either of which may or may not be indefinitely extendable. This ambiguity is most clearly on display in both the West's Greco-Roman and Judaeo-Christian heritage. The second part of the chapter shifts to religion and race as the main grounds for contesting the scope of the human since the Enlightenment, which open up into the horizons of contemporary trans- and posthumanism, respectively. The third part brings the discussion up to date by highlighting the ways in which contrasting trans- and posthumanist vectors have effectively destabilized the species unity promised by the Enlightenment equation: "Human = *Homo sapiens*." The result is competing drives toward encompassing the human in a "higher" or "broader" sense of unity, both of which can be captured by different senses of "superorganic."

HUMANITY FOR OR AGAINST HUMANS? A WORLD-HISTORIC STRUGGLE OVER SEMANTICS

To see the problem of human unity in stark relief, compare two spontaneous collective responses to human catastrophe in living memory. First, consider the accidental burning of Paris' Notre Dame Cathedral on 15 April 2019, which left no one dead or seriously injured. The building's foundation was laid for the Roman Catholic archdiocese of Paris in the twelfth century and has been subject to several restorations and extensions in later centuries. The

cathedral acquired its iconic status in French national and then world culture in the nineteenth century, after the last serious damage was done during the French Revolution. Within twenty-four hours of the 2019 fire, $900 million dollars had been committed to Notre Dame's rebuilding, a figure that was soon admitted to have been well in excess of the actual damage (Cuddy and Boelpaep 2019). Now contrast that sort of response to the amount pledged to Ethiopian famine relief as a result of the 1985 Live Aid concerts in London and Philadelphia organized by Bob Geldof and Midge Ure, which brought together an unprecedented number of leading pop, rock, and soul musicians. Adjusted for inflation to 2019 prices, $300 million dollars was raised at the two events. In this case, the motivating catastrophe involved 1.2 million deaths, 400,000 refugees, 2.5 million people displaced, and 200,000 children orphaned (Gill 2010).

My point in juxtaposing these two cases is not merely to draw attention to the grotesque extent to which people seem to place greater value on a singular human artifact than on the lives of many of their fellow humans. Without denying the validity of such a verdict, what matters for our purposes are the contrasting understandings of "humanity" that the two cases represent, which is epitomized in the question: Does "humanity" primarily refer to a *distinctive idea* or a *specific group*? In the case of the Notre Dame fire, the spontaneous worldwide "mourning" at the apparent loss of an iconic structure central to "our common humanity" suggests that "humanity" mainly refers to an idea that the building exemplifies especially well, perhaps even more than any number of actual human lives. This is in striking contrast to the appeal and response surrounding Live Aid, which was based on one group of recognized "humans" (mostly the wealthy West) explicitly reaching out to another such group (starving Ethiopians) who might have otherwise remained neglected, in order to reassert the sense of mutual affiliation that underlies "our common humanity."

Once again, we should not underestimate the vast moral schism that has separated these two conceptions of humanity, which has been especially pronounced in the Abrahamic religions (Judaism, Christianity, and Islam), according to which humans are created "in the image and likeness" of God. Problems start once this phrase is taken to imply that certain human creations may enjoy the elevated status of their human creators because, in some sense, those works also bear humanity's divine inspiration. Since the European Renaissance, this understanding has been usually reserved for creations designated "art." The response to the Notre Dame fire can be seen as operating in that spirit. But this attitude can also be detected in more metaphysical discussions of artificial intelligence.

Indeed, cybernetics founder Norbert Wiener (1964) famously speculated that the transfer of intelligence involved in the programming of a sophisticated computer, which renders the machine an autonomous entity, is arguably a godlike act of creation—a point he intended with the sort of ambivalence that was characteristic of the Cold War period. Nevertheless, the Abrahamic traditions have also housed vehement hostility to the fetishization of artifacts at the expense of both the transcendent deity and living human beings. The word "iconoclasm" captures this general attitude, which has been especially pronounced in periods of "purification" and "reformation" of the faith, when the art in churches—especially statues of sacred figures—would be stripped and sometimes destroyed for their "idolatry." A contemporary version of this mentality is most clearly on display in the targeting of

UNESCO World Heritage sites by "Islamist extremists"—but perhaps it equally applies to those behind the 9/11 destruction of New York City's World Trade Center. But in a much less violent, even sublimated vein, one might also include the learned refusal of, say, Hubert Dreyfus (1972), to treat "artificial intelligence" as anything more than a loose metaphor. It is clear from Dreyfus and his fellow existential phenomenologists that the personification of machines—however sophisticated in performance—is *ipso facto* an act of dehumanization.

At stake here is the sense of boundary if not closure presupposed by the phrase "unity of humanity." Certain questions come to mind: What is the difference between exemplifying and not exemplifying "humanity"? Who does and does not count as "human"? Contrary to what Dreyfus and his followers seem to assume, intuitions about the "human" are far from reliable or historically stable. Attempts ranging from Thomas Aquinas and the Scottish Enlightenment to contemporary evolutionary psychology to ground these allegedly universal intuitions in innate dispositions to sympathy and compassion falter because they explain too much: they explain just as much our spontaneous benevolence to animals as to people, without distinguishing the two. Indeed, Jeremy Bentham, who had no problem with this conclusion, popularized the use of "humane" to cover the moral treatment of animals, and his latter-day follower Peter Singer (1979) has gone the extra mile to argue that in times of resource constraint, we might be morally obliged to favor the maintenance of "abled" animals over "disabled" humans.

I shall return to this point in the next section, as this difficulty in securing the scope of the "human" provides both normative and naturalistic ballast for "posthumanism," which is alive to the prospect that people might well prefer the company of animals to that of their fellow and quite possibly burdensome humans. As Peter Sloterdijk ([1983] 1988) observed, this was the original sense of "cynicism," the ancient Greek attempt to expand the circle of moral concern by requiring us to look at the world from a dog's (*kunikos*) point of view, whereby presumably many human preoccupations would appear parochial, self-serving, if not outright callous and dangerous. There are echoes of Donna Haraway in this.

Historically speaking, "humanity" meant a general quality of being before it referred to a specific set of individuals, let alone the world as constituted by them. Thus, in the classical world, the prospect of "humanizing" animals—as in Aesop's Fables—did not carry the worries about "anthropomorphism" that bedeviled the nineteenth-century imagination. However, the Greeks were interested in how to render a being "human," which required a style of education, or *paideia,* which involved the refinement of various native animal capacities along the lines associated with the medieval "liberal arts" and the modern sense of "humanities" (Jaeger 1945). Such an education is essentially a high-minded "finishing school," whereby one learns how to speak, listen, write, read, observe, count, measure, as well as comport and care for one's body. In the end, such beings would be able to stand up for themselves in public life, thereby becoming, in Aristotle's terms, a *zoon politikon.* It is easy to see this characterization as the prototype for what Goethe and others of the German Enlightenment called *Bildung,* which is nowadays associated with Wilhelm von Humboldt's vision of the modern university, in which the instructor is required to present himself or herself as an inquirer—that is, someone who simultaneously knows what he or she knows and is open to new experience.

For our purposes, the most interesting feature of this pedagogical regime is that the ancients—unlike the moderns—did not expect everyone who we would now call "human" to undergo it. On the contrary, what became the foundational moment in the history of rhetoric was launched in fourth-century BC Athens over the question of whether anyone should be allowed to acquire *paideia*, simply upon payment of tuition fees, or whether a prior assessment should be made of the moral character of prospective students. The Sophists adopted the former stance, which at the time was seen as "opportunistic" in the worst sense of the term, whereas the latter was adopted by Isocrates and subsequently Plato and Aristotle, which became the more "respectable" stance. The upshot of that original Greek discussion was that precisely because *paideia* could be used for good or ill, it was important to ensure that students were benevolently disposed at the outset. Indeed, Plato coined "rhetoric" to refer to the Sophists' promiscuous peddling of *paideia*, which he regarded with the sort of disdain that is nowadays reserved for self-help books, TED talks, and internet courses. Yet the Sophists came closest to assuming a "universalistic" conception of humanity, as they appealed to the universalism of *money* as a neutral arbiter in determining one's fitness for undergoing *paideia*.

While we now easily regard this sense of "universalism" as far from ideal, "wealth" remained the dominant standard used from the late medieval period to the rise of the modern nation-state to establish non-natural (i.e., not by birth) citizenship, or "civil rights," on which much of the modern understanding of "human rights" has been built. The much-admired "republican city-states" of late medieval and early modern Europe were formed on this basis. Unlike the ancient Greek and Roman republics, where citizenship was predicated entirely on property ownership, the "civic republicans" favored more mobile forms of capital as better demonstrations of competence than sheer inheritance of a piece of land. This turn of mind opened the door to the attractiveness of "equality of opportunity" as a specifically "democratic" version of civic republicanism, whereby virtually anyone might contribute to the "commonwealth," provided that they receive an adequate level of health and education. The most concrete realization of this idea was the twentieth-century welfare state. But in our post-welfarist world, the earlier "classical" republican sensibility has returned in terms of state-based immigration policies based on "work permits" or, more generally, the migrant's "expected economic contribution" to the host society.

In contrast, "humanity" as a universalistic ideal potentially inclusive of all members of *Homo sapiens*—not simply the potential wealth producers—leads from Judaeo-Christian rather than Greek thought. The phrase "Judaeo-Christian" is important here. Christianity is a religion that not only attempts to supplement and enhance Judaism, which is the most natural way to think of the relationship between what Christians call the "Old Testament" and "New Testament," but also to regard Judaism from a second-order perspective, that is, as less history than metahistory. Thus, Christians do not treat the Old Testament prophecies as addressed exclusively to a "chosen people," the Jews, whose historic travails are recounted in the Scriptures. Rather, Christians take the prophecies to be addressed potentially to anyone willing to insert themselves in the unfolding world-historic drama.

This explains the composition of the New Testament, which is largely oriented to the repositioning of the Hebrew prophecies in light of the figure of Jesus, whose message is

presented from multiple, sometimes even contradictory angles in the Gospels and the Epistles. The resulting sense of "universalism" requires an existential conversion on the part of the reader, a decision to reorient one's life toward participation in the ongoing construction of the Christian narrative, in which the Bible hints at the rules of the game of which it presents only the opening moves. One's sense of humanity is then delivered as a consequence of this decision. This is largely the origins of "humanity" as a collective project in the making, which by the Enlightenment had come to be secularized as "progress" (Löwith 1949).

The sense of "universalism" implied here would also be adopted by Islam, which in turn may help explain the world-historic tensions between Christians and Muslims. The proselytizing projects of these two great world religions were the main forces for unifying humanity prior to the rise of what Kant called the "cosmopolitan" mentality in the second half of the eighteenth century, whereby Enlightenment philosophers raised the prospect of a religiously neutral "world government." It is perhaps no accident that cosmopolitanism began to be seen as an actionable political proposition only after the 1683 Battle of Vienna, when it seemed that "Islam," as represented by the Ottoman Empire, might overtake "Christianity," as represented by the Holy Roman Empire. The soul-searching that took place by advocates of both faiths in the wake of this traumatic episode generated the haunted mentality that Edward Said (1978) famously called "Orientalism."

But also during this period, Gotthold Ephraim Lessing's 1779 play *Nathan the Wise* set a precedent for a more pragmatic, future-forward approach to universalism, whereby the Abrahamic religions were urged to be concerned less with the legitimacy of their origins—which would be increasingly subject to empirical dispute—than with their practical benefits for fellow humans. This would be pleasing to whichever deity turns out to be the real one. But how far can this sense of universalism be extended? If humanity is completely detached from questions of origins, then in principle a being of any material constitution could be deemed "human"? In their different ways, *posthumanism* and *transhumanism* are open to this possibility, which will be explored in the rest of this chapter. However, we have so far seen that any completely origins-blind test for humanity—the object of some future version of the Turing Test—faces potential challenges from various forms of hereditary entitlement surrounding the "human," ranging from family upbringing and endowment to sheer material substratum. In all these cases, one must somehow be born human, which in turn helps to emphasize the historic significance in Christianity of "baptism," as an opportunity to be explicitly "born again" in the image and likeness of God.

THE CONTINUING ROLE OF RELIGION AND RACE IN DEFINING AND DESTABILIZING THE HUMAN

Humanity 2.0 starts with the claim that the meaning of humanity straddles two historically taboo topics in the modern era, *religion* and *race* (Fuller 2011: chap. 1). The former opens up into *transhumanism* and the latter into *posthumanism*. Underwriting this tension is a metaphysical dissatisfaction with the restriction of the "human" to the species *Homo sapiens*.

On the one hand, as we have seen, the strongest arguments for the "unity of humanity"

have been religiously based, specifically Abrahamic ones that privilege humanity above the rest of God's creatures. Indeed, the principal author of the United Nations Universal Declaration of Human Rights was a Catholic modernist philosopher, Jacques Maritain (Moyn 2011). To be sure, humanity's privilege pertains not to our animal bodies but to our divine souls, the "divinity" of which in the modern era came to be cast in more "politically correct" secular terms as "consciousness," "reason," and "mind." When Noam Chomsky continues to insist that humans possess a "language organ" that renders us distinct from the rest of the animal kingdom, even though his claim lacks any clear biological basis, he draws on this tradition. Finally there is the entire "development crisis" mentality that preoccupied global political economy in the second half of the twentieth century, again championed by the UN. In practice, this led to prioritizing the alleviation of human poverty above all other issues, on the grounds that doing otherwise would deprive the planet of its greatest source of value, human productivity. There are echoes here not only of Marx and Locke but also of Aquinas.

On the other hand, the strongest arguments against the "unity of humanity" come from Darwinian evolutionists, who stress that "species" is a mere convention to describe a spectrum of creatures whose genetic makeup in fact vastly overlaps with that of members of other so-called "species." What matters are the terms on which populations are segregated from each other for long periods, as a result of which interbreeding fails to yield offspring capable of reproduction. For Darwin himself, the duration of segregation provided a sliding scale between "race" and "species" identity. Moreover, most of Darwin's followers—for good or ill—have regarded "speciation" as inevitable and irreversible. In other words, whatever notional "unity" is currently attached to humanity is bound to fail as humans pursue a variety of life trajectories that over time amount to "branching off" from *Homo sapiens*. In that respect, "humanity" is just a passing moment in natural history, as Michel Foucault ([1966] 1970) originally suggested in the context of explaining the emergence of the "human sciences." All of that follows—but only as long as parentage remains the convention for assigning species identity. But if species identity is indeed conventional, then why should it be tied so closely to parentage?

To be sure, Darwin himself encouraged "hereditarian" thinking by presenting his theory as being based on the "common descent" of all organisms from some non-organic "primordial soup." This fed into discussions of how life arises from non-life, but more to the point: if a human is whatever turns out to be the biological offspring of humans, then even before multiple lineal paths produce a highly diverse humanity, how did nonhumans manage to produce the first humans? Difficulties in answering this "origins" question explain why many so-called "scientific racists" seemed to keep a door open to "special creation." However, developments in molecular biology in the second half of the twentieth century have made that line of argument untenable due to the massive genetic overlap that has been discovered among the species, even if that overlap does not map neatly onto the "evolutionary tree" based taxonomies with which Darwin flirted and became standard after his leading German scientific defender, Ernst Haeckel (cf. Fuller 2006: chap. 13; 2008: chap. 4). If we add our increasing capacity to alter default reproductive patterns through targeted antenatal genetic interventions, the result is an even more "conventional," in the sense of "malleable," conception of species than Darwin ever imagined. In that case, it would seem that the

distinction between "human" and "non-human" is in the eye of the beholder, which in practice means a political decision, not something that can be wishfully left to some "missing link" that scientists might find in the fossil record.

Given the degree of genetic overlap among the species, there is no clear division between "human" and "non-human." Indeed, depending the conventions used to identify the "human," some members of *Homo sapiens* might be classed as nonhuman. This was the context in which invidious forms of "scientific racism" was practiced in the nineteenth and twentieth centuries. However, the conventions involved in demarcating "human" from "non-human" have changed over this period, resulting in a rather different political configuration—evident in much posthumanist thought—that effectively turns scientific racism on its head.

Early in the nineteenth century, "humans" were distinguished from "non-humans" largely on "morphological" grounds, namely, based on surface appearances—and it was applied negatively to humans whose physical features resembled those of animals, especially apes (Gould 1981). Indeed, the textbook under scrutiny in the landmark 1925 US court case of *Tennessee v. Scopes*, the so-called "Monkey Trial," was George Hunter's *Civic Biology*, which portrayed a transparently morphological progression from monkeys to humans under the guise of "evolution." Much of the moral fervor aroused by that case—not least by the star prosecution counsel and defense witness, the left-populist politician William Jennings Bryan —turned on the anti-Christian racism that would result from teaching that particular version of "evolution" in schools, only two generations after the black slaves had been freed.

But it would be a mistake to think that evolution as such necessitated that sort of racism. Nearly a half-century earlier, George Romanes's (1883) early comparative animal behavior studies had already challenged this facile interpretation of evolution by suggesting that the relationship between human and animal performance—especially on tasks associated with "intelligence"—was much more complicated. As a result, he popularized the term "anthropomorphism" to honor the fables and natural histories in which humans have attributed their own quite nuanced traits to animals, which often have turned out to be both well observed by the humans and functionally adaptive to the animals concerned.

Whereas many in Romanes's day believed that he had romantically overestimated animal intelligence, it is fair to say that as animals have been more intensely studied, they have demonstrated forms of intelligence that are not simply unlike our own in ways we cannot fathom but superior in ways sufficiently comprehensible that we might learn from them. Insights from this basic point have been mined in that interdisciplinary hybrid of biology and engineering known as "biomimetics" (Benyus 1997). In this respect, Romanes's anthropomorphism did not go far enough. He underestimated both the distinctiveness of animal ingenuity and our own ability to make sense of it. Moreover, this more expansive "second order" sense of a shared cognitive horizon may well be crucial to our collective survival in a volatile world where it is by no means clear what form of intelligence will prove adaptive. No surprise, then, that research has been revived on finding a "measure of all minds" (Hernandez-Orallo 2017).

Some animal rights activists, deep ecologists, and posthumanists have gone further, arguing that whatever affinities, sympathies, and dependencies that members of *Homo sapiens* might have with other animals should be counted as a mark *for*—not against—them.

Such people are said to enjoy a heightened level of self-consciousness of their embeddedness in nature vis-à-vis those who continue to identify exclusively with fellow *Homo sapiens* abstracted from the rest of nature. Here one thinks of Donna Haraway's (2007) provocatively titled *Companion Species Manifesto*, which echoes the *Communist Manifesto* in suggesting that the leveling of species differences is akin to leveling class differences. Indeed, the fact that nowadays some people easily accord animals the same sort of recognition and respect as they do to fellow humans is often presented as the vanguard of a world whose value system no longer centers on the human.

However, the implicit attitude to humans in this posthumanist worldview is itself rooted in the history of Western politics. To be clear, posthumanists grant that *Homo sapiens* possesses capacities that enable our species to exercise what might be called "planetary stewardship"— but without concluding that those capacities make humans intrinsically superior to animals. This marks a key difference from transhumanists, whose sense of "stewardship" is closer to the biblically inspired one, which is designed to be a test of humanity's faith and ingenuity as creatures worthy of its divine heritage, presuming our "fallen" starting point (Huxley 1957; cf. Harrison 2007). Nevertheless, both posthumanists and transhumanists agree that we live in a time of some sort of global crisis, where humans are the source of both the problem and the solution—what is nowadays called the "Anthropocene."

Against this shared backdrop, posthumanists regard humanity as no more than what in republican Rome was called *primus inter pares* ("first among equals"). The Roman idea was that in a state of emergency, the leader is the citizen whose natural capacities best equip them to do what needs to be done, and hence can "dictate" to them. But once the emergency has passed, that person should revert to their default existence. This was the spirit in which George Washington served two terms as the first president of the United States, after which he retired to his Virginia plantation. Similarly, once the emergency represented by, say, adverse global climate change has passed, humans would not be expected to exercise such a strong steer over the allocation and regulation of the Earth's resources.

One clear conclusion that emerges from attempts to define the "human" in terms of the twin taboos of race and religion is that whatever sense of "unity" the human might be thought to have as a being coextensive with *Homo sapiens*, it has been continually under threat from, so to speak, "broader" or "higher" unities: "broader," in the sense of the human coming to be absorbed as simply one moment—albeit a distinctive one—in the history of animals; "higher," in the sense of the human marking a threshold for the realization of a potential that will enable it to break decisively with its natural history. The one aims to turn "humanity" into a chapter in the history of the Earth that is about to conclude, the other into the pretext for a journey of cosmic import that has barely begun: in terms of metahistorical style, *Infra-Foucault vs Ultra-Hegel*. I have spoken about an emerging ideological difference between *downwingers* and *upwingers* in this vein (Fuller and Lipinska 2014: chap. 1). The former approximate the horizons of contemporary *posthumanism*, the latter that of *transhumanism*. We shall explore the implications of these alternative visions for the unity of humanity in the final section.

IS THE UNITY OF HUMANITY AUTONOMOUS OR PART OF SOME LARGER UNITY?

My answer to this question may be best understood in contrast with that of Foucault ([1966] 1970), who also argued that the "human" is an unstable hybrid of the animal and the divine, an "empirical-transcendental doublet" which only came into focus as an object of study in the eighteenth century. However, whereas Foucault believed that the human had already begun to disappear from the ontological horizon by the end of the nineteenth century, due to the combined assault of Marx, Darwin, and Freud on humanity's allegedly unique capacity for reason, I believe that captures only half of the story—and the other half makes the entire story look different. At the same time as Marx, Darwin, and Freud were sowing the seeds of twentieth-century skepticism about the prospects for humanity's secular redemption (aka "progress"), a broad range of thinkers from the Russian Cosmists to Non-Euclidean geometers, probability theorists, symbolic logicians, and "transfinite" mathematicians were in their different ways approaching the human as a platform for an exploration of a more general sense of being that could acquire universal, even god-like proportions (Fuller 2019a). The great twentieth-century revolutions in physics and biology, conspicuously absent from Foucault's "archaeology of knowledge," were the downstream empirical products of these often metaphysically inspired developments.

It is worth noting, as a meta-level observation, that the spirit of Foucault's analysis was quite close to Darwin's—and I might add, the historian and philosopher of science Thomas Kuhn's. For all three, the object under historical study is presumed to be dead on arrival, be it an organic species, a scientific paradigm, or, in Foucault's case, the very idea of the human. Foucault's sense of the "unity" of humanity was that of closure, insofar as for him the species *Homo sapiens* was reaching the end of its period of world-historic salience. Unlike Hegel, who saw himself as drafting the backstory of an inherently future-oriented humanity, Foucault regarded himself as a coroner performing an autopsy on a corpse called "human." My general sympathies here lie with Hegel, although Hegel hardly anticipated the transhumanist doctrine of "morphological freedom," according to which membership in *Homo sapiens* is neither necessary nor sufficient for ascribing "humanity" to a being (Fuller and Lipinska 2014). The significance of this point will become clear in the following retelling of the history of the human condition since the European Enlightenment.

By the mid-eighteenth century, Western colonial contact with various primates around the world had led philosophers such as Jean-Jacques Rousseau to see the human as a kind of divinely inspired ape—on sheer morphological and behavioral grounds—even before evolution had become a recognized concept. The image of the "noble savage" remains a legacy of this mode of thought. It is reasonably considered a triumph of empiricism over rationalism. Westerners began to let their sheer physical resemblance to other creatures in the natural world override the unique character of the human soul that the Bible had taught them. Moreover, it altered the meaning of "Humanism," which in the Renaissance had veered between aestheticizing the human body as the embodiment of mathematical perfection (e.g., Leonardo da Vinci's "Vitruvian Man") and instrumentalizing the human body as a platform for the playing out of cosmic forces (e.g., Pico della Mirandola's Neoplatonic defense of

"human dignity"). In the Enlightenment, the meaning of "human" consolidated around a specific animal with surplus capacities, an "ape with apps" (Fuller 2019b). It would be easy to underestimate the long-term significance of this juxtaposition of humans and apes, which survives even in the avowedly anti-anthropomorphic animal rights movement.

In this context, the "human sciences" or "social sciences" were dedicated to figuring out the "surplus" that made *Homo sapiens* (also a term of that era) distinct from the rest of the animal kingdom. The main strategy involved providing "naturalistic" accounts of human uniqueness as defined in Abrahamic theology. Chomsky's postulation of a "language organ" is a good contemporary case in point. Such postulations are little more than secular versions of what theologians have regarded as our species capacity to understand and even participate in the *logos* (i.e., the conversion of words to deeds, the execution of a computer program) by which God creates. Appeals to the supposed uniqueness of human "consciousness" and "meaning-making" could be added to the list of such allegedly species-defining capacities, which somehow evolutionary biology would explain as "emergent properties," to recall a phrase that Thomas Henry Huxley's student, C. Lloyd Morgan, started to popularize in the 1920s.

Kant's coinage of "anthropology" in 1798 to name his invidiously empirical evaluation of the world's race-cultures should be understood in the light of this modern ape-centered history of humanity. While Kant was certainly trying to rank order human populations in terms of their spiritual capacity, he had inherited the Rousseauian "noble savage" conception of apes, as well as the anti-essentialism common to a range of great naturalists from Buffon and Lamarck to Darwin himself. They upheld a deep material continuity among life forms, which meant that non-material properties or functions could be ascribed to organisms only based on their performance in their habitats. And for this very reason, they believed that a radical change in habitat could result in a radical change in behavior. Thus, habitat—what we now call "culture"—could either facilitate or inhibit human development. ("Identity politics" was clearly never on any of these people's radar.) Interestingly, Carolus Linnaeus, the Swedish taxonomist who had coined *Homo sapiens* in 1759, was an outlier to this modernizing tendency by remaining wedded to divine special creation as the best explanation for the origin of species—notwithstanding his clear acknowledgment of humanity's kinship to apes. The Linnaean idea that God simply intervened to make humans different from apes was ultimately incorporated into the evolutionary narrative, thanks largely to Darwin's rival, Alfred Russel Wallace.

Nevertheless, Kant retained a theological residue that is absent from Darwin. Kant still believed in a spiritual dimension along which quite differently constituted and disposed organisms might be rank ordered. The quest for a potentially species-blind conception of "general intelligence" is the clearest secular descendant of Kant's line of thought (e.g., Hernandez-Orallo 2017). In contrast, Darwin clearly believed that, in an important sense, an organism could be "too intelligent" for its own good because, in the end, what matters is the organism's fit with its environment. Darwin had in his sights the highly developed frontal lobe of the *Homo sapiens* brain, which rendered our species susceptible to wild ideas capable of competing with direct experience for cognitive salience. The fact that our brains are so big relative to the size of our bodies means that we are provided with more opportunities to let

what is happening inside of ourselves override what is happening outside. Historically this has led to large amounts of organized violence toward both fellow humans and nature more generally.

Thus, Darwin would have no trouble recognizing the double-edged character of the Anthropocene. While this era has led humanity to reshape the Earth in its own image, it has equally increased the precariousness of those aspects of the Earth that escape humanity's focal concerns. Our disposition to judge successful risky interventions as indicative of genius rather than luck means that we routinely elide "fact" and "fiction," "rational" and "irrational," "conscious" and "unconscious." This helps to explain humanity's collective willingness to absorb enormous cost—even harm—in the short-to-medium term, in return for imagined long-term benefit, which may be paid out in quite small installments over a very long period. This tolerance of high costs typically reflects a strong commitment to an idea— such as "humanity" itself, understood as some improved future version of the current run of humans. On this point—for better or worse—the great religious, political, and scientific revolutions of the modern period are in agreement. And transhumanists, however much they might wish to deny it, are generally going down this path, which in the early modern period was paved by "theodicy," the theological justification of evil in an ultimately good world (Fuller 2011: chap. 5).

Nearly a century before Darwin, Kant had intuitively grasped the human propensity to "think outside of oneself," or "self-transcend." What eventually became Kant's signature "critique of pure reason" gestated in a textual encounter with the great Swedish polymath, Emanuel Swedenborg, who effortlessly glided between bold physics-driven engineering projects and radical, dream-based interpretations of the New Testament. Kant's 1766 work, *Dreams of a Spirit-Seer*, repays reading today (Johnson [1766] 2003). Swedenborg was arguably the first major modern celebrant of the brain as the interface organ between ourselves and the cosmos as a whole. He had clearly recognized the cognitive significance of the cerebral frontal lobe, which led him to suppose that the sort of visions that people experience in sleep or semi-conscious states are anticipations of the future or even other dimensions of physical reality (Gross 1997). For Swedenborg the problem was simply one of interpreting and acting on them properly. In this respect, he suggested a materialist substratum to the tradition extending from Plato and the mystics of the Abrahamic religions, resurrected in Renaissance ideas of humanity as "microcosm," and later picked up by the Russian Cosmists and contemporary transhumanists. It sees the brain as not simply the governor of the body but as the privileged portal for accessing and even projecting all of reality (Fuller 2014).

While Kant may have succeeded in marginalizing Swedenborg and the "spiritual" from critical philosophy, it was equally clear that he himself did not identify the human exclusively with *Homo sapiens*. Indeed, Kant's association of our "humanity" with practical reasoning and ethics suggests a conception closer to the Greek one of *paideia*, in which the upright ape is treated as an artifact in the making, which becomes "human" upon completion. This returns us to the opening observation of this section, namely, that both post- and transhumanists point toward a larger existential context, be it the Earth or the cosmos, in which the human comes into—and perhaps also out of—being.

Common to posthumanism and transhumanism is a sense of the embedded nature of the human that effectively renders it a part of a greater whole. The philosophical anthropology literature sometimes calls this embeddedness the *Umwelt*, after the usage of Heidegger and the later Husserl. However, a term better suited to such futuristic philosophies as posthumanism and transhumanism is the *superorganic*, which over the past century has developed two distinct meanings (Fuller 2016).

On the one hand, the "superorganic" may refer to such species as ants and bees, whose individual members are best understood as distributed parts of a single whole, such as a colony or a hive. The ultimate expression of this sensibility is the Gaia hypothesis, which attracts many posthumanists, according to which the functionality of the human "part" of the planetary whole is a source of grave concern. On the other hand, the "superorganic" may refer to the artificial environment—or "extended phenotype," as Richard Dawkins would say —in which a species, most notably *Homo sapiens*, remakes the world not simply to enhance its chances of survival but to expand its reach perhaps to the point of domination. Evidence for this sensibility in action is that each new generation takes less time than its predecessor to do the same things, which in turn permits more time to do new things. Learning becomes more efficient because the environment has been rendered "smarter." This fits the transhumanist utopia of a fully "humanized" world, what Pierre Teilhard de Chardin had called the *noösphere*. Of course, this option leaves unresolved the exact form that the future "human" will take to reflect such open horizons (Fuller 2019a, 2019b). The only thing that is clear is that the image of the cyborg looms large.

SOURCES CITED

Benyus, Janine. *Biomimicry: Innovation Inspired by Nature*. New York: William Morrow & Company, 1997.

Cuddy, Alice, and Bruno Boelpaep. "Notre Dame Fire: Has Too Much Money Been Given to Rebuild It?" *BBC News*, April 25, 2019, https://www.bbc.co.uk/news/world-europe-48039770.

Dreyfus, Hubert. *What Computers Can't Do*. Cambridge MA: MIT Press, 1972.

Foucault, Michel. *The Order of Things*. New York: Random House, [1966] 1970.

Fuller, Steve. *The New Sociological Imagination*. London: Sage, 2006.

Fuller, Steve. *Dissent over Descent*. Cambridge, UK: Icon, 2008.

Fuller, Steve. *Humanity 2.0: What It Means to Be Human Past, Present and Future*. London: Palgrave Macmillan, 2011.

Fuller, Steve. "Neuroscience, Neurohistory and History of Science: A Tale of Two Images of the Brain." *Isis*, vol. 105 (2014): 100–9.

Fuller, Steve. "Organizing the Organism: A Re-Casting of the Bio-Social Interface for Our Times." "Biosocial Matters," special issue, *Sociological Review Monographs*, vol. 64, no. 1 (2016): 134–50.

Fuller, Steve. "The Metaphysical Standing of the Human: A Future for the History of the Human Sciences." *History of the Human Sciences*, vol. 32 (2019a): 23–40.

Fuller, Steve. "Does Humanity's Spiritual Progress Require a Change in Our Species' Self-Understanding? A Twenty-First Century Challenge for the Church." *Church, Communication and Culture*, vol. 4, no. 2 (2019b): 123–30.

Fuller, Steve. and Veronika Lipinska. *The Proactionary Imperative: A Foundation for Transhumanism*. London: Palgrave Macmillan, 2014.

Gill, Peter. *Famine and Foreigners: Ethiopia after Live Aid*. Oxford: Oxford University Press, 2010.

Gould, Stephen Jay. *The Mismeasure of Man*. New York: W. W. Norton, 1981.

Gross, Charles. "Emanuel Swedenborg: A Neuroscientist before His Time." *Neuroscientist*, vol. 3 (1997): 142–7.

Haraway, Donna. *The Companion Species Manifesto*. Chicago: Prickly Paradigm Press, 2007.

Harrison, Peter. *The Fall of Man and the Foundations of Science*. Cambridge, UK: Cambridge University Press, 2007.

Hernandez-Orallo, José. *The Measure of All Minds*. Cambridge, UK: Cambridge University Press, 2017.

Huxley, Julian. *New Bottles for New Wine*. London: Chatto and Windus, 1957.

Jaeger, Werner. *Paideia: The Ideals of Greek Culture*. Oxford: Oxford University Press, 1945.

Johnson, Gregory., ed. *Kant on Swedenborg: Dreams of a Spirit-Seer and Other Writings*. West Chester PA: Swedenborg Foundation Publishers, [1766] 2003.

Löwith, Karl. *Meaning in History*. Chicago: University of Chicago Press, 1949.

Moyn, Samuel. "Jacques Maritain, Christian New Order and the Birth of Human Rights." In *Intercultural Dialogue and Human Rights,* edited by L. Bonante, R. Papini, and W. Sweet. Washington DC: Council for Research in Values and Philosophy, 2011, pp. 55–76.

Romanes, Georges. *Animal Intelligence*. New York: D. Appleton & Co, 1883.

Said, Edward. *Orientalism*. New York: Random House, 1978.

Singer, Peter. *Practical Ethics*. Cambridge UK: Cambridge, University Press, 1979.

Sloterdijk, Peter. *Critique of Cynical Reason*. Minneapolis: University of Minnesota Press, [1983] 1988.

Wiener, Norbert. *God & Golem, Inc*. Cambridge MA: MIT Press, 1964.

CHAPTER FOURTEEN

Toward Posthuman Human Rights?

UPENDRA BAXI

Relating the discourse of the "posthuman" to human rights is indeed an intimidating task for several reasons. First, there is the problem of ideology betokened by the suffix "ism": thus one hears of "humanism," "posthumanism," "transhumanism." Ideologies justify good as well as evil things, the latter are most manifest when "humanism" reeks of many evils (such as anthropomorphism, sexism, racism, colonialism, and imperious disregard of the other), and ways have to be found for "critical humanism" (Braidotti 2013) and nuanced anthropomorphism (Grear 2018). Second, it is this sense that posthumanism does not privilege the inhuman, but still struggles to make sense of the difficult distinction between the ethical idea of human rights and the law and jurisprudence of human rights (Baxi 2016; Schippers 2018).[1] Third, even this—the distinction between deontology and consequentialism—does not help us make sense of the "human" in human rights in the days of Anthropocene personhood, and great deal of ambivalence reigns in extending the discourse of human rights to posthuman entities.[2] Fourth, what is now called "legal posthumanism" deals with civilian and military mass usages of law and technology inviting us to examine the states of human rightlessness thus caused. The relationship between international humanitarian law and human rights law becomes both closer, and at the same time somewhat alienated, by what Julius Stone called in the wake of detonation of nuclear weapons in Hiroshima and Nagasaki "the depersonalization of the means of violence" (Stone 1954). With the advent of drones as war weapons, this process of depenalization has deepened. The extent of destructive depth stands measured by an irony (perhaps even

posthuman) when the American defense department abbreviates them as LAWS (lethal autonomous weapons systems)! A more precise posthuman anti-law targeted killing system than "unmanned" space vehicles has yet to be found—perhaps, the only rival may be found in nanobots invisible to the naked eye that disrupt and destroy human organisms.[3]

The prefix "post" haunts many flourishing discourses. But it obviously signifies more than any linear description of the existing before, the prevalent present, and the future to come. Rather, the multifarious discourses of the postmodern and the postcolonial show that the "postist" discourse offers new and unsettling forms of understanding; what we once-upon-a-time understood past to have been appears as equally contingent as our ways of being in the present and our notions about the future times of the species—all being thus far named pre-eminently as "human." The "post" thus emerges dialectically or not at all. In the very same way in which the "postcolonial" and "postsocialist" do not quite fully suggest any irreversible performance of the vanishing past and mark termination of some world historic transformative projects, the posthuman does not convey the end of the human but rather critically engages with some ways of enhancing that "human."

The genealogy of the idea of posthuman has been traced variously: the construction of the "posthuman" occurs at intersecting sites of literary and cultural theory, feminisms, anthropology, historiographies, development theory, philosophy, and juristic sciences with different shades of meaning.[4] But what is perhaps not much stressed in academic literature are the organic links between law, justice, and revenge; the Programschrift of sociobiology; and the problematic of legal regulation.

Catherine Malabou recently addresses the first: "If there is something like a specificity of the human, for Nietzsche, it is precisely revenge. The human is the only being that seeks revenge after an offense" and the "end of man would be the end of revenge" (2015: 67–8). But it is not the end of man "directed toward a return which no longer will have the form of the metaphysical repetition of humanism" (67–8). Law very often serves society as a generalized program of revenge. Thus, revenge or resentment remains integral to the idea of law and human rights; the posthuman indicates this intimacy among law, justice, and revenge rather pointedly well.

The current literature on the posthuman engages new technologies and philosophies but passes by its antecedents such as ethology, zoosemiotics, and sociobiology which inaugurated a co-evolutionary approach to the study of the "human"—studies of life other than human and studies of "man" as one of the many species.

The programschrift of sociobiology which emerged and developed during the early and middle phases of the Cold War was named as such by E. O. Wilson who basically maintained that the principles of evolutionary theory such as natural selection extended as much to social as physiological behavior. However, this approach which seemed to carry with it odious justifications of many social inequalities and discrimination was a subject of an intense political debate in the United States in the seventies.[5] But in its co-evolutionary approach (genes plus culture) species as a class rather than species as individual prefigured some dimensions of the posthuman. So do studies in zoosemiotics: the posthuman already arrived with studies of "animal language" (honey bee's waggle dance, song learning in birds, alarm calls like the canary calling from with the mine, and human language learning by nonhuman

animal persons [NHAP]) (Hailman 1985: 697–9). Much the same may be said about ethology which has gone beyond to institute highly methodology oriented studies. Earlier, Konrad Lorenz wrote and talked about aggression (Lorenz [1963] 2000, 1965) and Robert Ardrey (1997) about the "territorial imperative." But today, the language of "instinct" is abandoned and is replaced by that of complex learning.[6] The purpose of saying all this, and so briefly, is this neo-evolutionary approach to "animal" learning as a heredity/environment complex should also find a place in the reflections on the posthuman condition; this assumes added significance when we emphasize in the Anthropocene the need for interspecies thinking and solidarity.

THE MATERIALITY OF GLOBALIZATION

The materiality of contemporary economic globalization has profoundly affected the idea of being and remaining human, and the infinite diversity that is called the posthuman. The well-nigh irreversible technologies (artificial intelligence [AI], biotechnologies, neurosciences and neuro philosophy, nanotechnologies, and the combined forms of aggressive military war/defense) all over-problematize and reconstitute the notion of the "human." In particular, the impacts of these technoscience developments on social consciousness and social organization have in turn resulted in a paradigm shift from the universal human rights of all human beings to a trade-related market-friendly human rights paradigm (Baxi 2023: 308–21).

In this shift, the already very powerful aggregations of technoscientific capital secure more human rights unto themselves than individual human beings: the corporate persons today marshal not merely the rights to security of property and economic transactions (contracts) but command collective rights of corporate free speech and expression that extends to election financing, privacy and dignity, free movement, association and residence, reputation and honor. These were human rights guaranteed to individual human persons, not aggregates of technoscience capital.

At the same time, corporate voluntarism applies to corporations who are under no obligation to adopt international or national human rights responsibility on the specious ground that no human rights regime extends to entities other than states. Indeed, corporate technoscientific capital is bound by no standards of international law and claims immunity, even impunity, from any accountability/responsibility at international law.

If this is a destructive impact of the posthuman new era (to deploy the figure of Catherine Malabou) of "plasticity" of contemporary posthuman human rights, the simultaneously creative aspect is that multinational technoscientific aggregations also create materiality which translates normative enunciations into material social reality (Baxi 2023: 298–301; Vogel 2015).

Compared with the previous reconstructions entailed in the "modern," "contemporary" human rights languages, logics, and paralogics, technoscience enterprises expound some wholly novel ways of reconstituting the "human" and have articulated, on several registers, the promise and perils of the materiality of globalization. Accelerating globalization enacts the economy of speed (Virno 2012), and the sharing of the new culture of desires (through new infotainment embedding of a universal consumer self). All over again, we are

condemned to reiterate William Ogburn's hypothesis of a cultural lag between the common law as an adaptive culture confronted by rapid changes in industrial technologies (Ogburn 1922),[7] or more generally put the law as social technology as always under stress by the movement of the new technoscientific capital.

The empowering as well as disempowering impact of these technologies on human rights and social movement solidarities and forms of collective social action is well known. But it is no simple task to overview the complex and contradictory ways in which "new" social movements and religious authority episodically articulate resistance to the posthuman in the name of human rights, although the difference of auspices is indeed quite remarkable. See for example, Thweatt-Bates (2016); Sung Jung Mo (2018).

INFORMATION

Perhaps, crucial remains the notion of information in which all life forms stand presented as assemblages of coded information, which may be decoded as several texts as with the human genome projects. This decoding emerges sharply with advances in computational technologies; reading the genetic code remains insensible outside forms of AI signified by the digitalization, of the modes of production scientific theory and practice.

If a single cell in the human body is said to encode more information than all the volumes of *Encyclopaedia Britannica* (Rifkin 1983: 153), inescapable is the idea that humans are no more than "information-processing machines essentially similar to intelligent machines" (Hayles 1999a: 7). This carries at least the implication that "information is not a presence but a pattern" and further it loses its privileged status in human embodiment because information may be moved to other nonbiological platforms of memory such as the robotic forms of AI, which themselves constitute new machinist life forms developing capabilities of thinking beyond the programmed inputs.

We have moved from the "human" into "posthuman" forms of intelligent lifeforms; what emerges is a "disembodied posthuman," a cyborg (as noted early by Donna Haraway—a half machine, half human form in which information "loses its body" [Hayles 1999a: 7, 18]). Add to all this the "reluctant fascination" with "a near-future prospect of uploading human consciousness into a computer" or with the "postbiological future for (post) humanity in which embodiment will have gone beyond even computer" (Kurzweil 2006).[8] And thinking about "plastic materiality" which now describes the mansions of the posthuman. The end of the "human" as any decisive marker of the boundaries between "human" and "machine," the human and animal, the animate and inanimate of life, and the tiresome and well-worn distinctions between "human" and "nature," "male/female," and "men" and "machine" has already happened (Hayles 1999a: 7). If so, one has truly to talk not about "human rights" but "posthuman rights" of new life forms extending some rights to objects in/of "nature" (in a "postnatural" world including organisms modified by the humans—the sphere of cloning). Even when we take utmost care in handling the notion of technocultures,[9] the problem of the conflict, and irreconcilably, with what we know as human rights with posthuman rights remains.

Stated most generally, if the human rights discourse may be understood as avoidance of

surplus (in the sense of needless and unjustifiable) human and social suffering, or *non nocere* (do not harm) principle, how may we extend this notion to posthuman personhood (distribution of agency) and suffering to sentient NHAP, and other sentient species? How about objects in/of nature that supposedly feel no pain and cannot express it at all in language (such as stone, coal, oil and petroleum products, rivers, glaciers, waterways, mountains and hills, trees and forests)? The tendency toward statutory and constitutional recognition of posthuman legal personhood[10] to some objects in/of nature is of course most welcome. But how about those still excluded? Are all posthumans to have equal rights as the humans or to be totally excluded, and are others subject to infinite gradation?[11]

Extant literature on law and human rights relating to posthuman subjects is divided across conventional lines of the sentient and the non-sentient. These delineations of subjectivities at times includes NHAP,[12] and AI, whether "strong" AI or artificial general intelligence (AGI).[13]

NONHUMAN ANIMAL PERSONS

We tend to think of humans as "rational animals" but the emphasis remains on the word "rational." It sounds odd, certainly to the anthropomorphic ears, to listen to the idea that "animals" may have human rights. Partly surely to what Giorgio Agamben calls the "anthropological machine" (Agamben 2003), the distinction however can no longer be maintained when one accentuates the "species being" of the human (see Chitty 2009; Christensen 2016). However, it is clear that some NHAP have certain "rights," or that HAP (human animal persons) have certain duties toward them; one may choose to describe the latter situation as "duties without rights" which make perfect social and justice sense. Among these, the obligation to prevent cruelty has been recognized by almost all legal systems. But not all NHAP have human rights extended unto them. The fundamental differences, as concerns between NHAP and HAP are: (a) they may be owned as private property in ways that HAP can no longer be (the prohibition of human chattel slavery or the discourse of modern slavery does not apply to NHAP); (b) certain NHAP known as predator species may be culled, contained, or eliminated because they are diseased and the disease is communicable to humans or they present threats to human beings or resources; (c) used as, and for, human food and nutrition; (d) provide means for transportation of humans or goods; (e) used for clinical experimentation for drugs and cosmetics; (f) deployed as "companion species" and pets; (g) used for public entertainment; and (h) conserved as "endangered species." One would think that beyond the overarching prohibition of needless cruelty and surplus suffering and pain, most NHAP are among the posthuman rightless.[14]

Of course, there is some discussion in the literature concerning what human rights may extend to most human entities. We discuss some aspects of this below. But it must be said that here some sort of functionalism prevails.

TOWARD A SOCIAL HUMAN ENHANCEMENT?

The "benign" discourse proceeds to envisage the posthuman in the improvement of the human condition made possible by some astonishing actual developments in technoscientific knowledges. I explored two aspects of this approach earlier—the individual (now also called "biomedical") and transhumanist (movement that affirms technologies to eliminate aging and to greatly enhance human intellectual, physical, and psychological condition) and the "study of ramifications, promises, and dangers of technologies that will enable us to overcome fundamental human limitations" (Baxi 2017: 124–5).

Second, it summons a new ethics of enhancement foregrounding the study of the ethical matters involved in developing and using such technologies. There is no doubt that the transhumanist discourse exploits the age-old idea of human immortality in many different ways (Tobey 2004).[15] Is this a universal history of human species-desire (a specieist program of God-like pursuit of "immortality") or is this story a peculiar artifact of Judaeo-Christian tradition?[16] Furthermore, how may we identify "fundamental human limitations" of posthuman attributes, outside cultures, and histories?

Undoubtedly, the prospects of individual human enhancement are immense, even awe-inspiring, for both enhancement for traits (such as beauty, sporting abilities, and intellectual competence) and enhancement for therapy (overcoming dread genetic or other diseases and therapeutic cloning). But it is rightly suggested that genetic enhancement may turn out to be vastly inegalitarian; at least in the short and median run, it will be available only to the "genetically lucky" (Tobey 2004: 58). Such inequality may thrive with an increase in "efficiency and productivity … as a function of enhanced human capital" (Bostrom 2003). Eventually, "abilities that are currently reserved to other species or even to the imagination" may become available to all and augment "the possibilities of human life and the freedoms we have for self-expression and determination" (Baxi 2017: 206). Put more starkly, transhumanists merely celebrate the slow-moving scope for the "distributional access asymmetry" by invoking the proverbial trickle-down effect, without at all considering the ever-expanding regimes of global protection of intellectual property rights and neoliberal trade wars. Furthermore, transhumanists show some respect for "people … [who] choose to forego the opportunity to use technology to improve themselves" and thus "choose to remain unenhanced" (Baxi 2017: 217). Transhumanist agendum in those realms of enhancement as embellishment makes good sense[17] but not in areas of therapy.[18] In the related contexts of human disability and rights of sentient animals, Martha Nussbaum describes these obligations in terms of aspects of "basic justice" which aims at the prevention of "the blighting of valuable natural powers" (Nussbaum 2006: 351). As far as I can see, the transhumanist agendum does not as fully address these obligations.

No doubt, transhumanists are surely right when it is urged that there is a need to develop a new ethical discourse. However, the ethics they overall suggest neglects the politics of production of the enhancement technology and industry. They ignore a radical critique of the forms of the "human geneomania" (Ho 1998: 35, 37), characterizing life sciences that reduce to a "monolithic intellectual wasteland of genetic determinism … the enclosure of intellectual commons, and a 'de-intellectualization' of civil society, so that the mind becomes [subjugated to] a corporate monopoly" (Ho 1998: 35, 37). The conjugation of "bad science and big business" promotes new ways of totalitarian control which eliminates at the threshold

"all effective ideological opposition" under the "guise of 'freedom' and 'democracy' within 'free economies' in the global 'free-trade' regime of the WTO," "all the more difficult to grasp hold of and to resist" (Ho 1998: 37n38). The new global reality thus constituted by technoscientific discourse is best captured by the phrase "colonisation without colonizers" because as "distinct from the openly totalitarian regimes …, there is no dictator in charge, there is no one making decisions, rational or otherwise"; "instead, there are merely automatons driven by a sense of anxiety, the isolated individual driven by a need to amass wealth today, the government, to remain in power, against the insecurities of the morrow" (Ho 1998: 37). One is not any more secure, on this critique, about the benign potential of the emergent new "frontiers of justice," nor is it clear how far the capabilities approach may also respond to this radical critique.

The "dangers" of new technologies in the transhumanist agendum are presented via the dichotomy between "endurable or limited hazards" and "existential risks" defined as tending toward the "long-term" destruction of "prospects of humanity as a whole" (Bostrom 2003). They have in view here, for example, destructive uses of nanotechnology, biological warfare, "impudently and maliciously constituted superintelligence," and "nuclear war" (Bostrom 2003).[19]

This is important indeed; however, all that follows is a rather inchoate prescription, rather than a new ethics: transhumanists have "to recognize a moral duty to promote efforts to reduce existential threats" (Bostrom 2003). Clearly more anxious ethical attention work is needed to unravel the classification of "endurable and limited hazards" and the "existential" ones. Does not "humanity as a whole" stand depleted when entire human populations systematically become extinct as is the case with the growing rate of disappearance of nomadic and pastoral groups? In what ways does the multinational corporation genetic gold rush to preserve germplasm of the vanishing peoples make the loss of human genetic diversity "recoverable" after all? Similar questions arise concerning the permanent erosion of biodiversity, the systematic extinction of animal, plant, forest, and marine/aquatic forms of life, entailed ever since the enunciation of the ideal of mastery over nature inculcated by the European Enlightenment and now fiercely reinforced by the materiality of contemporary economic globalization. What new militant solidarities are summoned here? Is the emergence of new genetic underclasses, including cloned human beings willed into existence as genetic warehouses of body tissues and parts to be a matter of moral concern much the same way as animals produced merely as ingredients of human food chains? And how may this moral duty extend to the states, considered even as community of states (conceived in the phrase-regime of Deleuze and Guattari) as a "nomadic war machine" (Deleuze and Guattari 1986).

A third model is now suggested by Laura Y. Cabrera (2015): human social enhancement. She forcefully maintains that "the use of emergent technologies under a liberal individual view—where our functioning is reduced to the working of a type of biological machinery isolated from environmental and social factors, where bodies and individuals are seen as abstract and isolated agents—cannot ensure the achievement of any meaningful improvements for the human condition" (160). Both the biomedical and transhumanist models are based on freedom of individual choice and the market supply; this individualism leads to a "skewed distribution of human enhancement interventions." This is likely "not

only to exacerbate feelings of discrimination between the enhanced and the unenhanced," but also to "promote depression, anxiety and feelings of disempowerment." Furthermore, it "has the potential to instantiate far greater and meaningful divides than previous ones, such as an ability divide or a communication divide" (Cabrera 2015: 150). Persuasively arguing a social enhancement model, she warns that reasons and circumstances of justice require "fair distribution" and a "shift of the motivations and values from the current dominant ones lest 'enhancement' interventions might turn out to be worse for us than no enhancement at all" (150).[20]

FROM ARTIFICIAL INTELLIGENCE TO ARTIFICIAL LIFE FORMS

In the early decades of the twenty-first century, it is as "natural" to think of artificial life as it was in the last few decades of the twentieth century to think of "AI." Writing in 1988, Phil McNally and Sohail Inayatullah said:

> In the coming decades, and perhaps even years, sophisticated thinking devices will be developed and installed in self-propelled casings which will be called robots. Presently, robots are typically viewed as machines-as inanimate objects and, therefore, devoid of rights. Since robots have restricted mobility, they must be artificially programmed for "thought," lack senses as well as the emotions associated with them, and most importantly cannot experience suffering or fear, it is argued that they lack the essential attributes to be considered alive. (McNally and Inayatullah 1987)

But prophetically, they added: "The robot of tomorrow, however, will undoubtedly have many of these characteristics and may perhaps become an intimate companion to its human counterpart" (McNally and Inayatullah 1987). And they further said, "We believe that robots one day would have rights" (120).

There is of course a difference between having rights and having human rights. The latter entails "juridical humanism" which "implies a belief in an objectively ascertainable essential gap between humans and the rest of the world". Humans are believed to be "so different from any other kinds of creatures that the law is morally justified to regard the human good as the principal concern and supreme objective of the legal system"; it "seems to be based on a rather strong version of human exceptionalism" (Pietrzykowski 2014: 3).[21]

However, it is being gradually, nationally, and globally recognized that computational intelligence or life forms do exist and make decisions as principals in trade, investment, finance, and business. Questions do arise concerning capacity to make legally binding contracts, administering trusts, civil liability (torts, consumer welfare, shareholder or investor protection, product liability, environmental care and justice) and criminal liability (Chopra and White 2011).[22] There is no question that how strictly legal issues are decided by legislature and courts will also eventually shape the human rights selves of artificial life and intelligent machines, which now also somewhat stand invested with a life of emotions (see

Kurzweil 1999, 2006).

Tomasz Pietrzykowski suggests that we evolve a juridical and philosophical distinction between fully human persons and "nonpersonal subjects of law"; allowance for nonhuman personhood does not detract from the "species dependent" conceptions of legal persons. Arguing that the "concept of a person should be … conspicuously decoupled from the concept of 'subject-hood' …" holding further that "someone having humanlike properties" does not mean any "automatic relegation to the category of things" (Pietrzykowski 2014: 8–9).

POST-WOMAN AS POSTHUMAN?

The posthuman machines are, as we all know, created by mostly the male of human spices; accordingly it is but "natural" that they will carry a sexist bias toward the other half. But the wider question is whether gender (ethnicity and all other identities) will be irrelevant to the cyber futures. Kevin Warwick, famous for his neural-cyber experimentation with his own self, and considered the first cyborg, also founded in 2006 FIDIS ("Future of Identity in the Information Society"). His work on ethicbots—i.e., the ethical aspects of cyborgs and robots and the future of identity—is little known but he was "posing into question a fixed notion of the human, emphasizing instead its dynamic and constantly evolving side" and in this context made his notorious statement that "human beings are destined to be a subspecies" (Ferrando 2014: 2).

This, of course, is music for the critics of posthumanism and transhumanism (Ferrando 2013; see also Grosz 1994). And, in many senses, the posthumanist materialities are postbiological. In fact, the cameo empirical study here undertaken shows that "none of them [the student respondents to the questionnaire] thought of robots in feminine terms" (Ferrando 2014, 15). Yet, the study proceeds to conclude that while the robots "can communicate in a human code without being human; … can hold a mechanical body and a biological brain (think of biological AI); they have been constructed from human knowledge and categories," they "still … transcend them both." Cultural beliefs "play a key role in the human reception of advanced AI, while political, social and economic interests are crucial to its developments." But, it is not clear, why in the "futures, the integral onto-epistemological approach of the posthuman may allow humans and robots to fully develop their interconnected potentials, eventually facilitating an original interspecies venture into the existential quest" (Ferrando 2014, 43). The quest of—and for—the posthuman lies in the positing that just as we cannot predict the past, we may not entirely foresee the future.

---

chippers valuably, while distinguishing "posthumanism" from "humanism," reinforces the line of thinking that emphasizes the continuity rather than breaks with "humanism" suggesting of course a reconfiguration of the latter.

invented this word in 2002 out of my feminist discontent with the term—"human rights" (the term human had the suffix "man" in it, so had "son" as suffix to "person"; I therefore took the first two letters of human and first three letters of "person"; to coin the word "huper." But I did not use it). Yielding to the conventional usage of human rights in my *The*

Future of Human Rights. Even though I use the conventional term in this paper, the term "huper" appears more apt in the posthuman context.

While much has been written on the futures of civilian nanorobotics in the areas of food, nutrition, health, and environment, the discourse on its war-like or military uses is somewhat sparse, though some attention is devoted to organized but relatively invisible criminal networks of combined state and non-state actors called "nanomafia": see Flores (2018). Miniaturization of microelectronics systems and further development of nanocensors hold many "promises" for the new military technology in near future. See, for example, Kharat et al. (2006) and Nasu and McLaughlin (2014).

he corpus of Donna Haraway and N. Katherine Hayles is here especially pertinent. See Donna Haraway (1989, 1991, 1992, 2003) and Donna Haraway and Thyrza Goodeve (2018). See also N. Katharine Hayles (1999a, 1999b, 2005, 2006). Mads Rosendahl Thomsen makes a very important contribution in *The New Human in Literature: Posthuman Visions of Changes in Body, Mind and Society after 1900* (2013).

ee, for example, Laland and Brown (2011) and Lumsden and Wilson (1981).

or example, it is said of homing pigeons that they "compass but they learn landmarks, can see ultraviolet rays invisible to the human eye, possess an uncanny magnetic sense, can see polarization patterns in the blue sky, can hear infrasound (such as the wind blowing through the Rocky Mountains from thousands of miles away), and may even be able to orient by odours in their environment. Put simply, birds have 'backup' guidance systems in abundance, making use of sensory abilities that few workers even imagined a couple of decades ago" (Hailman 1985: 696–7).

ee also Brinkman and Brinkman (2005) and Honigmann (1947).

urzweil considers this process as exemplifying a "law" of accelerating returns. But see Nicholas Agar (2010).

ayles remarks at the outset that nanotechnology is "not so much a theoretical breakthrough as a concentration of previously known theories, new instrumentation, discoveries of new at the nano-level, and overlaps disciplines that appear to be converging into a new interdisciplinary research front" (Hayles 2004: 11). Simply put, it is old wine in a new bottle but also some new wine in a new bottle! It is not easy at one level to decide the "new" element in a technoscience field, yet it creates many new social and cultural realities.

ee, for example, Wennemann (2013), Grear (2006), and Kapica (2014).

have deployed the term "sentient" though it is questionable. For example, David R. Lawrence and Margaret Brazier differentiate between sentience as "simply the capacity to experience sensation, which would of course apply to creatures incapable of reasoned thought such as a mouse" while "sapience carries with it an implication of wisdom, reason, and insight" akin to human beings (Lawrence and Brazier 2018: 312).

he human rights discourse concerning the rights of "animals" is normally limited to a couple of groups within the ensemble of "animals" Elementary zoology teaches us that birds are normally included as among six groups of animals; the others are amphibians (characterized by their semi-aquatic lifestyles, who have to stay in the vicinity of water and form most of the most endangered species), fish, reptiles (crocodiles and alligators, turtles and tortoises, snake, and lizards), vertebrates (97 percent of all species, without backbone and internal skeleton, a widely varied group that includes insects, worms, arthropods, sponges, mollusks, octopuses, etc.), mammals (the humans forming a crowning achievement).

ee Daugherty and Wilson (2018). See also Newell and Simon (1976) and Baldwin (2019).

xceptions, important but meager, to this observation are provided, for example by The Convention on International Trade in Endangered Species of Wild Fauna and Flora, often referred to as CITES (SIGH-teez), which entered into force in 1975 aiming at ensuring that international trade does not threaten the survival of wild plants and animals. Three appendices regulate trade in endangered species. To put the matter briefly, Appendix 1 deals with species that are in danger of extinction. Appendix 2 allows export if the plant, animal, or related product was obtained legally, and if harvesting it is shown not to hurt the species survival. And Appendix 3 may allow a country that protect at least one species to ask others for help in regulating the trade. One may read several duties of care which are owed to many species. According to some sources, the International Union for Conservation of Nature (IUCN) Red List is the second most severe conservation status for wild populations in the IUCN's schema after Critically Endangered (CR). In 1998, the IUCN listed 1.102 and 1.197 spices respectively. The Convention does not confer personality on concerned species and there is a considerable movement from one appendix to others. How effective the protection is, is an area of great divergence between activists, states, and international civil servants.

obey here presents the "best case scenario" for enhancement.

ee, for example, S. Settar, *Pursuing Death* (1990).

or example, whether or not to use anti-wrinkle facial treatment, pursue skin grafts, related modes of reconstructing body parts, cryonics, prolongation of life in the face of aging, neural implants, etc.

athan A. Adams IV writes: "If therapy loosely conveys treatment aimed at bringing an unhealthy person to health, whereas enhancement conveys extending some characteristic, capacity, or activity, it is tempting to think that we can adopt a bright line rule permitting the former, but never the latter. In truth, this would still require us to define 'normality,' because therapies always constitute enhancements, but not vice-versa" (Adams 2003: n.p. in the download).

ee also the reflections by Paul Virilio (2001).

ee also Bostrom (2005), Bostrom and Roache (2007), Racine and Forlini (2010), and Rose (2007). See further, the analysis that would identify "humanism" as a series of ways of silencing: 'During the Agricultural Revolution humankind silenced animals and plants, and turned the animist grand opera into a dialogue between man and gods. During the scientific Revolution humankind silenced the gods too. The world was now a one-man show. Humankind stood alone on an empty stage, talking to itself, negotiating with no one and acquiring enormous powers without any obligations' is this apostrophe suggesting the end of a quote? (Harari 2017: 96).

ietrzykowski maintains that "one of the key philosophical foundations of the contemporary legal order is the belief that the law ultimately serves to promote human good and that the community of law is actually composed of all but only human beings" (2014: 2–3). See also Allen Supiot (2017).

ee also for a germinal conceptual discussion of legal personality, Ngaire Naffine (2003, 2009), Anna Grear (2015, 2018). See also the analysis in Lawrence B. Solum's (1992) "Legal Personhood for Artificial Intelligences" which raises the difficult question of whether AZ entities possess "consciousness, intentionality, emotion, and free will to rule out the possibility that it can be produced artificially by a computer" (1283).

SOURCES CITED

Adams, Nathan A. "Creating Clones, Kids & Chimera: Liberal Democratic Compromise at the Crossroads." *Notre Dame Journal of Law, Ethics and Public Policy*, vol. 17, no. 1 (2003): 71–149.

Agamben, Giorgio. *The Open: Man and Animal*. Translated by Kevin Attelli. Stanford: The Stanford University Press, 2003.

Agar, Nicholas. *Humanity's End: Why We Should Reject Radical Enhancement*. Cambridge, MA: MIT Press, 2010.

Ardrey, Robert. *The Territorial Imperative: A Personal Inquiry into the Animal Origins of Property and Nations*. N.p: Kodansha America, Inc, Reprint edition, 1997.

Baldwin, Richard. *The Globotics Upheaval: Globalization, Robotics, and the Future of Work*. New York: Oxford University Press, 2019.

Baxi, Upendra. "Towards a Climate Change Justice Theory." *Journal of Human Rights and the Environment*, vol. 7, no. 1 (2016): 7–31.

Baxi, Upendra. *Human Rights in a Posthuman World: Critical Essays*. Delhi: Oxford University Press, 2017.

Baxi, Upendra. *The Future of Human Rights*. New Delhi: Oxford University Press, 2023, fourth edition, forthcoming.

Bostrom, Nick. "A History of Transhumanist Thought." *Journal of Evolution and Technology*, vol. 14, no. 1 (2005): 1–25.

Bostrom, Nick. "The Transhumanist FAQ: A General Introduction." The Transhumanist Association, 2003, www.transhumanism.org.

Bostrom, Nick, and Rebecca Roache. "Ethical Issues in Human Enhancement." In *New Waves in Applied Ethics*, edited by Jesper Ryberg, Thomas S. Petersen, and Clark Wolf. Basingstoke: Palgrave Macmillan, 2007, pp. 120–52.

Braidotti, Rosi. *The Posthuman*. Cambridge: Polity, 2013.

Brinkman, Richard L., and June E. Brinkman. "Cultural Lag: A Relevant Framework for Social Justice." *International Journal of Social Economics*, vol. 32, no. 3 (2005): 228–48.

Cabrera, Laura Y. *Rethinking Human Enhancement: Social Enhancement and Emergent Technologies*. London: Palgrave Macmillan, 2015.

Chitty, Andrew. "Species-Being and Capital." In *Karl Marx and Contemporary Philosophy*, edited by Andrew Chitty and Martin McIvor. London: Palgrave Macmillan, 2009, pp. 123–42.

Chopra, Samir, and Laurence F. White. *A Legal Theory for Autonomous Artificial Agents*. Ann Arbor: The University of Michigan Press, 2011.

Christensen, Carleton B. "What Is Species-Being?: Towards a Full Rehabilitation of the Concept of Alienation." Carleton

Bruin Christensen (*web page*), October 4, 2016. www.cbchristensen.net/papers/2016/10/04/what-is-species-being.html.

Daugherty, Paul R., and H. James Wilson. *Human + Machine: Reimagining Work in the Age of AI*. Cambridge: Harvard Business Review Press, 2018.

Deleuze, Gilles, and Félix Guattari. *Nomadology: The War Machine*. Translated by Brian Massumi. Boston: MIT Press, 1986.

Ferrando, Francesca. "Posthumanism, Transhumanism, Antihumanism, Metahumanism, and New Materialisms: Differences and Relations." *Existenz*, vol. 8, no. 2 (2013): 26–32.

Ferrando, Francesca. "Is the Post-Human a Post-Woman? Cyborgs, Robots, Artificial Intelligence and the Futures of Gender: A Case Study." *European Journal of Futures Research*, vol. 2, no. 43 (2014): 1–17.

Flores, David Salinas. "The Nanomafia: Nanotechnology's Global Network of Organized Crime." *International Physical Medicine & Rehabilitation Journal*, vol. 3, no. 3 (2018): 273–77.

Grear, Anna. "Human Rights—Human Bodies? Some Reflections on Corporate Human Rights Distortion, the Legal Subject, Embodiment and Human Rights Theory." *Law Critique*, vol. 17 (2006): 171–99.

Grear, Anna. "Deconstructing Anthropos: A Critical Legal Reflection on 'Anthropocentric' Law and Anthropocene 'Humanity'." *Law and Critique*, vol. 26, no. 3 (2015): 225–49.

Grear, Anna. "Human Rights and New Horizons?: Thoughts toward a New Juridical Ontology." *Science, Technology, & Human Values*, vol. 43, no. 1 (2018): 129–45.

Grosz, Elizabeth. *Volatile Bodies: Towards a Corporeal Feminism*. Bloomington: Indiana University Press, 1994.

Hailman, Jack P. "Ethology, Zoosemiotic and Sociobiology." *American Zoologist*, vol. 25 (1985): 695–705.

Harari, Yuval Noah. *Homo Deus: A Brief History of Tomorrow*. New York: Vintage, 2017.

Haraway, Donna. *Primate Visions: Gender, Race, and Nature in the World of Modern Science*. New York: Routledge, 1989.

Haraway, Donna. *Simians, Cyborgs, and Women: The Reinvention of Nature*. London: Free Association Books, 1991.

Haraway, Donna. "The Promises of Monsters." In *Cultural Studies*, edited by Lawrence Grossberg, Cary Nelson, and Paula Treichler. New York: Routledge, 1992, pp. 295–337.

Haraway, Donna. *The Companion Species Manifesto: Dogs, People and Significant Otherness*. Chicago: The Prickly Paradigm Press, 2003.

Haraway, Donna, and Thyrza Goodeve. *Modest_Witness@Second_Millennium.FemaleMan©_Meets_OncoMouseTM*. New York: Routledge, 2018.

Hayles, N. Katherine. *How We Became Posthuman: Virtual Bodies in Cybernetics, Literature, and Informatics*. Chicago: Chicago University Press, 1999a.

Hayles, N. Katherine. "Simulating Narratives: What Virtual Creatures Can Teach Us." *Critical Enquiry*, vol. 25, no. 1 (1999b): 1–26.

Hayles, N. Katherine. *Nanoculture: Implications of a New Technoscience*. Bristol: Intellect Books, 2004.

Hayles, N. Katherine. *My Mother Was a Computer: Digital Subjects and Literary Texts*. Chicago: University of Chicago Press, 2005.

Hayles, N. Katherine. "Unfinished Work: From Cyborg to Cognisphere." *Theory, Culture, & Society*, vol. 23 (2006): 159–66.

Ho, Mae-Wan. *Genetic Engineering: Dream or Nightmare? The Brave New World of Bad Science and Big Business*. Penang: Third World Network, 1998.

Honigmann, John J. "The New Attack on Cultural Lag." *The Antioch Review*, vol. 7, no. 1 (1947): 55–63.

Kapica, Steven S. "'I Don't Feel like a Copy': Posthuman Legal Personhood and *Caprica*." *Griffith Law Review*, vol. 23, no. 4 (2014): 612–33.

Kharat, D. K, H. Muthurajan, and B. Praveenkumar. "Present and Futuristic Military Applications of Nanodevices." *Synthesis and Reactivity in Inorganic, Metal-Organic and Nano-Metal Chemistry*, vol. 36 (2006): 231–5.

Kurzweil, Ray. *The Age of Spiritual Machines*. New York: Viking, 1999.

Kurzweil, Ray. *The Singularity Is Near: When Humans Transcend Biology*. New York: Penguin, 2006.

Laland, Kevin N., and Gillian R. Brown. *Sense and Nonsense: Evolutionary Perspectives on Human Behaviour*. Oxford: Oxford University Press, 2011.

Lawrence, David R., and Margaret Brazier, eds. "Legally Human? 'Novel Beings' and English Law." *Medical Law Review*, vol. 26, no. 2 (2018): 309–27.

Lorenz, Konrad. *Evolution and Modification of Behavior*. Illinois: Chicago, 1965.

Lorenz, Konrad. *On Aggression*. London: Routledge, [1963] 2002.

Lumsden, Charles J., and Edmund O. Wilson. *Genes, Mind and Culture: The Coevolutionary Process*. Cambridge, MA: Harvard University Press, 1981.

Malabou, Catherine. "From the Overman to the Posthuman: How Many Ends?" In *Plastic Materialities: Politics, Legality,*

and Metamorphosis in the Work of Catherine Malabou, edited by Brenna Bhandar and Jonathan Goldberg-Hiller. Durham: Duke University Press, 2015, pp. 67–8.

McNally, Phil, and Sohail Inaytaullah, "'The Rights of Robots': Technology, Law and Culture in the 21st Century", 1987. https://www.academia.edu/665116/The_rights_of_robots_Technology_law.

Naffine, Ngaire. "Who Are Law's Persons? From Cheshire Cats to Responsible Subjects." *Modern Law Review*, vol. 66, no. 3 (2003): 346–67.

Naffine, Ngaire. *Law's Meaning of Life: Philosophy, Religion, Darwin and the Legal Person*. London: Hart, 2009.

Nasu, Hitoshi, and Robert McLaughlin, eds. *New Technologies and the Law of Armed Conflict*. Berlin: TMC Asser Press and Springer, 2014.

Newell, Allen, and Herbert A. Simon. "Computer Science as Empirical Inquiry: Symbols and Search." *Communications of the ACM*, vol. 19 (1976): 113–26.

Nussbaum, Martha C. *Frontiers of Justice: Disability, Nationality, and Species Membership*. Cambridge and Harvard: The Belknap Press, 2006.

Ogburn, William F. *Social Change*. New York: B. W. Huebsch Inc, 1922.

Pietrzykowski, Tomasz. "Law, Personhood, and the Discontents of Juridical Humanism," September 28, 2014, available at SSRN, https://ssrn.com/abstract=2502528.

Racine, Eric, and Cynthia Forlini. "Cognitive Enhancement, Lifestyle Choice or Misuse of Prescription Drugs?" *Neuroethics*, vol. 3, no. 1 (2010): 1–4.

Rifkin, Jeremy. *Algeny*: *A New World*. New York: Viking Press, 1983.

Rose, Nikolas. *The Politics of Life Itself: Biomedicine, Power, and Subjectivity in the Twenty-First Century*. Princeton, NJ: Princeton University Press, 2007.

Schippers, Birgit. "Towards a Posthumanist Conception of Human Rights." In *Critical Perspectives on Human Rights*, edited by Birgit Schippers. New York: Rowman and Littlefield, 2018, pp. 68–82.

Settar, S. *Pursuing Death*. Dharwad: Karnataka University Press, 1990.

Solum, Lawrence B. "Legal Personhood for Artificial Intelligences." *North Carolina Law Review*, vol. 70 (1992): 1231–87.

Stone, Julius. *Legal Controls of International Conflict: A Treatise on the Dynamics Of Disputes- and War-Law*. London: Stevens, 1954.

Sung, Jung Mo, "Religion, Human Rights, and Neo-liberalism in a Post-Humanist Era," *The Ecumenical Review*. Accessed March 16, 2020, htpps://www.thefreelibrary.com/Religion%2c+Human+Rights%2c+and+Neo-liberalism+in+a+Post-Humanist+Era.-a0536928202 2018.

Supiot, Allen. *Homo Juridicus: On the Anthropological Function of the Law*. Translated by Saskia Brown. London: Penguin Books, 2017.

Thomsen, Mads Rosendahl. *The New Human in Literature: Posthuman Visions of Changes in Body, Mind and Society after 1900*. London: Bloomsbury, 2013.

Theweatt-Bates, Jeanine. *Cyborg Selves: A Theological Anthropology of the Posthuman*. Routledge, Taylor & Francis Group, 2016.

Tobey, Daniel L. "What's Really Wrong with Genetic Enhancement: A Second Look at Our Posthuman Future." *Yale Journal of Law and Tech*, vol. 6 (2004): 53–160.

Virilio, Paul. "Interview 12: The Kosovo W@r Did Take Place." In *Virilio Live: Selected Interviews*, edited by John Armitage. London: Sage, 2001, pp. 167–198.

Virno, Paul. *A Grammar of the Multitude: For an Analysis of Contemporary Forms of Life*. Translated by Isabella Bertoletti, James Cascaito, and Andrea Casson. Boston: MIT Press, 2012.

Vogel, Steven. *Thinking Like A Mall: Environmental Philosophy After the End of Nature*, Cambridge, MA: MIT Press, 2015.

Wennemann, Daryl J. *Posthuman Personhood*. Belgium: University of Antwerp Press, 2013.

CHAPTER FIFTEEN

Disability, Neo-Materialism, and the Biopolitics of the Project of Western Man: Toward a Posthumanist Disability Theory

DAVID T. MITCHELL AND SHARON L. SNYDER

Over the past two decades, theorizations of posthumanism and neomaterialist philosophy have begun to radically reshape our understanding of what counts as materiality. Matter itself begins to take on a complex, interactive role in the configuration of knowledge and the world, and is in turn shaped by that universe of interactions. According to the posthumanist philosopher of agential realism Karen Barad, "Matter is a dynamic intra-active becoming that is implicated and enfolded in its iterative becoming … In other words, materiality is discursive … just as discursive practices are always already material" (2007: 151–2). For this reason, it is "matter(ing)" rather than matter that most effectively defines the scenes of posthumanist philosophical intervention. And it is this "matter(ing)," too, that occupies our attention in this essay, as we seek to elucidate the key role of disability's ongoing potentiality in the reshaping of the world.

For many readers, the notion of matter will still tend to conjure examples with more clearly delimited boundaries, from the primacy of the atom, to the fleshiness of human and nonhuman bodies, to broader configurations of environment and world. Within this more familiar terrain, matter appears either to promise greater solidity to its discursive counterpart or to serve as a purely overdetermined product of discourse, as in the tradition of social

constructivism.

The urgency of posthumanist attention to materiality thus lies in its challenge to the boundaries that have traditionally posited matter either as given and separate from historical, cultural, and discursive processes, or as the constructed end-product of such processes. This bounded and linear reading of matter that is integral to social constructivism continues to permeate disability studies, thanks in large part to the significance and longevity of the social model. The result is that disability is construed primarily through a discursive fate as synonymous with consignment to biological classifications of undesirable embodiment. Therefore, disability studies now must encounter something amiss in social constructivism itself. Here we contend that such a critique opens up space for an alternative, neomaterialist, posthumanist basis to encounter disability more viscerally.

Posthumanist disability theory offers an opportunity to provide a substantive theoretical reworking of the repetitive employment of impaired—read: socially marked and biologically determined as undesirable—bodies as diagnostic tools of things gone awry in their social and environmental contexts. It is within the terrain of diagnosis that the medical and social models share a common objective in fixing things gone awry. For example, in the instance of the medical model, disability is diagnosed as dysfunction and the impaired individual as incapacitated, thus, in need of fixing through supplementation, surgical intervention, therapy, and training. Alternatively, the social model of disability engages the social difficulties encountered by nonnormative bodies as opportunities to diagnose barriers in the environment forged around narrow norms of aesthetics, capacity, and functionality. While these two diagnostic approaches have profound differences when it comes to their findings (one diagnoses deviant embodiment, the other diagnoses exclusionary social and built environments), they both tend to empty disability materiality of its active participation in fashioning alternative biologies, alternative subjectivities, and viable nonnormative modes of life (human, animal, organic, inorganic). Social model thought also tends to keep in place the barrier between human and nonhuman animals, as the latter continues to resonate as a slander on the former. A posthumanist disability approach provides an opportunity to encounter disability more viscerally as an active participant in the transhistorical, intraspecies, and cross-cultural interactions of materiality, sociality, structures, and environments.

If, as posthumanist neomaterialism proposes, there is an interrelationship between matter and discursive meaning, we need to more tangibly recognize the materiality of disability's active participation in the processes of meaning-making itself.[1] This is not simply because disability must be resignified in more positive, affirming ways; but rather that disability provides the evidence of embodiment's shifting, kaleidoscopic, dynamically unfolding agency. If materiality's excess agency beyond the discursive proves incredibly difficult to capture, disability, with its uncharacteristic morphing rearrangements of matter, makes that task a bit more tangible than it might prove otherwise. Bodies matter, but more than in the influential "citationally iterative" sense that Judith Butler theorizes in her second book titled, *Bodies That Matter* (2011: 6). For Butler both sex and gender are culturally constructed (there is no material essence to their meaning), and this production of the discursive realm opens their meanings up for reinscription. The ability of sex/gender norms to pass as "natural" serves as the product of cultural repetitions that deeply ingrain social meaning in

materialities. Gender performativity (i.e., the "gender trouble" created by the defining instability of sexual identity), then, helps destabilize the cultural status of these "ostensibl[e] categories of ontology" (Butler 2006: xxvii). Their discursive overdetermination offers up opportunities for the destabilizing play of resignification: the citationality of sameness can be used against itself to make the sex/gender terrain of meaning more elastic. However, such formulas of citationality (even in their most radical subversive applications) rely upon a passive substrate subject rather than a more fully agentive corporeality. Such a practice essentially subordinates materiality's agency to the whims of cultural iterations that function as law. In contrast, posthumanist approaches are bound up in the material, discursive interplay that continually reconfigures the world. One does not precede or eclipse the other.

The posthumanist we advocate recognizes that matter itself exerts influence and agency that ultimately outstrips any human ability to deterministically channel its substantiality into false discursive singularities. It makes the diagnostic imperative that reduces disability to a mere barometer of cultural insufficiencies less determinative. It returns disability to its proper place as an ongoing historical process of materiality's dynamic interactionism. It situates disability not as deviant, but rather as evidence for the "excess" that marks materiality's agency and reaches beyond the realm of the cultural while shaping its formulations. In other words, we do not pursue representational, rehabilitative meanings for disability, but rather we take as a starting point the fact that disability is already a part of the process of materiality's active, unfolding participation in the world. It is "world-making" in the cultural sense that queer theory intends (Berlant and Warner 1998: 558), but it is also the *world-making* of difference for which we argue through disability materiality as informed by theorizations of neomaterialist posthumanism. Elizabeth Grosz puts this process in Darwinistic terms as "life as the ever more complex elaboration of difference" (2004: 66–7).

A COMPLEX ELABORATION OF DIFFERENCE

Disability participates in this "complex elaboration of difference" rather than solidifies something gone awry in an otherwise stable process. Embodiment's defining precarity and surprising unfoldings turn disabilities into productive, proactive expressive capacities within matter itself. This alternative approach to materiality intends to "give materiality its due" by avoiding the purely inscription-based models at work in most social constructivist theory (Coole and Frost 2010: 7). Bodies are not "dumb material" upon which sociality simply writes; rather, they actively participate in their own shapings and the shaping of the world of which they are a part (Massumi 2002: 1). Yet, at the same time, posthumanist disability theory is not to be confused with transhumanism. Transhumanism effectively extends the most dangerous inclinations within humanism in that proponents invest in the capacity of a human-directed escape from disability and other late eugenical dreams of an exceptionally capacitated humanity beyond our current one.[2] Posthumanism is an opposition to this belief, perhaps, even, as Cary Wolfe argues it, the "opposite of transhumanism" (2010: xv).

This foundational distinction exists at the heart of what posthumanist neo-materialists are theorizing variously beneath the banners of neomaterialism, nonnormative positivism, and/or posthumanist disability theory. The attempt is to think more deeply about materiality's

agential capacities without continuing to consign disability to a reductively pathologized and thus wholly human discursive fate. In part our attempt is to dislodge the human-centric foundation upon which humanist, liberal philosophy rests; in the next section of this chapter, we expand on the destabilization of the foundations of this figure of hypercapacitated, homogenizing Western man. At this juncture, the roles of materiality in general, and disability materiality in particular, have reached their limit within liberal humanist philosophical formulas of material differences. *Disability therefore must be rescued as the more active, dynamic, and substantive materialization that it is. Or, rather, posthumanist disability theory assists the social model in surrendering its inability to give an ever-mutating materiality its due.*

While social constructivism has largely consigned materiality to a minimalist-made product of discourse, posthumanism seeks to decenter this human-centric understanding by recognizing matter "not as iterative citationality [Butler] but as *iterative intra-activity*" (Barad 2007: 184). Matter makes new worlds of possibility surface even as it often seems statistically deterministic in its evident-ness. Disability, which the social model of disability has tasked as social disadvantage "constructed on top of impairment" (Corker 2002: 8), provides one of the best examples of an overdetermined, constructed, and socially sequestered materiality upon which normative social orders inscribe pathology, undesirability, even nonviability. Whereas difference has now been significantly refashioned as the potentiality of alternative modes of being, social constructivism continues to resist including disability as an alternate becoming. The majority of our extant critical theories have continued to ignore disability in their theories of queer, gender, racialized, classed, sexualized, environmentalist, and intersectionalist approaches to questions of embodiment. This tendency has continued despite active attempts to reverse this telling omission from social justice approaches, such as those of Robert McRuer (crip/queer theory), Carol Thomas (feminist theory), Nirmala Erevelles (critical race theory), Jim Charlton (neo-Marxist theory), and Alison Kafer (sexuality studies), among many others.

We think that we know disability when we see it and that seeing, itself a privileging of an ableist capacity of a singular form of interactionism, involves encountering a limit with which most disciplines about materialist embodiment would rather not associate. Even the social model's culturally constructivist emphasis puts aside the question of direct encounters with the substantiality of nonnormative embodiment. As the authors of the Union of the Physically Impaired Against Segregation (UPIAS) put it in their 1972 white paper on disability: "It is only the actual impairment which we must accept, the additional and totally unnecessary problems caused by the way we are treated are essentially to be overcome and not accepted" (UPIAS). While it may at first appear that UPIAS anticipates a material encounter with disability ("It is only the impairment we must accept"), the admission dispenses with the need and moves immediately to an analysis of the sources of cultural oppression: "the additional and totally unnecessary boundaries" of socially constructed exclusions. The application of disability as the product of oppression situates nonnormative materiality as somehow inappropriate for, even threatening to, and certainly beside the point of, political discourse.[3] It must be accepted and immediately set aside as a private matter in order to deal with the exposé of the public forces of oppression. Within this formulation and

its many offspring, disability, then, could be argued to serve as a holdover from antiquity. Impaired bodies continue to provide the illusion of ways to reliably anticipate less viable forms of embodiment and thus determine in the language of contemporary cost/risk analyses those bodies in which society should not invest. The payoff appears too meager, and, thus, the investors likely unrequited.

Yet, as studies in the sociology of medicine recently show, what appears to be a body's discordant sidestepping of a more stable program—one organism only possesses as an illusory investment in their own non-morphing capacitation into the future—is actually the historical unfolding of a mutating, adaptive materiality responding to alterations in environmental conditions, internal stresses, inorganic/organic entanglements, fluctuating stimuli, and historical conditions of cultural practice. While mutations recognized as impairments might appear undesirable and "incapacitating," the conditions to which they respond are often far more deleterious. Examples of this insufficiency of predictive capacities abound: from the iron overloads of hemochromatosis to counteract bubonic plague (Moalem & Prince 2008: 18), to red blood cell mutations that render malarial infestations less effective (Neese and Williams 2012: 6), to esophageal atresia in order to protect the fetus from ingestion of high iron or mercury content (Mitchell and Snyder 2016: 488), to name just three. Thus, many contemporary societies continue to treat the alternative responses of nonnormative materiality as discordant, while, in fact, our understanding of these alternative routings remains inexact at best, and deleteriously dehumanizing at worst. We tend to avoid reading disability in this sense as specifically contextualized forms of (in)capacitated organismic expressions particular to their own agential histories of adaptation, disruption, and inventive misfirings foundational to replication itself. As Christopher Boone explains in Mark Haddon's *The Curious Incident of the Dog in the Night-Time:*

> And there is life on Earth because of an accident. But it is a very special kind of accident. And for this accident to happen in this special way, there have to be 3 conditions. And these are
>
> 1. Things have to make copies of themselves (this is called Replication)
> 2. They have to make small mistakes when they do this (this is called Mutation) ?
> 3. These mistakes have to be the same in their copies (this is called Heritability)
>
> And these conditions are very rare, but they are possible, and they cause life. And it just happens. But it doesn't have to end up with rhinoceroses and human beings and whales. It could end up with anything. (Haddon 2004: 165)

While the narrator who may be placed on the autistic spectrum helps to summarize a fully Darwinian theory of evolution in this simple text formula, the novel seeks to point out that such "mistakes" are in fact the source of species diversity. Thus, the question is less about deleterious differences than about organismic agential materiality that is fully prediscursive. Christopher's elaboration on genetic replication allows for no anticipation of undesirable organismic expressions, but rather a blueprint for anticipating material diversity as inevitable (and, we might add, even desirable).

The practice of using disability as predictive of life-forms in which we should *not* invest allows a certain confidence in the slippery concept of difference as undesirable to creep back into our social justice investments. Within this scenario of deviant matter, disability has little to offer beyond functioning as a vehicle for exposing certain arrays of disadvantageous material expressions, or at most, an embodiment through which to know the world's

exclusions, intolerances, and inhumane discriminations. This is disability's dual diagnostic function in the medical and social models that a disability studies-based neo-materialism helps to expose, reconnoiter, and rewrite. Disability, within these limited formulas, has nothing to tell us about the alternative agencies of becoming. It offers no ethical map to productive divergences of being-in-the-world from which we may learn, adopt, and adapt. It refuses crossings of the species barrier, where, for instance, Dawn Prince-Hughes argues gorillas helped her become more human (2010: 4), or where Temple Grandin argues that her participation on the autistic spectrum enables her to go when imagining the perspective of cattle (Grandin and Johnson 2005: 20).[4] For Christopher Boone, Prince-Hughes, and Grandin, this "freedom" to cross species boundaries provides an opportunity in posthumanist disability studies to pursue alternative applications of ethical behaviors that may have nothing to do with a more typical normative exchange quotient where everything is undertaken in order to receive some form of reciprocity. These are human-nonhuman relations that do not depend on an exchange of the nonhuman animal's return of feeling for the experience of connectedness.

Consequently, through a variety of animal crossings and intra-agential encounters with organic and even inorganic life, the neomaterialist or non normative positivistic approach participates in what Cary Wolfe describes as a view of matter that is not "posthuman" in the sense of being "after embodiment," but rather is critical of the "fantasies of disembodiment and autonomy, inherited from humanism itself" (Wolfe 2013). In the first instance, impairment surfaces as a serious question that feminist disability studies originally introduced to disability studies' own fantasies of disembodiment through the concept of "impairment-effects" (Thomas 1999: 42). According to Carol Thomas, impairment-effects are those aspects of disability embodiments that cause disabled people to struggle with incapacity and often prohibit them from pursuing lives of robust political citizenry as the result of being what Asma Abbas refers to as "agency-impaired" (2010: 133). To be "agency-impaired" is to fall short of a leftist political investment in bodies actively pursuing their rights as a display of the agency-fetishizing signs of fully capacitated, even while marginalized, citizens. As Spike Lee memorably puts it in his film of racial unrest, *Do the Right Thing*: "Fight the powers that be." Yet what Abbas points out is that such an idealization of citizenry neglects the lives of those who must labor to scrape out their basic needs on a daily basis, those bodies who, by definition, do not promise transcendence to a transhumanist overcoming, but rather are fully posthumanist in their composition, behaviors, and tactical alternatives of living. Many disabled lives can be found beneath this category and, in ignoring it by idealizing the rights-slinging alternative, we miss what these lives that matter have to teach us. Disability artist Micah Bizant creates portraits of those killed by police violence in the Black Lives Matter movement by emphasizing their deaths as an outcome of the compounding intersections of race, gender, and disability.

Consequently, the posthuman turn participates in the decentering of liberal classical man from the equation of the demands of materiality as in the above examples of Abbas's "low-level agency" participants and Bizant's intersecting identity portraits. Posthumanist approaches provide alternative pathways for investigating nonnormative and nonhuman embodiments as a source of insight and the alternative agential participation of materiality in

knowledge production. It is no longer possible in this formulation to see disability as a deviance from able-bodiedness. Instead, posthumanist disability theory actively avoids thinking about disability as some preexisting, external force that throws instability into an otherwise stable pattern or code. Rather, mutation (particularly when characterized as disability) names "the randomness which is always already immanent in the processes by which both material bodies and cultural patterns replicate themselves" (Rutsky 2007: 111).

Disability, then, is matter in motion and the exposure of the lie through which we think materiality as a stable baseline of limited plenitude. Borrowing from these recent traditions that feed into posthumanist neomaterialisms, we seek to explore how the matter of disability *matters* beyond its diagnostic positioning since at least the fifteenth century as a depreciated socially inscribed deviant surface alluding to the inferior depths within. As Foucault points out, the concept of man is rather recent (1994: 386). As opposed to continuing to accept the assumption of disability studies that disability primarily organizes our exposés of oppression, we argue that bodily variations discursively mapped as "impairments" do not merely mirror prejudicial interpretations of contra-aesthetic, dysfunctional, unexamined lessons of those living in under-capacitated bodies. Instead posthumanist disability theory takes as a starting point the idea that matter is neither inert nor simply inscribed by cultural forces against its interests. In order to derive this alternative approach, we pursue disability as the space of possibilities opened up by the "indeterminacies entailed by exclusions" (Barad 2007: 230). In other words, the alternative modes of becoming that even the most severe impairments offer involve the promise of an alternative agency that reshapes the world and opens it up to other modes of (nonnormative) being.

Thus, we begin to return full circle from our starting point in contesting the notion that disability is *only* capable of being resignified, as this would be the constructivist end point. Even more significantly, we insist on the ways in which the materiality of impairment opens up new worlds of potentiality. Materiality's mattering is an active participant in the resignification process, as knowledge has to keep shifting in order to keep up with mutating matter and vice versa. As Lynn Huffer argues for as the creativity of queer lives, disability alternatives make available "an ethical frame that can actually be used as a map for living" (2009: 48). Able-bodiedness is a boundary-making process that relies on pejorative concepts of disability to see itself as privileged and desirably capacitated (Diedrich 2001: 219). In this sense, able-bodiedness needs disability to embody devalued states of existence in which to showcase its own capacitated desirability. Robert McRuer refers to this centrality of disability to ability as the latter's provision of a "mutually constitutive" inside for heteronormative able-bodiedness (2006: 4). Within able-bodiedness's parasitism exists a disability host. One cannot exist without the other, but to yield only to exposés of this interdependency of binaries further erodes disability's material promise. This is a primary degenerative relationship promoted by social constructivist thought that posthumanist disability theory as imagined here intends to throw into question.

What might a posthumanist disability theory tangibly offer to our understanding of materiality's agential participation in the world? To open up this question, allow us to explore how disability has played a key role in the critique of Newtonianism by Quantum Physics based on a sequence of disability insights. Karen Barad points out that Newtonian physics

argues one cannot both gauge the materiality of the measuring instrument and, at the same time, use the instrument to gauge the properties of the object/field to be measured. This separation helps Newtonian physicists in arguing that a "cut" (a distinct separation exists) between measurer and measurement device that makes neutral observation of the properties of another possible. In order to critique this reigning distinction of faith in scientific neutrality, Barad takes up the formulations of Quantum Theory (particularly the thought of Niels Bohr), who critiqued Newtonianism through an elaboration of the inextricability of matter and measurement. One of Bohr's nodal points of entry for articulating a critique of Newtonianism is a man holding a cane and standing in a dark room—first sensing its "weightiness" and then employing the cane to sense the immediate environment around him. In this arrangement, as Newtonian physics premises, a cut between observer and observed erupts as the experimenter is consigned to either paying attention to the materiality of the instrument of measurement or engaging in the act of measuring an external materiality. This either/or partition creates the Newtonian foundation for claims that the observer can be separated out from that which is observed. This subtraction of the observer from the observed produces the prized product of neutrality.[5]

Many disability studies scholars will recognize (as did the philosopher of phenomenology Maurice Merleau-Ponty) Bohr's description above as one akin to the use of a blind cane by those with visual impairments (2014: 144). "Travel caning" involves the arc-like swings of a white cane with a ball on the end of it to "feel" out the terrain before one. It also involves holding the rubberized handle in one's hand with an artful, slackened grip to produce the most sensitive read of the topography ahead. In fact, the feel of the materiality of the cane and its interaction with the environment are simultaneously pivotal to a successful blind navigation of the world. In contrast, Newton's formulation erects a separateness in that one is either sensing the weight of the stick, the stickiness of the handgrip, the bounce of the ball, the flexing weight of the cane, or taking a reading of the surface of a sidewalk, for instance, in order to pick the least barrier-ridden route. The latter activity involves the displacement of the former and vice versa.

Through an alignment with Bohr's alternative argumentative pathway that explains materiality as an active participate in measurement, posthumanist disability theory allows us to recognize that impairment is not separable from interaction with the environment in the ways Newtonianism tends to posit; this contentious nebulous zone of materiality's interactionism exists at the heart of agential realism. Attention shifts back and forth between materiality and measurement, and neither can be held in a distinct partition as definitively separable from the other. To extend this disability insight at the heart of her book, Barad draws from the disability studies analysis of Lisa Diedrich to argue that late disability memoirist Nancy Mairs's intra-agential relationship to her Quickie P100 power wheelchair shows that the machine cannot be separated from the person (Barad 2007: 158). When the machine goes down, so does Mairs's body, and thus one is not simply the conveyance vehicle of the other (fleshy) occupant. This is no mere prosthetic relation.

In addition, we would argue that the assertion made by Donna Haraway in her eponymous "Cyborg Manifesto" helps critique Newton's either/or argument in this regard: when one uses prosthetic equipment, one has to both sense its materiality and navigate an environment, as

the lack of ease of detachable parts makes the difficult merger of materiality and machine chronically enmeshed. When a wheelchair user, for example, sits on a cushion placed on top of a metal platform, one will, at first, sense the cushion, the feel of its surface—hard, soft, narrow, ripped, ribbed, and then, not long in the future, increasingly come to sense the unforgiving materiality of the metal platform mattering beneath the foam. Over the course of use, through the daily positioning in a power wheelchair, one realizes that the wheelchair's navigation of surfaces—its measuring function—certainly coexists with some sense of the materiality of the metal platform on top of which one sits; the joystick that one manipulates to navigate the environment; the whir of the wheels and motors as they canvas various surfaces; screen readouts on the control pad that interact with the visual and audio inputs of cognition; the pressing of the plastic arm rests into the fleshy arms that creates an indent in the foam cushion beneath and wears a groove in the bone above; the movement of one's body based on a pace set by the machine to which one is connected and other machines to which one is not, and so on. Awarenesses of the device, one's body, and the surface traversed all occur simultaneously and do not exist in a Newtonian "cut" as separable from each other. This is one of the alternative ways that disability materiality holds a heightened sense of materiality's intra-agency with various forms of what is often euphemistically called "human enhancement."

Furthermore, at the core of the neomaterialist argument is the interrogation of an assumption about the "vital, self-organizing, and non-naturalistic structure of living matter itself" (Braidotti 2013: 2). Posthumanism's alternative enjambment of "naturalcultural" is gradually replacing the stricter binary partitioning model of a nature-culture divide that has so dominated our conversations about materiality in general (King 2003: 2).[6] Stacy Alaimo's influential concept of transcorporeality, with its emphasis on the intermeshed qualities of human and "more-than-human nature," also resonates here (2010: 2). A critique of the assumed "cut" between the binary terms of disability and ability enables a further movement into encounters with multiplicity as the "diffraction pattern" they represent. An opposition to normative ability no longer proves tenable as a simple dualism. Those results that fall outside of the norm and, therefore, cannot be explained (or normed) and thus, discounted as mistakes, now provide an opportunity to focus on variance as a way to read the noncompliance of matter with measurement's standardization within disciplines of alternative embodiment, including quantum physics, posthumanism, black feminist materialisms, disability studies, and queer theory.

Nonnormative ability can no longer reliably operate as an expression of mere deviance from baseline normativity. As Jane Bennett puts it in her analysis of Lucretius's imaginings of bodies falling in a void: "Bodies … are not lifeless stuff but matter on the go, entering and leaving assemblages, swerving into each other" (2010: 18). Deviations in all measuring systems exist, yet posthumanist disability theory recognizes these waverings from a fictional normative baseline as, in fact, the activity of materiality's continuous reconfiguration, or materialization, of the world itself. The rearrangement of these concepts becomes one of the critical means by which we tailor more suitable schemes for scrutinizing the present and its historical relations with, for instance, the now crumbling project of Western man.

DESTABILIZING THE PROJECT OF WESTERN MAN

The colonized subject cannot experience her or his nonbeing outside the particular ideology of western Man as synonymous with human. (Weheliye 26)

To fashion the collective alternative methodological approaches we imagine here, posthumanist disability theory draws upon the insights of neo-materialism as a way to imagine materiality as enacting its own demands upon the social and discursively overdetermined world of poststructuralism. This is not to dispense with the semiotic slippage so central to post-Derridean analytical techniques, but rather to further pressure the overdetermined role of discursivity in relation to material agencies. As explained in the previous section, posthumanist methodologies foreground disability's "strange agencies of natural-cultural processes" as offering multiple pathways for reimagining the alternative flows of dynamic embodiment (Alaimo 2016: 107). This approach allows us to analyze what we refer to as the fundamental instability of the post-Enlightenment project of classical man.

First, posthumanist disability theory positions the Western humanist project, classically represented in Leonardo da Vinci's model "Vitruvian Man" (1487–90), as incommensurate with contemporary approaches to materiality and embodiment. In our last book, *The Biopolitics of Disability*, we refigure classical man by offering an alternative disability vision of "Vitruvian Man with CP" on the book's cover. This figuration further exposes the privileged contours of Leonardo da Vinci's classical ideal as one that is thoroughly racialized (white), gendered (male), sexualized (heteronormative), aesthetic (symmetrically proportioned), and capacitated (hyper-able). The classical "Vitruvian Man" features standards of capacitation that distance him from other embodiments as they are hypermarked by difference and denigrated based on the absence of the unmarked qualities attributed to any historical period's specific universalized concepts of normativity (Mitchell with Snyder 2015: iii). Posthumanist disability theory, then, exposes the historically and socially particular constellation of embodied properties that have gone into the making of Western man as a culturally centric, time-bound, and now failing product of the post-Enlightenment. Its quantitative and qualitative proportions have accompanied the ongoing upsurge of territorial and cultural expansions informing the realization of a European world system of global imperialism over other(ed) bodies since the eruption of the "Age of Discovery."

For instance, in Magarita Zamora's translation of Christopher Columbus's "Letter to the Sovereigns" of March 4, 1493, he describes his New World anthropological encounters through a series of embodied displacements of racialized, gendered fantasies onto the indigenous islanders of what is now mapped as the Caribbean Islands but to which Columbus referred to as "The West Indies" (Zamora 1993: 3). One island (Matenino) has a population of all women "without a single man" who "use military weapons and other masculine practices" (8); another island (Caribo) is populated by "those who eat human flesh" and grow their "hair very full, like women" and are willing to copulate with Matenino women, while other men fear bodily mutilation from such encounters; there is an island (Jamaica) with all bald inhabitants; and an island (Cuba) of people "who are born with tails" (8). The description arrives despite the fact that Columbus explains he has had almost no commerce

with the indigenous peoples because they run away when his Spanish caravels approach. In *Carnal Inscriptions*, Susan Antebi argues that Columbus's lack of actual contact with indigenous people bearing the traits he describes allows for a European notion of monstrosity to function as a metaphor for indigenous alterity that is always projected and displaced. Corporeal otherness thus becomes a justification for exploitation and conquest, but also a site of absence—a flight from a more intra-agential encounter with the materiality of those encountered—that will continue to impact the network of material and discursive relations between imperial and colonial locales (Antebi 2009: 26–8).[7]

In the same letter containing these demographic fantasies of nonnormatively embodied islanders, Columbus argues that the discovery holds particular promise for the Spanish king and queen who financed the endeavor because a militarized force could dominate such multiplicitous embodiments with its own superior regularity of armed capacitation in a matter of weeks. Once colonized, the island resources and slave labor could be extracted and sent back to Spain to boost its coffers. Another key goal of this imperial project was to begin the expansion of a "world system" of colonialism that had the reconquest of Jerusalem from its Muslim inhabitants as the penultimate future objective (Columbus 7). As Aníbal Quijano argues, the colonization of the Americas produces the modern notion of racial difference and global capitalism as intertwined, mutually dependent processes. The resulting and ongoing "coloniality of power" is thus defined through labor exploitation as continuous with racialization, or differentiated and denigrated embodiment (2000: 536–40).[8]

Thus, colonialism, projected fantasies of nonnormative embodiment, Christian crusading, the rise of capitalism, and global conquest form the support pillars of European ableist imperial fantasies from 1493 onward. The figure of classical man in relation to which this imperialist project is imagined situates Leonardo's "Vitruvian Man" as the instantiation of a biologically superior basis for a justification of conquest. The project of Western man, as black materialist feminist theorists such as Alex Weheliye (2014) and Sylvia Wynter (2014) point out, is eroding in Ozymandias-like ways because of the slow historical decay of properties that have proven increasingly biased based on their emphasis on the deficiency of some bodies. Both Weheliye and Wynters argue that the articulation of the project of Western man can be nothing but incomplete, as it excludes the historical, cultural, and material particularity of people of color from its colorless presentation. In Weheliye's terms, the principal goal of black studies is "to disrupt the governing conception of humanity as synonymous with Western Man" (2014: 5). Likewise, according to Katherine McKittrick, Sylvia Wynter notes that the "correlations in this image ['Vitruvian Man'] between the Human body and the universe hide the fact that the body depicted and the experience upon which Leonardo was relying was a Greco-Roman concept of the human figure" (McKittrick 2014: 109). Such a project proves inherently disqualifying for most, and for crip/queer/racialized people in particular as their radically diverse and evolving embodiments challenge the static vision of desirability that Vitruvian Man imposes. Alternatively, posthumanist disability theory positions the spastic, racially hybrid, polymorphously sexualized, androgynous, arms-and-legs-akimbo multiplicity of "Vitruvian Man with CP" in its place.

Consequently, in the incomplete and now increasingly abandoned project of Western Man,

disability can claim some contribution to bringing about this "productive failure." Halberstam points out in *The Queer Art of Failure* that what has been historically understood as queer people's inability to achieve a heteronormative baseline of adulthood in fact represents the unfolding of their alternative cultural and material agencies (2011: 31). Such divergent expressions of adulthood are based in the productive eruptive potential of queerness itself. Likewise, Rosi Braidotti points out that "the allegedly abstract ideal of Man as a symbol of Classical Humanity is very much a male of the species; it is a he. Moreover, he is white, European, handsome, and able-bodied" (2013: 24). To counter monistic celebrations of Leonardo's "Vitruvian Man" as the basis of the project of imagining Western Man, Braidotti offers up the image of "New Vitruvian Woman" as an alternative to the representation of male embodiment.

While whiteness and maleness have long dominated critiques of classical humanism, "handsomeness" and "able-bodiedness" arrive as a startling eruption in Braidotti's philosophical formulation. This twining of aesthetic with able-bodiedness augments the racialized and engendered coordinates in the realization of Western man's classical contours. We rarely think of masculine appearance and bodily capacity as qualities of Enlightenment embodiment; likewise, disability, both aesthetic and functional, rarely impresses itself as necessary to exclude so specifically.

What is the meaning behind this inclusion of ability in the classical formula of "the human" that Braidotti so tellingly cites without further elaboration? Why might disability prove central to alternative formulations of "the posthuman"? First, in addition to heteronormative masculinity, the creature that Braidotti cites also comes with its class privileges intact. Her analysis borrows from Cary Wolfe's description of the "Cartesian subject of the cogito" defined as the "subject as citizen, rights-holder, property holder and so on" (Wolfe 2010). As a product of the convergence of gendered, racialized, sexualized, and class characteristics, the classical body of humanism has grown necessarily endangered as a unit of common belonging for the human (and, Wolf would add, nonhuman) species. Braidotti's calling out of the figure as a "he" brings attention to the fact that the Vitruvian is also excessively able-bodied in presentation. Seven and a half heads tall, four-limbed (if we allow for its display of range of motion that creates an appearance of eight limbs), a fully flexible range of motion in each appendage, sculptured musculature, symmetrically proportioned, and well balanced on one or two legs, the Vitruvian Man defies all specificity of corporeal variation.

Such impossible coordination of parts conceals any apparent embodied idiosyncrasy, and thus proves akin to William Carlos Williams's exclamation in his poem about Elsie, a maid with a "broken-brain," that the "pure products of America go crazy" (1991: 217). This defining undesirability of purity (i.e., the genetic equivalent to the mass production of homogeneous replication) fully situates the forms of eugenicist human exceptionalism that posthumanist disability theory employs as ready to critique. Particularly as the world grows increasingly toxic, as medical science harbors the capacity to keep more kinds of bodies alive, and as disabled bodies expand their material presence as participatory subjects in exclusionary human-made environments, posthumanist disability theory asks how variation might serve as the foundation for modes of reconfiguring, reimagining, and renavigating the

world?

Posthumanist disability theory thus attempts to reverse this Eurocentric foundational insight by joining in an outpouring of racial/gendered/trans/classed/disability critiques of the classical humanistic concept of Western man as based on a form of domination over othered bodies that deviate from its zero-degree game of sameness. As Wynter's philosophy explains, "Once the universality of the Human has been postulated—and we encounter this formulation in many official documents telling us that humans 'are all born equal'— hierarchies are needed and put into place to establish differences between all who were 'born equal'" (McKittrick 2014: 109). Specifically, posthumanist disability theorists critique the formulas of Western man that treat cognitive, physical, sensory, and psychiatric differences as faults localized in individual bodies rather than as revelatory of a more agential materiality's defining multiplicity.

Posthumanist philosophers commonly cite "human enhancement" as one cornerstone of this pursuit to seriously decenter the individual figure of Western man as self-contained and biologically intact. Much of this discussion is based on a contemporary technological fetishism of products (or potential products) that take disabled people as their test market in the hopes of moving adaptive devices out into the wider consumer market. Or, perhaps even more problematically, as tech products fail on the mass market such consumables are sloughed off onto disabled people as a second-tier offload of useless developments. We witnessed this for instance in the US response to post-earthquake Haiti when closets of uncirculated prosthetics (wheelchairs, canes, walkers, and various assistive devices largely rendered useless in such an environment) were dumped into Port-au-Prince for "charitable" tax benefits. As a formidable test market, disabled people are commonly considered to possess materiality in "obvious" need of supplementation, and thus the direction of "human enhancement" takes on a "helping aura" formerly associated almost exclusively with the rehabilitation therapies (physical, occupational, speech, and others). Donna Haraway famously identifies "paraplegics and severely handicapped people" as having "the most intense experiences of complex hybridization with other communication devices" (1990: 315–16).

Many disabled individuals we know describe their relationship to their assistive devices (communication or otherwise) in terms that resonate with "complex hybridization," but nevertheless Haraway's definition suggests a relationship of human and machine that comes off as a bit too breezy. These interactions between material bodies and machines generally prove anything but comfort ridden and usually signal the degree to which one arrives, at best, in a détente with supplementary equipment.[9] Vitruvian Man has no adaptive technology on his person, and, thus, any prosthetic encumbrance draws crip/queer figures outside the lines of the enfolding circle of symmetrical normalcy in which he or she finds a more transitive conception of self buffered from harm.

Like its new materialist predecessors, posthumanist disability theory certainly emerges from recognitions that the Anthropocene has engendered the agency of humanity to such a degree that the human now functions as akin to a geological force capable of affecting all life on the planet (Braidotti 2013: 5; Alaimo 2016: 1). This force has marshaled significant destructive impact on what we know as the material world from the fifteenth century to the

present day. Because the dominating figure of Western man has been key to the consolidation of this destructive and anthropocentric framework, posthumanist disability theory has to participate in collapsing the stability of fantasies of embodied normative power. A key challenge is to contest the imposition of a stable mode of desirability and functioning over forms of materiality that are devalued because of their excessive differentiation. Thus, a posthumanist disability theory secures the chain that may bend the figure of classical European normative masculinity at the ankles and drag it further to the ground.

Posthumanist disability theory elaborates on the specific modes of differentiated embodiment materialized and impacted through relations between human and nonhuman, organic and inorganic bodies and environments, and in particular through agricultural and military forms of toxicity that give rise to biopolitical notions of sacrificial subjects such as Mbembe's "necropolitics" and Giorgio Agamben's "bare life." Both of these consciously pursued devaluation schemes are defined as the state-sanctioned material destruction and intentional disablement of human bodies and populations deemed expendable (Agamben 1998: 6; Mbembe 2003: 14). Alexander Weheliye champions Mbembe's approach and depreciates that of Agamben, based on the former's inclusion of targeted colonized subjects and the latter's emphasis on a universalized, abstracted concept of subjection to power-knowledge as in the Foucauldian tradition of European philosophy (2014: 63). Yet, to be fair, Agamben deals directly with disability populations in his analysis of Nazi eugenic formulations of "life unworthy of life," while Mbembe and Weheliye leave disablement as a material imposition of violence on bodies. Posthumanist disability theory straddles each of these terrains, as it neither avoids a Marxist tradition of employing disability as proof of industrial capitalism's destructive power nor eschews attention to materiality's morphing, creative, corporeal rearrangements.

Furthermore, part of the reformulation of Western man involves a radical reassessment of the relationality between animal and human bodies (that which Wolfe refers to as "the animal turn" [Wolfe 2013]). Whereas humanism has aggressively promoted the controlled breeding of animal and plant bodies in order to increase yield, deny decay, and expand profits, such schemes of genetic direction have produced enormous disability-relevant alterations in human, nonhuman, organic, and inorganic environmental conditions. Pesticide development, for instance, not only alters the nature of what one ingests, but also threatens the migrant, lower-class bodies that clear, maintain, prune, and harvest the fields. In these agrarian locales capacitated labor power is extracted and worn into disabled bodies as a nearly inevitable outcome of the ways in which repetitious movements ultimately deny the very capacities on which they are initially valued. They are also those bodies that get "dusted" by pesticides sprayed across environments by "crop dusters" circling above (Rich 1991: 3).

Thus, racialized, devalued embodiments become excessively open to exposures that presumably keep the post-Enlightenment body safe, definitively intact, and capacitated for overproduction. Privilege operates as an ability to seal off one's body from deleterious encounters with toxicity. Falsely buffered from his own carcinogenic products, Western man gradually ingests a productive portion of the "slow death" he sows and can only fantasize an escape hatch from such hazardous exposures (Berlant 2007: 754). His positioning at appropriate distances from the site of production for safekeeping does not prevent the

animacies of such toxins from incorporation into his own bodily domain (Chen 2012: 218). In addition, industrial farming has erased the presence of framers and farmworkers across Norther and Southern Hemispheres and, in moves reminiscent of the dust bowl 1930s, kept extended families adrift and without access to the education, affiliation, health care, employment tenure, or organization requisite for empowering allies.

To a significant extent, this inability to buffer the farmer's or migrant worker's exposure to materiality's rewriting at the core of all being drifts from zones of agricultural production to necropolitical zones of conflict where expendable bodies are defined by forms of state-imposed immobility. The techno-military proliferation of microconflicts on a global scale has given way (largely via drone strikes and the arresting of refugee and immigrant movements at the southern US border) to new levels of administered violence. These new geographical displacements of populations result in a physical dislocation on the outskirts of a more bounded and desirable humanity. Mbembe refers to this placement across a long *dureé* in abjected physical space as a key characteristic of "the postcolony" (2003: 103). The material locations of such bodies position them as targets and thus their expendable peripherality coincides with their immobilizations in various fenced-off elsewheres. Aerial thanatic delivery systems merge artificial intelligence, cybernetic gaming, and human operators in a new formula of death with distance (Braidotti 2013: 44–5). As Jasbir Puar points out, the Gaza Strip can be recognized as a physical collection point that defines all bodies within it as expendable with respect to their peripheral location outside and within the borders of Israel (Puar 2015: 2). The Gaza Strip in Puar's terms is now the world's largest open air prison. Such quarantined populations experience their lives as an offshoot of the excessive exposures to death and disability that are justified as a result of their immobilized, extreme localization in the occupied territories of contemporary settler colonialisms.

While militarized militias use civilian populations as their cover and as governments consciously place those defined as expendable at a physical distance in temporal, makeshift detention camps for the excessively diasporic, those same peripheral citizenries find themselves increasingly subject to what Elaine Scarry describes as the two primary products of war: death and disability (1987: 12). Thus, posthumanist disability theory encompasses an extraordinarily complex nexus of mutating bodies, including semi-permeable interactions between human, nonhuman, and inorganic animacies; environmental toxicities and the mutating bodies they produce; quantitative and qualitative measurements of capacities, functionalities, and aesthetics; pharmaceutical and cybernetic trafficking in ways of rewriting material subjectivities; the economic unfoldings of profit where products cause disease and then the same corporate producers provide the therapies to treat the impaired bodies their runoffs produce; amputee fantasies of incapacitated bodies performed by able-bodied actors that retain all but the material specificity of the bodies in question; nonhuman and human animals cross-referenced as mutually devalued and, therefore, euthanasia-worthy; forms of mobility and environmental sensitivity that preclude a more robust participation in "natural" landscapes; as well as the targeting of disabled racialized bodies as unarmed threats to an excessively militarized police force. All of these topics posit the "unique mattering" of posthumanist disability embodiments that reveal uncanny capacities where only unproductive incapacity was imagined to reign.

The neologism 'intra-action' signifies the mutual constitution of entangled agencies. That is, in contrast to the usual 'interaction,' which assumes that there are separate individual agencies that precede their relationship, the notion of intra-action recognizes that distinct agencies do not precede, but rather emerge through, their intra-action" (Barad 33).

The 2013 documentary film *Fixed: The Science/Fiction of Human Enhancement* offers an excellent elaboration of debates surrounding transhumanism, disability, and ableism.

In *The Biopolitics of Disability: Neoliberalism, Ablenationalism, and Peripheral Embodiment*, we call this neomaterialist methodology within disability studies "nonnormative positivisms." The definition offered of this alternative approach to imagining disability runs as follows: "Disability Studies scholars are caught in their lives and their theories between two zones of negativity without something akin to 'nonnormative posivitisms.' Without alternative materialist approaches there exist few ways to identify the creative interdependencies at the foundations of disability alternatives for living addressed in our existing traditions of thought. Disability studies, in the years to come, must be able to address what crip/queer bodies bring to the table of imagining the value of alternative lives, particularly lives that exist at the fraught intersections of marginalized identities such as disability, race, gender, sexuality, and class …. There is a great need for an ethical methodology from which disabled people can articulate how their lives bring something new into the world that may otherwise go unrecognized. Nonnormative positivisms provide alternative spaces from which to discuss options for living within alternative embodiments (those designated here by lives lived in peripheral embodiments) as a critical third rail of disability experience" (2015: 5–6).

There have been a number of disability memoir-related works published within the last few years wherein disabled narrators (particularly those on the autistic spectrum) argue that their "oversensitivity" to touch and lowered reliance on vision allow them to cross the species barrier and enter into the worlds of animals with a greater degree of sensitivity and identification. One of the most significant examples of this claim occurs in Mark Haddon's novel *The Curious Incident of the Dog in the Night-Time*. The novel explores the narrator, Christopher Boone's, uncanny transspecies crossings with the neighbor's dead dog and his own hamster. We also discuss Christopher's articulation of Darwinian evolutionary theory later in this essay.

Other new materialist scholars in addition to Barad have emphasized the significant impact of quantum physics on philosophical approaches to materiality. For example, as Diana Coole and Samantha Frost write in their indispensable introduction to *New Materialisms: Ontology, Agency, Politics*, "Theoretical physics' understanding of matter is now a long way from the material world we inhabit in our everyday lives, and … it is no longer tenable to rely on the obsolete certainties of classical physics as earlier materialists did" (2010: 12).

Katie King argues that one way to evaluate the effectiveness of a feminist transdisciplinary practice it to index how "well it opens up unexpected elements of one's own elements in lively and re-sensitizing worlds." Thus, our attempt in this chapter to approach disability materiality in "ways of participating in multispecies learning or self-organization across ecologies, mattering without owning the action" (2003: 2).

Also see Palencia-Roth (1996) for further discussion of monstrosity as a trope within the project of European conquest.

Shaun Grech's (2011) work on disability in the global South effectively contextualizes Quijano's discussion of coloniality in relation to disability and contemporary global capitalism (94).

Vivian Sobchack's (2004) discussion of her experience of embodiment with a prosthetic leg offers detailed and complex insight on the lived materiality of human enhancement and disability. See her chapter "A Leg to Stand On" (205–25).

SOURCES CITED

Abbas, Asma. *Liberalism and Human Suffering: Materialist Reflections on Politics, Ethics, and Aesthetics*. New York: Palgrave Macmillan, 2010.

Agamben, Giorgio. *Homo Sacer: Sovereign Power and Bare Life*, Stanford University Press, 1998.

Alaimo, Stacy. *Bodily Natures: Science, Environment, and the Material Self*. Bloomington: University of Indiana Press, 2010.

Alaimo, Stacy. *Exposed: Environmental Politics and Pleasures in Posthuman Times*. Minneapolis: University of Minnesota Press, 2016.

Antebi, Susan. *Carnal Inscriptions: Spanish American Narratives of Corporeal Difference and Disability*. New York: Palgrave Macmillan, 2009.

Barad, Karen. *Meeting the Universe Halfway: Quantum Physics and the Entanglement of Matter and Meaning*. Durham and London: Duke University Press, 2007.

Bennett, Jane. *Vibrant Matter: A Political Ecology of Things*. Durham: Duke University Press, 2010.

Berlant, Lauren. "Slow Death (Sovereignty, Obesity, Lateral Agency)." *Critical Inquiry*, vol. 33 (Summer 2007): 754–80.

Berlant, Lauren, and Michael Warner. "Sex in Public." *Critical Inquiry*, vol. 24, no. 2 (1998): 547–66.

Braidotti, Rosi. *The Posthuman*. Cambridge: Polity Press, 2013.

Brashear, Regan Pretlow, dir. *Fixed: The Science/Fiction of Human Enhancement*. Making Change Media, 2013.

Butler, Judith. *Gender Trouble*. London and New York: Routledge, 2006.

Butler, Judith. *Bodies That Matter: On the Discursive Limits of "Sex."* London and New York: Routledge, 2011.

Chen, Mel Y. *Animacies: Biopolitics, Racial Mattering, and Queer Affect*. Durham: Duke University Press, 2012.

Coole, Diane H., and Samantha Frost, eds. *New Materialisms: Ontology, Agency, Politics*. Durham: Duke University Press, 2010.

Corker, Marian. "Deafness/Disability—Problematising Notions of Identity, Culture, and Structure." Leeds Centre for Disability Studies, 2002, http://pf7d7vi404s1dxh27mla5569.wpengine.netdna-cdn.com/files/library/Corker-Deafness.pdf

Diedrich, Lisa. "Breaking Down: A Phenomenology of Disability." *Literature and Medicine*, vol. 20, no. 2 (2001): 209–30.

Foucault, Michel. *The Order of Things: An Archeology of the Human Sciences*. New York: Vintage Books, 1994.

Grandin, Temple, and Catherine Johnson. *Animals in Translation: Using the Mysteries of Autism to Decode Animal Behavior*. New York: Scribner, 2005.

Grech, Shaun. "Recolonizing Debates or Perpetuated Coloniality: Decentring the Spaces of Disability, Community and Coloniality in the Global South." *International Journal of Inclusive Education*, vol. 15, no. 1 (2011): 87–100.

Grosz, Elizabeth. *The Nick of Time: Politics, Evolution, and the Untimely*. Durham: Duke University Press, 2004.

Haddon, Mark. *The Curious Incident of the Dog in the Night-Time*. London: Vintage, 2004.

Halberstam, Judith. *The Queer Art of Failure*. Durham: Duke University Press, 2011.

Haraway, Donna. *Simians Cyborgs and Women: The Reinvention of Women*. New York: Routledge, 1990.

Huffer, Lynn. *Mad for Foucault: Rethinking the Foundations of Queer Theory*. New York: Columbia University Press, 2009.

King, Katie. "A Naturalcultural Collection of Affections: Transdisciplinary Stories of Transmedia Ecologies." *S&F Online*, vol. 10, no. 3 (2003): 1–18.

Massumi, Brian. *Parables for the Virtual: Movement, Affect, Sensation*. Durham, NC: Duke University Press, 2002.

Mbembe, Achilles. *On the Postcolony*. Berkeley: University of California Press, 2001.

Mbembe, Achilles. "Necropolitics." Trans. L. Meintjes, *Public Culture*, vol. 15, no. 1 (2003): 11–40.

McKittrick, Katherine, ed. *Sylvia Wynter: On Being Human as Praxis*. Durham, NC: Duke University Press, 2014.

McRuer, Robert. *Crip Theory: Cultural Signs of Queerness and Disability*. New York: New York University Press, 2006.

Merleau-Ponty, Maurice. *The Phenomenology of Perception*. Translated by Donald A. Landes. London: Routledge, 2014.

Mitchell, David T. *The Biopolitics of Disability: Neoliberalism, Ablenationalism, and Peripheral Embodiment*. Ann Arbor: University of Michigan Press, 2015.

Mitchell, David T., with Sharon L. Snyder. "The Matter of Disability." *Bioethical Inquiry*, vol. 13 (2016): 487–92.

Moalem, Sharon & Jonathan Prince. *Survival of the Sickest: A Medical Maverick Discovers Why We Need Diseases*. New York: William Morrow, 2007.

Moalem, Sharon & Jonathan Prince. *Survival of the sickest: the surprising connections between disease and longevity*. New York: Harper Perennial, 2008.

Neese, Randolph M., and George C. Williams. *Why We Get Sick: The New Science of Darwinian Medicine*. New York: Vintage, 2012.

Palencia-Roth, Michael. "Enemies of God: Monsters and the Theology of Conquest." In *Monsters, Tricksters, and Sacred Cows: Animal Tales and American Identities*, edited by A. James. Charlottesville: University Press of Virginia, 1996, pp. 23–49.

Prince-Hughes, Dawn. *Songs of the Gorilla Nation: My Journey through Autism*. New York: Broadway Books, 2010.

Puar, Jasbir. "The Right to Maim: Disablement and Inhuman Biopolitics in Palestine." *Borderlands*, vol. 14, no. 1 (2015): 1–26.

Quijano, Aníbal. "Coloniality of Power, Eurocentrism and Latin America." *Nepantla: Views from the South*, vol. 1, no. 3 (2000): 533–80.

Rich, Adrienne. *An Atlas of the Difficult World: Poems 1988–1991*. New York: W. W.Norton, 1991.

Rutsky, R. L. "Mutation, History, and Fantasy in the Posthuman." *Posthuman Conditions*. Edited by Neil Badminton, special issue, *Subject Matters: A Journal of Communication and the Self*, vol. 3, no. 2 (2007): 107.

Scarry, Elaine. *The Body in Pain: The Making and Unmaking of the World*. Oxford: Oxford University Press, 1987.

Sobchack, Vivian. *Carnal Thoughts: Embodiment and Moving Image Culture*. Berkeley: University of California Press, 2004.

Thomas, Carol. *Female Forms: Experiencing and Understanding Disability*. Buckingham: Open University Press, 1999.

UPIAS (Union of the Physically Impaired Against Segregation). Centre for Disability Studies, Leeds University. http://disability-studies.leeds.ac.uk/files/library/UPIAS-UPIAS.pdf

Weheliye, Alexander G. *Habeas Viscus: Racializing Assemblages, Biopolitics, and Black Feminist Theories of the Human*. Durham, NC: Duke University Press, 2014.

Williams, William Carlos. "To Elsie." In *The Collected Poems of William Carlos Williams, Volume I: 1909-1939*, edited by A.W. Litz and C. MacGowan. New York: New Directions, 1991, pp. 217–20.

Wolfe, Cary. "Posthumanities." Carywolfe (*web page*) 2010, www.carywolfe.com/post_about.html.

Wolfe, Cary. *What Is Posthumanism?* Minneapolis: University of Minnesota Press, 2013.

Zamora, Margarita. "Christopher Columbus's 'Letter to the Sovereigns': Announcing the Discovery." In *New World Encounters*, edited by Stephen Greenblatt. Berkeley: University of California Press, 1993, pp. 1–11.

CHAPTER SIXTEEN

Therapy, Enhancement, and the Posthuman

SARAH CHAN

Enhancement and the posthuman are closely linked in bioethics. The notion of using technology to improve on or go "beyond" (normal) human abilities is central to many accounts of enhancement, in descriptions such as "new biotechnologies [aimed] at the enhancement of human capacities and traits" (Parens 1998: S6); changing "the basic parameters of the human condition" (Bostrom and Roache 2007: 120); or the use of "medicine and technology to reshape, manipulate and enhance … human biology" (Savulescu and Bostrom 2009: 1).

Moreover, if we consider the types of interventions that have commonly been considered under the label "human enhancement," it is clear that the "ethos of enhancement" is bound up with ideas of transcending human limitations, perhaps even the human condition itself. Physical modifications enabling humans to achieve new levels of athletic performance or experience new sensory modalities; cognitive modulation to increase memory, concentration, mood, and more; radical life extension; cyber-enhancement, the fusion of human and machine: all of these imply pushing the boundaries of existing human abilities.

At the same time, the concept of the posthuman poses some challenges in relation to enhancement. If human enhancement is a journey toward becoming or creating posthumans, how will we know when we have arrived; what would count as a posthuman, rather than a human enhancement? And how would we define enhancement for posthumans? A common (though as we shall see, somewhat problematic) way of conceptualizing human enhancement is as an improvement above the level of "normal" or "species-typical" function, something

that goes "beyond therapy." But if posthuman enhancement entails some form of species transformation, how are we to determine what is "normal" or species-typical for a posthuman?

This chapter explores the relationship between enhancement and the posthuman in bioethics, focusing in particular on the therapy/enhancement distinction (T/ED) and how this might be rewritten for posthumanity. Whether we think the posthuman is already here, a thing of the far future, or a state of perpetual liminality, examining therapy and enhancement through a posthuman lens may help us rethink how we approach them today.

BIOETHICS, ENHANCEMENT, AND THE POSTHUMAN

In bioethics, "the posthuman" arises at the intersection of the human body and technology. Whereas some approaches to posthumanism emphasize the dissolution of the "human," rendering it as something porous and unbounded (see for example Hayles 1999; Didur 2003; Pepperell 2005), the posthuman in bioethics is strongly linked to ideas of human enhancement as the "next phase of … evolution" (Dewdney 1998; Chan and Harris 2012), which will ultimately turn our species from humans into posthumans. Indeed, some suggest that technologically mediated human enhancement represents an improved version of evolution itself (Harris 2007; Powell and Buchanan 2011).

Inherent in this approach is the concept of posthumanism as a transformation of the human condition. As Gordijn and Chadwick (2008: 4) suggest, "interventions with the purpose of enhancement might bring about such radical changes that the result could only be regarded as a posthuman being, and no longer as a human being"; similarly, Agar (2010: 2) claims that posthumans created by radical human enhancement would be "fundamentally different kinds of beings." The posthuman condition, moreover, represents not just transformation but *improvement*, transcending the current capabilities of the human species to produce "beings with vastly greater capacities than present human beings" (Bostrom 2003: 78; see also, 2008).

Thus, although many posthuman bioethical imaginaries involve fusions between human and machine, such as in cyber-enhancement, the crucial blurring is not that between human and non-human, nature and culture, but between "Humanity 1.0" and "2.0" (Chan 2008; Fuller 2013). The bioethical "posthuman" is "essentially defined by its deviation from the human state" (Chan and Harris 2012: 78), and thus re-centers the human at its core, as that which the posthuman goes beyond and supposedly improves upon. Indeed, some hold the view that "we are already posthuman"; that is, our present and future use of emerging technologies to transform the human to posthuman is part of a continuum of development; and further, that the perpetual remaking and becoming that this process entails is an essential quality of human-ness (Lawrence 2017a, 2017b).

In this sense, the posthuman in bioethics stands in something of a contrast to other critical posthumanist approaches, that aim to de-center the human (Simon 2003). At the same time, however, in prompting us to confront questions that go beyond species boundaries, it opens up possibilities for self-critique: for, we might say, a critical posthumanist interrogation of the bioethical posthuman. Examining the T/ED and the ways in which it has been read in

bioethical debate is one route to enabling this.

FROM THERAPY TO ENHANCEMENT

In discussing human enhancement, one of the first questions that arises is: what *is* enhancement? Early attempts to define enhancement as a topic for ethical consideration often started from what it is not: enhancement is more-than-health, or not-therapy. Juengst (1998), for example, refers to "interventions designed to improve human form or functioning beyond what is necessary to sustain or restore good health." Indeed, the President's Council on Bioethics (President's Council on Bioethics 2003: 29) explicitly titled its report on human enhancement "Beyond Therapy," delineating its main area of concern as "those uses of biotechnology that go … beyond the usual domain of medicine and the goals of healing" (2003: 6). How to tell therapy from enhancement, however, is itself a thorny problem.

The significance of the T/ED has arisen partly from the way in which notions of biomedical enhancement, and bioethical thinking about them, have developed. Many of the technological possibilities that have prompted considerations of human enhancement involve medicine making us "better than well" (see Elliott 2003). Interventions that began as treatments for disease or dysfunction may have unexpectedly successful effects, or be repurposed for another goal altogether. The possibility of using therapeutic means to achieve enhancement ends has provoked pragmatic and ethical concerns to delimit the scope of proper medical practice: distinguishing "therapy" from "enhancement" is one way of determining what doctors *ought* to do, and what the finite resources of health care systems can and should be *expected* to do, with the new technologies at their disposal.

Moreover, since therapy is usually considered an uncontroversial goal—what could be wrong about making sick people well?—and a good intrinsically worth pursuing, attempts to explore what might potentially be problematic about human enhancement have often focused on applications that seem to fall outside this scope. Those opposed to enhancement ("anti-meliorists," as Caplan 2009 describes them), unless they want to be placed in the awkward position of rejecting all medical treatments, must find some way in which the "enhancement" interventions they regard as ethically suspect are relevantly different to those they accept as "therapy." This tends to commit them to upholding some form of the distinction, even if in a limited way.

Many accounts of "enhancement" thus center the concept of "therapy" by constructing "enhancement" in opposition to it. Even as the bioethical posthuman is defined as "beyond human," enhancement is defined by going "beyond therapy." This presents a potential difficulty for how we might think about therapy versus enhancement in the posthuman era. As we shall see, most forms of the T/ED rely on ideas about normalcy and species-typicality; Daniels (2000), for example, defines enhancement as "interventions that improve a condition that we view as a normal function or feature of members of our species" (309). If we take the posthuman condition to imply some sort of species transition or alteration beyond "human" limits, it is defined precisely by being species-atypical. What, then, constitutes "normal" or "species-typical" for a posthuman, and what (if any) relevance might the T/ED have in posthuman society? To answer this, we must scrutinize the distinction more closely.

THERAPY/ENHANCEMENT: A PROBLEMATIC DISTINCTION

Much attention has been devoted to trying to define enhancement, and hence to analyzing the T/ED. Like many problematic boundaries in bioethics, it has an intuitive, common-sense appeal: there seems obviously something different about (for example) taking antibiotics to combat infection or having surgery to repair a hernia, compared to taking steroid drugs to improve athletic performance or having magnets or RFID chips implanted in one's hand. But can the relevant differences between these cases be explained principally in terms of whether they constitute "therapy" or "enhancement," and by what features do we classify them as one or the other?

Definitions of therapy versus enhancement generally hinge on a combination of the related concepts of normalcy, health and disease, function and dysfunction: therapy restores to normal while enhancement increases above normal; therapy treats disease, ameliorates dysfunction, and restores health, while enhancement improves function for the already-healthy. As we shall shortly see, however, each of these concepts itself presents definitional challenges, rendering the T/ED a rather slippery creature.

In trying to unpack and make sense of the T/ED, we should also ask what we expect such a distinction to do. Those who seek to draw a line between therapy and enhancement are generally doing so in pursuit of a normative judgment about the relative worth of the two types of intervention; we need therefore not only an account of where to draw this line but why it should be considered morally significant. Possible normative applications of the distinction include dividing what is morally permissible from what is impermissible ("therapy yes, enhancement no"); delineating the proper role of medicine (see for example Pellegrino 2004); or determining what is obligatory versus non-obligatory, or higher versus lower priority, for a health system to provide. Most accounts of the T/ED combine both descriptive and normative elements: that is, in explaining what the distinction rests on and where the line is to be drawn, they also attempt to justify why it should be drawn there for their intended purpose.

It is hard to see what could be *intrinsically* wrong with enhancement. As many have noted, therapy is "enhancing" in that it makes the patient better. Relying on the benchmark of "normal" simply shifts the definitional and normative burden: what is "normal" and why ought we to be or remain that way? Some therapies do not just restore the patient to normal but make them better than normal; for example Tiger Woods's laser eye surgery resulting in better-than-20/20 vision. Normal might be taken to mean simply a population statistical description, but then why should it have any normative force? We regard as permissible a range of interventions that have gradually shifted the baseline of statistical "normal": sanitation, maternal and child health, vaccination, dental care.

A prominent account of the T/ED is that elaborated by Daniels (2000; see also Sabin and Daniels 1994), who suggests that it may help inform what sorts of interventions health care systems should provide[1]. Drawing on Boorse's concept of "species-typical function" (Boorse 1975, 1977), on which "disease and disability … are construed as adverse departures from or impairments of species-typical normal functional organization" (Daniels 2000: 314), he

argues that the role of just health care is to protect normal functioning. This is because, he contends, "by keeping people close to normal functioning, healthcare protects an individual's fair share of the range of opportunities reasonable people would choose in a given society" (315).

Daniels is, however, at pains to specify that the T/ED "by itself does not specify the boundary between obligatory and nonobligatory medical services" (316), nor between permissible-impermissible interventions. Indeed, a strict identification of what is species-typical with what is permissible would be incoherent with most of modern medicine and the functioning of modern society; "normal" life in the twenty-first century is very species-atypical. It is also difficult to show why species-typicality should have any moral significance. Unless we subscribe to some version of the naturalistic fallacy in deriving "ought from is," how we happen to be as a species has no bearing on how we should be. The drawback of using "normal" as a basis for moral judgments is that the concept simply indicates where individuals stand as members of a reference class or a statistical population; it does not by itself say anything about what is better or worse for those individuals, or better or worse for society in general. Moreover, when it comes to the possible existence of posthumans, whose defining feature may be that they are no longer human-species-typical, a benchmark based on either species-typicality or species-average will be meaningless.

In summary, even those dubious about enhancement acknowledge the challenges of drawing a clear distinction between the two, let alone using it as the basis for determining what is permissible. Instead, for enhancement skeptics, the T/ED, even if blurred, often indicates a "grey area" between morally acceptable and morally questionable uses of biomedical technology. On this view, enhancement may not be wrong *per se*, and we may face problems at the margins in determining exactly what is or is not an enhancement, but the notion that an intervention might constitute "enhancement" can serve as a "moral warning flag" (Daniels 2000) that should prompt more careful scrutiny.

Public Policy and the Therapy/Enhancement Distinction

To summarize so far, the T/ED faces two main challenges: first, whether a coherent distinction can be drawn, and second, supposing it could, what the normative significance of such a distinction might be. The conclusion reached by most scholars, whether generally in favor of or against enhancement, is that the T/ED is limited in its usefulness: it is, as Parens (1998: S13) describes it, "permeable, unstable and can be used for pernicious purposes."

Despite this, however, and whether as a reflection of the evolving bioethical debate or via folk psychology, the distinction has acquired significance in public discourse over biomedical technologies. A 2016 report on US publics' attitudes to enhancement noted that the T/ED "provides a framework for thinking about human enhancement in everyday terms" (Pew Research Center 2016: 8). In the UK, results of a public dialogue commissioned by the Royal Society (Hopkins Van Mil 2017) showed that although UK publics are fairly positive about genetic technologies in general and their therapeutic potential, the possibility of using them for "enhancement" finds much less support and is cause for concern (31, 69–70).

The T/ED also continues to have significant influence in policy: for example, the report of the US National Academies of Science and Medicine on human genome editing was willing

to accept the possibility of somatic and even germline genome editing for therapies, but recommended against its use "for purposes other than treatment or prevention of disease and disability," devoting an entire chapter to the consideration of "enhancement." Yet the above-mentioned difficulties with the distinction are liable to cause problems if we attempt to import it directly into policy. Unsurprisingly given the above complexities, and as illustrated in practice by the controversial first use of heritable human genome editing, intended to confer immunity to HIV, views on what constitutes enhancement or therapy are liable to vary.

Another problematic manifestation of the T/ED in health policy is that, in trying to limit the domain of medicine to therapy and exclude enhancement, it encourages the funneling of all sorts of diverse needs through a medical frame. Consider for example the range of interventions that require mental health assessment as a condition of access, and the creation of associated psychiatric diagnoses. If we say that medicine's only legitimate purpose is to provide therapy, we are required to classify wellbeing needs as a disorder to justify medical treatment.

Medicalization in turn can bring issues of stigmatization, even as it legitimizes intervention. Relevant to this, some have suggested that erasing the T/ED to pursue enhancement may encourage us to view the human condition as essentially pathological and permanently in need of treatment, rendering us "always already disabled" (Fuller 2011: 155). If, however, this results in a leveling effect whereby "disease" and "disability" become less stigmatized by virtue of becoming more universal, this is probably a good thing!

Nonetheless, medicalization may have other undesirable consequences. In the first place, it casts doctors as gatekeepers, vesting them with perhaps disproportionate authority to dictate what constitutes "a good life" for others. It may also create potential for commercial exploitation, by rendering treatments subject to the health technologies market and enabling companies to sell "a happiness nostrum" (Pellegrino 2004) with the added veneer of medical legitimacy.[2]

In any case, it is clear that if the T/ED is neither coherent nor consistent, we will need some other way of evaluating interventions, as well as to encourage publics and policy-makers to think more critically about the distinction and its usefulness.

"THE ONLY WAY IS UP": PROBLEMS WITH CRITICIZING THE T/ED

There is a deeper issue with discourse around the T/ED, from which even arguments rejecting the coherence and normative significance of the distinction are not immune. The T/ED pretends to divide the range of possible interventions in two according to some objective binary standard: on one side therapy, on the other enhancement. This not only assumes that such a line can consistently be drawn, but also implies a sort of directionality or polarity to the field of human function: improvements up to a certain point are therapy; improvements beyond that are enhancement. Pro-enhancement critiques of the T/ED often oppose the line-drawing, but implicitly reinscribe the associated directionality premise: that human functioning and flourishing can be classified along a single axis on which, generally

speaking, "the only way is up." Although they reject the moral significance of the "normal," in their enthusiasm for enhancement as acceptable or even obligatory (Savulescu 2005; Harris 2007) they assume that normal is necessarily preferable to sub-normal, and above-normal preferable to normal.

Transhumanist bioethics and bioethical accounts of the posthuman that treat it as either interchangeable with transhuman or an eventual goal of transhumanism (see for example Bostrom 2003; Graham 2002; World Transhumanist Association) represent a further extension of this assumption. Even moderate defenders of enhancement, however, in criticizing the T/ED tend to subscribe to its underlying one-dimensional account of improvement. McKeown (2017), for example, in opposing the T/ED as a basis for determining what is legitimate treatment, argues for "a deliberate reduction of the significance of normality" (200), contending that "someone can have medically improvable needs irrespective of their relative health" (203). However, in characterizing relevant needs as "*medically* improvable" and health as something that *can be* relative, that is, in terms of a given attribute, individuals can be positioned on a linear scale of health on which a uniform direction of "need" tracks upward, this argument nonetheless imports biomedical norms even as it rejects the significance of normalcy.

Since medicine has generally aimed at correcting biological dysfunction, it is perhaps inevitable that approaches to enhancement developed in the context of going "beyond therapy" nevertheless share medicine's orientation toward normative accounts of biological function. We have also seen, however, that these accounts are problematic even in terms of defining or evaluating human enhancement, and likely to be wholly inadequate when we come to the prospect of posthuman enhancement. Some further work is needed to disentangle the concepts of enhancement, function and improvement, and their associated values.

ENHANCEMENT, IMPROVEMENT, AND FUNCTION

In the first place, it is not straightforwardly the case that *increasing* a given function always represents an improvement or an enhancement. Chadwick defines enhancement as "an addition or exaggeration of a characteristic which may or may not constitute an improvement" (Chadwick 2008: 31). On this view, "enhancement" is increased function, but in a non-evaluative sense: enhancements need not be desirable nor desired by the individual in question. This is somewhat at odds with the general direction of enhancement discourse, however: if enhancements were not desired or desirable in at least some sense, there would be much less debate over whether we ought to have them.

Harris (2007) gives a different account: "If it wasn't good for you, it wouldn't be enhancement." He states that "an enhancement is by definition an improvement on what went before." The sense of improvement here, then, is of something being better *for you*, rather than necessarily signifying an increase in a given function. Savulescu and colleagues (2011) arrive at a similar conclusion in distinguishing between "*functional* enhancement, the enhancement of some capacity or power"(3) and "*human* enhancement, the enhancement of a human being's life." They propose a "welfarist account of human enhancement," such that an enhancement is "[a]ny change in the biology or psychology of a person which increases the

chances of leading a good life in the relevant set of circumstances" (7).

Building on this, Earp and colleagues (2014) further elaborate on the difference between increased function and enhancement, distinguishing the welfarist account of *human* enhancement from what they term the "functional-augmentative approach," on which "enhancements" are interventions that "improve some capacity or function … by increasing the ability of the function to do what it normally does." What, though, does a function "normally" do?

The concept of biological function is itself contestable (see for discussion Canfield 1990): to refer to what something is "supposed" to do seems to imply a *telos* or sense of intentional design that is awkward to impute to biology. Yet on the other hand, defining "function" as simply what a thing *happens* to do is equally unsatisfactory. For example, the cell surface receptor CCR5 transmits molecular signals across the cell membrane; it also provides a route for HIV infection, but with respect to the latter it seems odd to say that its *function* is to allow infection.

Biological approaches to function thus tend to operate on the assumption that "healthy living equals proper functioning; and sickness, injury, and death equal disrepair, dysfunction, and destruction" (Canfield 1990: 39). Boorse (1975: 57) goes further in characterizing functions as "species-typical contributions to the apical goals of survival and reproduction."[3]

Regardless of whether this idea mistakenly implies design, intention, or understanding of evolutionary theory, importing it from philosophy of biology to moral philosophy is additionally problematic, since it brings with it implicit normativity about our "proper function" or purpose as human beings. Perhaps in the pure biological sense, our "proper function" is to survive and reproduce our genes—but we are more than mere biological organisms!

Accounts of enhancement as "good for you" or enabling one to lead "the good life" appear to recognize this. Earp and colleagues (2014) identify several cases of "diminishment as enhancement," where reduction in a higher-order function or capacity (i.e., a function doing "what it normally does") should be considered enhancement: for example, weakening memory for those who have experienced trauma. They argue that in evaluating interventions, we should refer to the "*normative goal* of the modification" and whether it improves overall well-being. Similarly, focusing on "human functioning" and *human* enhancement, per Harris and Savulescu's arguments discussed above, directs our attention to what is better *for one* or enables one to function better *as a human*.

But do these approaches go far enough in differentiating "improved biological functioning" from enhancement? What is it to function well as a human? What, indeed, would it be to function well as a posthuman? If different states of *biological* functioning are valuable to the extent they conduce to one's own "good life," what is a disvalued state for one could be a valued state for another. Functioning well as a (post)human might mean opposite things for different individuals.

To give a (perhaps extreme) example, consider again the CCR5 receptor whose *biological function* is not, I contended, to allow HIV infection. It might seem that our common-sense understanding of function and its relationship to enhancement are here aligned: increasing the receptor's ability to transmit HIV to the inside of the cell would not be increasing its

biological function, nor would most of us regard increased susceptibility to infection as an enhancement. HIV, however, is more than a disease, more even than an "illness"; it is also a socio-cultural object. In certain sub-cultures, practices of deliberate HIV transmission have acquired social value as "experiments with elective kinship" and shared seropositive status can be a basis for identity and community formation (Dean 2008). Within this context, immunity versus susceptibility may not have the simple values we tend to ascribe to them, and infection may have a very different *social* function.

ENHANCEMENT AND DISABILITY? REDEFINING ENHANCEMENT FOR POSTHUMANITY

As discussed, a key step in many pro-enhancement arguments is to recognize that an enhancement intervention can be "good for us" individually regardless of whether we happen to be above or below the norm. That is, one person's therapy may be another's enhancement, but there can be good moral reasons to pursue both.

The above analysis, however, suggests we might go one step further: could one person's *disease or disability* be another's enhancement? Certainly, if we reject normative claims about "species-typical" or "proper" functioning, biology and *telos*, there seems no reason why what is "good for one" might not be bad for another. Indeed, a commonplace illustration is reproductive medicine: for one person, infertility may be a disease that leads them to seek IVF; for another it may be a desired state, in pursuit of which they may seek physical or chemical "enhancement." Fertility treatment and contraception are both generally acceptable and considered to be part of legitimate medical practice,[4] even though their aims with respect to biological function are exactly the opposite.

Yet enhancement enthusiasts have been strikingly reluctant to allow for the possibility of disease or "disability" as enhancement more generally. If we examine the ideas typically associated with pro-enhancement positions, about what constitutes "a good life" or what sorts of things can be "good for one," we repeatedly find assumptions that "disability," "disease," and "impairment" are harmful, and repairing them, whether to or above normal, constitutes "the good" (Harris 2000, 2001, 2005; Savulescu 2001; Savulescu and Kahane 2009).

This brings us to the key question this chapter seeks to pose. Could a critical posthumanist consideration of what constitutes "enhancement" serve to problematize not only the T/ED, but the rather one-sided approach that has so far characterized most bioethical accounts of "the posthuman"?

In this project, critical disability studies and enhancement ethics are uneasy allies. Both deny that the concept of "normal" has moral meaning, and argue that ideas of "normalcy" and the normativity associated with it are socially constructed. Hughes (2000), for example, rejects the view that "the wisdom of the body lies in its acquiescence to the social status quo" (556); pro-enhancement perspectives likewise tend to oppose "status quo" arguments that how things are (how "most people" are) is how they ought to be, and that "normal" has any moral meaning.

Yet insofar as enhancement arguments align with typical bioethical transhuman-to-

posthuman ideology, they in fact recapitulate the very norms they seek to reject. As Fuller puts it, "transhumanism's normative horizons veer towards … *ableism* … the indefinite promotion of various abilities, regardless of the species identity of their possessors" (Fuller 2011: 155). In this, they have more in common with "normalists" than posthumanists.

Consider Boorse's opposition to extending the goals of health care to include enhancement: "Not only is there no fixed goal of perfect health to advance towards, but there is also no unique direction of advance." In fact, as we have shown, the ableism inherent in many pro-enhancement arguments does imply a strong directionality. With a critical posthumanist orientation, however, we can ask: Why *should* there be a unique direction of advance? Whose embedded values determine this direction, and what possibilities for diverse accounts of the good life and different forms of (post)human flourishing might this foreclose?

Both normalists and enhancement enthusiasts also unite in supposing an objective account of what is good for us as humans: Boorse (1977) writes, "The trouble with calling physical or mental or moral excellence health is that it tends to unite under one term a *value neutral notion*—freedom from disease—with the most controversial of all prescriptions: the recipe for an ideal human being." Likewise, Daniels (2000: 572) defends his "Normal Function" model by saying: "The line between disease and disability and normal functioning is thus drawn in the *relatively objective and nonevaluative* context provided by the biomedical sciences" (315).

Yet, as STS and critical disability scholars have shown, science is far from "objective and nonevaluative," and "freedom from disease" is *not* a value-neutral notion. Indeed, its putative claim to value-neutrality is precisely what makes it dangerous. Hughes (1999: 164) speaks of the "perceptual pathology of non-disablement. It is pathological because it is not neutral and because it thinks of itself as being so." In the same vein, transhumanist ableism, enhancement as non-disablement, makes claims about objectivity and universality that are, in the end, unfounded. Hughes's critique picks out arguments that seek to distinguish disability from impairment but in the process import values to impairment; a similar process is at work in arguments that reject the T/ED, but nonetheless import hidden values that assume there is an objective account of "the good life" or what is "good for one," and hence a single "recipe for the ideal human being."

What can this tell us about posthuman enhancement? First, the acceptability and priority of interventions should be determined by something other than the T/ED; and indeed, by something other than accounts of normal or proper function, even where normal is not seen as a morally significant baseline. In an ideal posthuman society, members should be enabled, to the greatest extent possible and in a way compatible with the demands of justice, not only to pursue but to define their own ideals, regardless of species.[5]

Thus, while in relation to enhancement we may previously have spoken of "human flourishing," in posthuman society, the idea of "*human* flourishing" will be obsolete. Instead, we might see posthumans flourishing with a variety of capacities and in myriad embodied forms, achieved through the use of technological interventions, the intended consequence of which might be different or indeed completely opposite between one individual and another.

A SOCIAL MODEL OF (POSTHUMAN) ENHANCEMENT

We might, then, redefine enhancement for the posthuman era as anything that improves, not "human" flourishing in general but the individual and collective flourishing of beings as members of society. This will have less to do with "species-typical" features and more with individuals living their own "good lives" in a given context.

Of course, contexts are open to change; it is important to note that improved flourishing can result equally from changes (enhancements) to society as much as individual functioning. Recognizing this, Savulescu and colleagues (2011: 16) propose that in evaluating potential enhancement interventions, we should take into account "whether there are reasons to prefer modifications of the natural or social environment." We should also consider, however, not just how the context might be modified and whether it would be preferable to do so, but how context itself conditions *what counts* as an "enhancement."

Social models of disability require us to recognize that not only our innate capacities but how the world is structured, physically and socially, can affect our ability to function in it (UPIAS 1976; Oliver 1983; Shakespeare 2013). Disability, on this account, is produced not (only) by the fact of an individual's impairment, that is, their physical limitations, but by the external conditions that render that individual less able to function within society as a result. Similarly, when it comes to enhancement, we should ask: *why* do we consider a particular intervention an enhancement; what is it about the context that makes it so, and how should we respond to this? A social model of enhancement could encourage us to attend not just to how enhancement technologies can help us achieve "the good life" according to our own lights, but also to how our ideas of what the good life is, and what is required of us in order to pursue it, are shaped by social norms and conditions.

This in turn may have useful insights for our discussions of enhancement: which issues we regard as salient and how we shape arguments around them. For example, a common tactic in enhancement ethics is the use of arguments from analogy to support claims about the acceptability of enhancement technologies. Caffeine is often used as an example of a quotidian "cognitive enhancement." Given that (so goes the argument) many of us consume caffeine to improve cognitive capacities such as wakefulness and concentration, we cannot consistently mount a principled opposition to the use of other substances, such as "smart drugs," to help us achieve the same goal. Other things such as risks, costs, and so forth being equal, the widespread acceptability of the former should imply *prima facie* acceptability of the latter.

This argument provides a limited defense of some enhancement technologies: taking Modafinil or Ritalin for cognitive enhancement purposes is no different in principle to drinking coffee. It leaves unasked, however, the question of why we need to drink so much coffee in the first place! In so doing, it misses the opportunity to apply more critical scrutiny to the social conditions—such as long working hours and pressure to ever-greater productivity—that produce this situation and create the need for cognitive enhancers. Which of these would produce the greatest improvements in wellbeing: (1) having free access to modafinil, allowing us to sleep less in order to meet increasing demands on our time; (2) reconsidering social expectations (which are in any case culturally relative) about work and

productivity in order more actively to resist these demands; or even perhaps (3) enhancing our coping mechanisms to reduce the burden of stress imposed by time pressures?

I hasten to emphasize that this is not an anti-enhancement argument as such. It is, however, a call to temper our enthusiasm for biomedical enhancement, to reconsider what is "good for us" and how we achieve it. Some problems are better fixed by altering individual biology or psychology, others by altering social conditions. Explicitly adopting a social model of enhancement will not solve the problem of which is which. It may, however, help us deal with other difficult cases.

Consider, for example, extreme body modification or elective amputation. Bioliberal advocates of enhancement have shown a tendency to deal with such difficult cases by shifting them onto the terrain of political rather than moral philosophy: Sandberg's (2013) concept of morphological freedom, for example, is based on what we should be *allowed* to do rather than what we *should* do with our bodies. Strongly normative accounts of enhancement that claim an obligation to enhance from beneficence generally treat "questionable" interventions, such as extreme body-modification, as an irrational or at best neutral choice that can be justified by liberalism toward being able to make our own choices even where they are sub-optimal. They are less willing to admit that something such as elective amputation of an "objectively" healthy limb might be a rational choice for a particular person; at most they allow that it might be an instrumental good such as the "flat feet of a draftee" (Boorse 1975: 53).

The lesson, in thinking from social models of disability to enhancement, is first to acknowledge that even when we are disposed to view "disability" as socially constructed, we nonetheless often accept the concept of "impairment" as having a biological reality, importing with it normative values attached to certain states-of-body (Hughes 1999). Thinking about cases that enable us to question the value or disvalue of impairment through the lens of a social model of enhancement may help us understand how we might value different states of embodiment as it is continually produced and experienced: at the interface of our own state-of-being and how others perceive us, the states-of-being of others and how we perceive them in relation to ourselves, and the social norms that condition both our and others' expectations. Our needs and desires with respect to that embodiment are part of what contribute to a life's being good or less-good.

Finally, in considering how to apply accounts of enhancement that invoke ideas about the "best possible chance of a good life," we must acknowledge that in the individual case, "a good life" can only mean how good or bad your life is *for you*, via your own unique experience of embodiment-in-context. When making decisions about future people, whether human or posthuman, or for people who cannot decide for themselves, it makes sense to "go with the odds" and consider what most people would want, taking into account as many specific contextual factors as possible. For decisions involving present persons, however, fairly strong weight should be given to their own ideas about what they want, how they experience their embodiment, and what makes a good life for them.

CONCLUDING THOUGHTS: ENHANCEMENT IN A

POSTHUMAN SOCIETY

How might we start to apply these ideas in today's human-becoming-posthuman society? We have seen that the T/ED not only suffers from problems of definition, consistency, and applicability when applied to the human species, but threatens to disintegrate entirely when it comes to posthumanity. Where then does that leave us?

Both those who are anti-enhancement in general and those who are pro-enhancement but favor a transhumanist often point to the supposed unfeasibility of an "anything goes" approach in order to resist stretching the definition of "enhancement" to include conditions that they regard as being a step too far. Echoing Boorse's concern, they complain that without distinctions, directions, or limits, we will have no way to meet a potentially infinite range of needs, or to prioritize amongst them. This is not so, however: even if we reject both the T/ED and the directional approach, there will still be plenty to differentiate morally amongst various possible interventions. Two factors stand out as particularly important.

The first is an intervention's effects in terms of equity. A moral and political, rather than biological, definition of enhancement should determine priority, but not acceptability of interventions. This is similar to Daniels' attempt to apply the T/ED to define just health care. Instead of "normal function," however, what we should protect is equality of opportunity for wellbeing, taking into account that the conditions for wellbeing may be very different amongst different individuals and bear little relationship to what is either population-average or species-typical.

The second factor that will be important in evaluating possible interventions is the expected benefit relative to the level of risk. Therapies will often, though not always, present a more favorable risk-benefit ratio: as Daniels (2009: 38) argues, "the probability of potential benefit … may plausibly outweigh certainty of catastrophic illness," whereas "if we are trying to improve on an otherwise normal trait, the risks of a bad outcome, even if small, outweigh the acceptable outcome of normality." This implies that new interventions such as genome editing may be more justifiable in the experimental stages for "therapeutic" purposes, but does not rule out their use for enhancement, especially where people are choosing to take the risk on themselves rather than making decisions for others.

Moreover, there are many cases in which it may be beneficial to "converge on the normal" even where the alternative is not necessarily "catastrophic." Since society is configured for "normal" people, being unable to do something of which "normal" people are capable may present more of an impediment to our wellbeing than being unable to do something that other people cannot do either. For this reason, "restoring to normal" with respect to a state regarded as "disease" or "disability" may often (but again not necessarily always) represent a more significant benefit than "increasing above normal." Again, however, we must recognize that this is a product of both individual function in a given external context and individual experience; thus in determining what constitutes a benefit and how significant that benefit is, we should likewise be heavily guided by individuals' expressed views regarding their own experiences and values.

Considering therapy, enhancement and the potential of both to reinforce "harmful conceptions of normality," Parens (1998) wrote that "[t]he challenge is to learn

simultaneously to attend to the suffering of individuals and to criticize and resist the systems that produce that suffering." (S14)Social models of both disability and enhancement, brought together in a critical posthumanist approach to the bioethical posthuman, may provide a foundation for that resistance.

---

hough he is; see Daniels (2000) at 316, 320.

oorse himself, in discussing disease, which he takes to be purely descriptive and the opposite of health versus illness, which incorporates an evaluative component, comments that "Our thinking about health might be greatly clarified if 'wellness' had some currency" (Boorse 1977: 56). It is notable that "wellness" today seems largely to have been co-opted by the industries of complementary, alternative and consumer "medicine"; whether through overly strict gatekeeping and a too-narrow vision of the proper goals of medicine, or for some other reason, it seems that mainstream medicine is failing to satisfy our wellness needs.

anfield, however, points out, with reference to earlier historical investigations of biological function, that this would imply a profound shift in the concept of "function" with the advent of evolutionary theory: "[T]o read 'function' in terms of survival and having progeny is to read back into an already extant method of biological investigation ideas that belong properly to post-Darwinian times" (1990: 42).

ven so, medical practice in this area is often swayed by the belief that it is "normal" or "species-typical" to reproduce, requiring at least a positive burden of proof on those who elect not to do so: for example, doctors are more reluctant to offer surgical sterilization procedures to childless women (Ehman and Costescu 2018) or those with fewer children (Lawrence et al. 2011).

ho should be included as "members of society" once species is no longer the defining criterion is another question that cannot be considered here; suffice to point out that a posthumanist approach should prompt us critically to address it.

SOURCES CITED

Agar, Nicholas. *Humanity's End: Why We Should Reject Radical Enhancement*. Cambridge, MA: MIT Press, 2010.

Boorse, Christopher. "On the Distinction between Disease and Illness." *Philosophy and Public Affairs*, vol. 5, no. 1 (1975): 49–68.

Boorse, Christopher. "Health as a Theoretical Concept." *Philosophy of Science*, vol. 44 (1977): 542–73.

Bostrom, Nick. "Human Genetic Enhancements: A Transhumanist Perspective." *Journal of Value Inquiry*, vol. 37, no. 4 (2003): 493–506.

Bostrom, Nick. "Why I Want to Be a Posthuman When I Grow Up." In *Medical Enhancement and Posthumanity*, edited by Bert Gordijn and Ruth Chadwick. Dordrecht: Springer, 2008, pp. 107–36.

Bostrom, Nick, and R. Roache. "Ethical Issues in Human Enhancement." In *New Waves in Applied Ethics*, edited by J. Ryberg, T. S. Petersen, and C. Wolf. Hampshire: Palgrave Macmillan, 2008, pp. 120–52.

Canfield, J. V. "The Concept of Function in Biology." *Philosophical Topics*, vol. 18, no. 2 (1990): 29–53.

Caplan, A. L. "Good, Better or Best?." In *Human Enhancement*, edited by Julian Savulescu and Nick Bostrom. Oxford: Oxford University Press, 2009, pp. 199–210.

Chadwick, Ruth. "Therapy, Enhancement and Improvement." In *Medical Enhancement and Posthumanity*, edited by Bert Gordijn and Ruth Chadwick. Dordrecht: Springer, 2008, 25–37.

Chan, Sarah. "Humanity 2.0? Enhancement, Evolution and the Possible Futures of Humanity." Supplement, *EMBO Reports*, vol. 9, no. S1 (2008): S70–S74.

Chan, Sarah, and J. Harris. "Post-What? (And Why Does It Matter?)." In *The Posthuman Condition: Ethics, Aesthetics and Politics of Biotechnological Challenges*, edited by Kasper Lippert-Rasmussen, Mads Rosendahl Thomsen, and Jacob Wamberg. Aarhus: Aarhus University Press, 2012, pp. 75–87.

Daniels, Norman. "Normal Functioning and the Treatment-Enhancement Distinction." *Cambridge Quarterly of Healthcare Ethics*, vol. 9, no. 3 (2000): 309–22.

Daniels, Norman. "Can Anyone Really Be Talking about Ethically Modifying Human Nature?." In *Human Enhancement*, edited by Julian Savulescu and Nick Bostrom. Oxford: Oxford University Press, 2009, pp. 25–42.

Dean, Tim. "Breeding Culture: Barebacking, Bugchasing, Giftgiving." *The Massachusetts Review*, vol. 49, no. 1 (2008): 80–94.

Dewdney, Christopher. *Last Flesh: Life in the Transhuman Era*. Toronto: HarperCollins,1998.

Didur, Jill. "Re-Embodying Technoscientific Fantasies: Posthumanism, Genetically Modified Foods, and the Colonization of Life." *Cultural Critique*, vol. 53 (2003): 98–115.

Earp, Brian D., Anders Sandberg, Guy Kahne, and Julian Savulescu. "When Is Diminishment a Form of Enhancement? Rethinking the Enhancement Debate in Biomedical Ethics." *Frontiers in Systems Neuroscience*, vol. 8 (2014): 1–8.

Ehman, Dylan, and Dustin Costescu. "Tubal Sterilization in Women under 30: Case Series and Ethical Implications." *Journal of Obstetrics and Gynaecology Canada*, vol. 40, no. 1 (2018): 36–40.

Elliott, Carl. *Better Than Well: American Medicine Meets the American Dream*. London: W. W. Norton, 2003.

Fuller, Steve. *Humanity 2.0: What It Means to Be Human Past, Present and Future*. Basingstoke: Palgrave Macmillan, 2011.

Fuller, Steve. *Preparing for Life in Humanity 2.0*. Basingstoke: Palgrave Macmillan, 2013.

Graham, Elaine. "'Nietzsche Gets a Modem': Transhumanism and the Technological Sublime." *Literature and Theology*, vol. 16, no. 1 (2002): 65–80.

Gordijn, Bert, and Ruth Chadwick. "Introduction." In *Medical Enhancement and Posthumanity*, edited by Bert Gordijn and Ruth Chadwick. Dordrecht: Springer, 2008, pp. 1–8.

Harris, John. "Is There a Coherent Social Conception of Disability?" *Journal of Medical Ethics*, vol. 26 (2000): 95–100.

Harris, John. "One Principle and Three Fallacies of Disability Studies." *Journal of Medical Ethics*, vol. 27 (2001): 383–7.

Harris, John. "Reproductive Liberty, Disease and Disability." Supplement, *Reproductive Biomedicine Online*, vol. 10, no. 1 (2005): 13–16.

Harris, John. *Enhancing Evolution*. Princeton: Princeton University Press, 2007.

Hayles, N. Katherine. *How We Became Posthuman: Virtual Bodies in Cybernetics, Literature, and Informatics*. Chicago: University of Chicago Press, 1999.

Hopkins, Henrietta, Anita van Mil, and Suzanna Kinsella. *Potential Uses for Genetic Technologies: Dialogue and Engagement Research Conducted on Behalf of the Royal Society*. Hopkins Van Mil, Findings Report, December 2017.

Hughes, Bill. "The Constitution of Impairment: Modernity and the Aesthetic of Oppression." *Disability and Society*, vol. 14, no. 2 (1999): 155–72.

Hughes, Bill. "Medicine and the Aesthetic Invalidation of Disabled People." *Disability and Society*, vol. 15, no. 4 (2000): 555–68.

Juengst, E. "What Does Enhancement Mean?" In *Enhancing Human Traits: Ethical and Social Implications*, edited by Erik Parens. Washington, DC: Georgetown University Press, 1998, pp. 29–47.

Lawrence, David R. "The Edge of Human? The Problem with the Posthuman as the 'Beyond'." *Bioethics*, vol. 31 (2017a): 171–9.

Lawrence, David R. "More Human than Human." *Cambridge Quarterly of Healthcare Ethics*, vol. 26, no. 3 (2017b): 476–90.

Lawrence, R. E., K. A. Rasinski, J. D. Yoon, and F. A. Curlin. "Factors Influencing Physicians' Advice about Female Sterilization in USA: A National Survey." *Human Reproduction*, vol. 26, no. 1 (2011): 106–11.

McKeown, Alex. "Enhancement and Therapy: Is It Possible to Draw a Line?" In *Rethinking Cognitive Enhancement*, edited by Ruud ter Meulen, Ahmed Mohammed, and Wayne Hall. Oxford: Oxford University Press, 2017, pp. 193–212.

Oliver, Michael. *Social Work with Disabled People*. Basingstoke: Macmillan, 1983.

Parens, Erik. "Is Better Always Good? The Enhancement Project." *The Hastings Center Report*, vol. 28, no. 1 (1998): S1–S17.

Pellegrino, Edmund. "Biotechnology, Human Enhancement and the Ends of Medicine." *Dignity*, vol. 10, no. 4 (2004): 4–5.

Pepperell, Robert. "The Posthuman Manifesto." *Kritikos*, vol. 2 (2005): n.p. https://intertheory.org/pepperell.htm.

Pew Research Center. "U.S. Public Wary of Biomedical Technologies to 'Enhance' Human Abilities." July 26, 2016.

Powell, Russel, and Allen Buchanan. "Breaking Evolution's Chains: The Prospect of Deliberate Genetic Modification in Humans." *Journal of Medicine and Philosophy*, vol. 36, no. 1 (2011): 6–27.

President's Council on Bioethics. *Beyond Therapy: Biotechnology and the Pursuit of Happiness*. A Report of the President's Council on Bioethics. Washington, DC, October 2003.

Sabin, J. E., and N. Daniels. "Determining 'Medical Necessity' in Mental Health Practice." *The Hastings Center Report*, vol. 24, no. 1 (1994): 5–13.

Sandberg, Anders. "Morphological Freedom—Why We Not Just Want It, but Need It." In *The Transhumanist Reader: Classical and Contemporary Essays on the Science, Technology, and Philosophy of the Human Future*, edited by Max

More and Natasha Vita-More. Chichester: Wiley-Blackwell, 2013, pp. 56–64.

Savulescu, Julian. "Procreative Beneficence: Why We Should Select the Best Children." *Bioethics*, vol. 15, no. 5–6 (2001): 413–26.

Savulescu, Julian. "New Breeds of Humans: The Moral Obligation to Enhance." Supplement, *Reproductive Biomedicine Online*, vol. 10 (2005): 36–9.

Savulescu, Julian, and Guy Kahne. "The Moral Obligation to Create Children with the Best Chance of the Best Life." *Bioethics*, vol. 23, no. 5 (2009): 274–90.

Savulescu, Julian, and Nick Bostrom, eds. *Human Enhancement*. Oxford: Oxford University Press, 2009.

Savulescu, Julian, Anders Sandberg, and Guy Kahne. "Well-Being and Enhancement." In *Enhancing Human Capacities*, edited by Julian Savulescu, Ruud ter Meulen, and Guy Kahne. Oxford: Wiley-Blackwell, 2011, pp. 1–18.

Shakespeare, Tom. "The Social Model of Disability." In *The Disability Studies Reader*, edited by Lennard J. Davis. New York: Routledge, 2013, pp. 214–21.

Simon, Bart. "Toward a Critique of Posthuman Futures." *Cultural Critique*, vol. 53, Winter (2003): 1–9.

UPIAS. "Fundamental Principles of Disability." London: Union of the Physically Impaired Against Segregation, 1976.

World Transhumanist Association. "Transhumanist FAQ." Humanity+ (*web page*). Accessed April 3, 2019, https://humanityplus.org/philosophy/transhumanist-faq/

Technology

CHAPTER SEVENTEEN

What Can We Learn from Eugenics?

NICHOLAS AGAR

How should we confront the ethical challenges of gene editing? This chapter offers Francis Galton's ([1883] 2012)) concept of eugenics as a means to gain better understanding of the ethical implications of gene editing and successive transformative technologies.[1]

It is especially important that we accelerate our philosophical inquiry. I write this chapter in the wake of Chinese scientist He Jiankui's claim to have created the "world's first gene-edited babies."[2] Subsequent to the initial announcement of this possible breakthrough in reproductive medicine, there was speculation that his modifications of the children's genomes may have, perhaps inadvertently, increased their intelligence.[3] Advances in gene editing challenge us to decide what to change and what to preserve about our humanity. CRISPR will not be the last technological advance with the power to change fundamental aspects of the way we are as individuals and as a species. We should expect technological progress to bring more powerful ways to alter human genomes. We should also expect transformative technologies that do not involve genes. Perhaps the future will bring cybernetic brain implants and mind-uploading into digital machines. I present gene editing and He Jiankui's claimed use of it as an ethical wake-up call that could leave us better prepared for more potent derangements of our humanity.

My first goal in this chapter is to sketch an approach to novel ethical challenges such as those presented by gene editing. A Google search of "He Jiankui" in early 2019 reveals much moral rushing to judgment about gene edited babies. The problem is that haste impairs the quality of our ethical thinking. I argue for a distinction between early-stage and late-stage

ethical inquiries. I present early-stage ethical inquiries as more imaginatively inclusive than the more precise and targeted methods of late-stage ethical inquiry. Early-stage ethical inquiries are prompted by the recognition that a novelty demands ethical evaluation. They aim to survey a broad range of ethical issues. Late-stage ethical inquiries are more concerned about formulating precise moral obligations and permissions. Their conservatism stems from a strong interest in avoiding erroneous moral advice.

I offer Francis Galton's eugenics—"the science of improving stock"—as a case study of early-stage ethical inquiry into gene editing (Galton [1883] 2012): 17, n1). When we consider gene editing as eugenics, we historicize to identify ethical issues that might otherwise be overlooked. Reminders of the moral and scientific errors of Galtonian eugenics remind us of forgotten dangers in choosing human characteristics. I suggest that among these mistakes are some useful positive proposals about how to edit human genomes.

EARLY-STAGE AND LATE-STAGE ETHICAL INQUIRIES

We are now combining knowledge from genomics—the science directed at describing human hereditary material—with increasingly powerful tools to change that material. Philosophers may complain that there is nothing *philosophically new* about gene editing. Since the 1970s philosophers have addressed thought experiments in which people genetically modify themselves or their children in ways that increase intelligence or physical prowess (see, for example, Harris 1992; Savulescu 2001). In what follows, I argue that philosophical arguments about genetic engineering presented in advance of the technologies to actually effect these changes have tended to omit an essential stage in ethical evaluation.

We should distinguish the evaluation we engage in at an early stage in our acknowledgment of an ethical challenge from the evaluation appropriate at a later stage in our assessment. What I will call early-stage ethical inquiry occurs when we first confront a moral challenge. It is triggered by a recognition that a novelty requires ethical assessment. Early-stage ethical inquiry serves as a scoping exercise that aims to identify values potentially involved. Late-stage ethical inquiry moves from an ethical survey to formulating specific obligations and permissions:

1. Early-stage ethical inquiry occurs at the outset of our encounter with a moral challenge. It is a philosophical scoping exercise whose goal is to identify all values potentially involved in making good ethical choices. Early-stage ethical inquiry is essentially preliminary. It does not aim to describe specific moral obligations or permissions.
2. Late-stage ethical inquiry commences once we have a good idea about many of values involved in responding to a moral challenge. Its aim is to formulate specific moral obligations and permissions.

The two stages of ethical inquiry have different biases. The precision of the analytic method suits it to late-stage ethical inquiry. It facilitates the formulation of specific moral obligations and permissions regarding the use of gene editing and other transformative technologies.

Analytic philosophers place a premium on the avoidance of error. But their methods have the downside of being conservative. Ethicists who rely exclusively on the methods of analytic philosophy risk what statisticians refer to as type 2 errors—or false negatives. They fail to identify unfamiliar moral or prudential values that may be infringed or promoted by gene editing.

We need more expansive methods if we are to conduct a useful early-stage ethical survey that identifies all of the values encroached on by a significant technological novelty. In this paper, I offer historicizing as one early-stage approach the ethics of gene editing. It involves locating gene editing in a context that includes the history of debate about what to change and what to preserve about our humanity. Early-stage approaches have their own distinctive biases. They generate many of what statisticians describe as type 1 errors—or false positives. Some of the values they identify are erroneous.

The biases of the analytic method and the biases of the more expansive early-stage method I describe in this paper can complement each other to yield an accurate picture of a transformative technology's moral and prudential effects. An early-stage approach that generates type 1 errors can combine with a late-stage approach biased toward type 2 errors. Historicizing is one early-stage approach that helps us toward a fuller inventory of values promoted or infringed by human transformation. We should expect that any pseudo-values can be deleted by the conservative analytic techniques of late-stage ethical inquiry. In effect, the more precise analytic methods of late-stage ethical inquiry play a philosophical proof-reading role. There is an established tradition of eliminativism in philosophy in which fraudulent values are identified and then expunged (see, for example, Mackie 1977; Churchland 1986). The established methods of philosophical eliminativism can be applied to any pseudo-values posited by an overly imaginative early-stage inquiry.

We can draw an analogy between the way we approach a novel ethical challenge and the way a geographer approaches a newly discovered land. The geographer begins with a survey that aims to identify all significant points of interest. The goal would be a map that indicates the approximate locations and dimensions of all significant geographical features—mountains, valleys, forests, lakes, and so on. With this compete, investigators with more precise methods can subject these putative points of interest to more detailed scrutiny. Any non-existent mountain ranges identified by the initial survey can be deleted at this stage. It is better for the surveyor to err this way than by overlooking actual mountain ranges that are unlikely to then be detected by subsequent, more precise investigations.

I have suggested that historicizing can be a valuable early-stage way to approach the technological novelty of gene editing. I do not mean the historicism criticized by Karl Popper (1994), according to which we can use historical information as a predictive tool. For the purposes of this paper, ethical historicizing seeks to make explicit the relevance of the insights of past thinkers to a novel technology.[4]

The recent history of genetics offers some useful lessons for those who claim that the potential for gene editing to bring new therapies creates a moral obligation to pursue it.[5] The Human Genome Project was officially inaugurated in 1990 with the, then seemingly monumental, goal "to sequence and map all of the genes—together known as the genome—of members of our species, *Homo sapiens*."[6] The Project was marketed as a potentially

decisive blow in our species' war against disease. In June 2000 President Bill Clinton said of the publication of the "working draft" of the human genome—"It is now conceivable that our children's children will know the term cancer only as a constellation of stars."[7] There are numerous ways that this advance could eventually lead to better treatments for cancer. But it is now apparent that writing down the nucleotides of genes involved in cancer leaves us a long way short of abolishing the disease. Advocates who sought to market the Human Genome Project as ending cancer by the time of their grandchildren were overselling it and therefore exaggerated the moral importance of the sequencing task. Clinton's child's children will almost certainly know cancer as a terrible disease. When we think about the potential for gene editing to bring cures we should not forget the exaggerated moral prioritization suggested by these assessments of what gene sequencing could do for humanity.

The historical thinking sampled by this chapter comes from the dawn of our attempts to use scientific understanding to change humans—Francis Galton's (Galton [1883] 2012)) notion of eugenics. It may be hard to see how a late eighteenth-century debate about eugenics could possibly be relevant to an early twenty-first-century debate about gene editing. As we shall see, the methods involved are completely different. The debate about eugenics was a debate about the advisability of managing human reproduction. The current debate about gene editing is about the repurposing of an enzyme used by bacteria to combat viruses to make targeted changes to DNA. Earlier discussions nevertheless raise points about which aspects of our humanity to change and which to preserve that are not contingent on technological details.

To say that historicizing is of value in early-stage ethical investigations is not to say that the ethical arguments that result from late-stage ethical inquiry will make indispensable appeal to historical facts. Historical appeals belong in an ethical scoping exercise even if we dispense with them when we advance our specific ethical duties and permissions. We should not say that gene editing is right because it is eugenics. But nor should we say that gene editing is wrong because it is eugenics. Ethical claims are not true or false in the basis of their historical provenance. Those who say so commit the genetic fallacy. Nevertheless, when we survey debate about eugenics we gain access to century and a half of reflection on right and wrong ways to modify humanity that might otherwise be overlooked. We can use the results of this survey to formulate arguments that avoid the genetic fallacy.

COMPARING EARLY-STAGE ETHICAL INVESTIGATION AND EARLY-STAGE SCIENTIFIC INVESTIGATION

Philosophers who move too quickly to late-stage ethical thinking often make the mistake of premature advocacy of proposals. In early philosophical discussions of human genetic modification, we should resist the tendency to issue overconfident endorsements or rejections that we should properly acknowledge as premature.

Scientists are better than moral philosophers at recognizing that in the early stage of an encounter with a phenomenon, our claims or conjectures should generally be provisional. We expect to gain evidence that might revise initial assessments. Scientists are trained to avoid

the overconfident apodictic pronouncements that moral philosophers are inclined to offer about new technologies. They remember that the German geologist Alfred Wegener's proposal of plate tectonics was vindicated in spite of the apparent absurdity of forces powerful enough to shift entire continents.[8]

We should expect reflection to make distinctively ethical discoveries. To see what these ethical discoveries might be like, consider the method of reflective equilibrium that is an influential approach to formulating and justifying moral judgments. Norman Daniels says, "Viewed most generally, a 'reflective equilibrium' is the end-point of a deliberative process in which we reflect on and revise our beliefs about an area of inquiry, moral or non-moral" (Daniels 2008). When morally assessing a technological novelty, we seek coherence with beliefs about similar cases and a wide range of moral and factual beliefs. Arriving at coherent beliefs about a technological novelty can take time. Moral philosophers are expected to play the role of solvers of theoretical jigsaw puzzles, testing a variety of combinations of moral and non-moral beliefs to see which combination is the most coherent. Gene editing seems to enable choices formerly unavailable to us. We should expect that deciding which moral assessments of it cohere best with more established judgments about how to use technology to alter the characteristics of humans will take time. The technological novelty of gene editing may even lead to the revision of moral assessments about which we were formerly quite confident.

Gene editing arrives in the context of two decades of bioethical reflection on embryonic selection enabled by Pre-implantations Genetic Diagnosis (PGD) in which embryos are created by IVF and we decide which to start a pregnancy with on the basis of genetic tests (see Botkin 1998; Robertson 2003). We can seek coherence between these judgments about PGD and judgments about the ethics of gene editing. Perhaps the most coherent combination of beliefs requires that we retreat from our earlier judgments about PGD. We may retreat from confident endorsements of PGD in the basis of unacceptable human uses of gene editing that these seem to entail.

In early-stage ethical engagements with a technological novelty, moral philosophers should allow that strong initial suspicions about a technology may be overturned by a combination of fresh evidence about the technology and ongoing critical reflection on moral and prudential claims. We do not expect assessments of coherence to be philosophically obvious or instantaneous. If we expect time to pass before we arrive at the rational end-point of a reflective equilibrium about gene editing, we should be appropriately circumspect about our initial moral judgments. We should offer them initially as low-credence conjectures about how we should apply gene editing to human beings. We should be open to the possibility that low-credence conjectures about a gene editing could travel the equivalent of the path from low to high credence of Wegener's conjecture about wandering continents, as we consider the fit of alternative moral proposals about gene editing with established moral beliefs. In science the path from a low-credence conjecture can happen when it successfully predicts an unexpected observation. The path from a low-credence ethical conjecture to a reasoned moral conclusion about a technological novelty can occur as we consider it in the light of other moral and non-moral beliefs. Advocacy that once seemed outlandish can come to seem more mainstream.

GALTON'S SCIENCE OF IMPROVING STOCK

I have described eugenics as the first attempt to apply scientific understanding to the project of changing humanity. An early-stage ethical investigation of gene editing can seek to apply what we learned from this attempt.

The word "eugenics," coined by Francis Galton, a cousin of Charles Darwin, combines the Greek *eu*, meaning "good" or "well," with the suffix *-genēs*, meaning "born." In his 1883 book *Inquiries into Human Faculty and Its Development*, Galton defined eugenics as "the science of improving stock, which is by no means confined to questions of judicious mating, but which, especially in the case of man, takes cognizance of all influences that tend in however remote a degree to give to the more suitable races or strains of blood a better chance of prevailing speedily over the less suitable" (Galton [1883] 2012): 17n1).

Eugenics as described by Galton has a different focus from the techniques of genetic modification that focus on the DNA of specific individuals. Eugenics operates on populations. Galton planned to improve population quality by managing human reproduction. Eugenics comprised two interventions in human heredity. Positive eugenics involved encouragement of those judged to be well born to have many children. Negative eugenics would discourage the reproduction of the dysgenic or poorly born. A combination of positive and negative eugenics combined to form a policy of managing human reproduction. Human stock would be improved by the same methods used by millennia of farmers to improve the quality of livestock.

The errors of eugenics have been well described and I limit myself to a brief summary here (see Agar 2004; Kelves 1998; Paul 1995 and the essays in Bashford and Levine 2010). There were factual errors. Galton and those who sought to implement his science of improving human stock misunderstood human heredity. Galton supposed that his age's racist and classist prejudices might serve as a guide to the eugenic and dysgenic. Modern genetics has revealed a wide variety of genetic variants that increase the likelihood of disease. These disease-related genetic variants are scattered across the genomes of the socially successful and socially unsuccessful. Queen Victoria—the individual who according to the prejudices of Galton's age should have possessed human life of the highest quality—carried the recessive gene for haemophilia. It would be passed on with history altering consequences to Alexei, the son of Tsar Nicholas II (Massie 1967). Some genetic variants associated with disease are more common in people with specific ethnicities. But it is simply false to assert that certain ethnicities are globally worse in hereditary terms than are other ethnicities. Unless you assume an explicitly racist or classist conception of improvement, you do not improve the quality of a population by depressing the reproductive rates of groups who suffer prejudice because of the color of their skin or their socio-economic category.

There are also distinctively moral errors. We place a high value on our procreative liberty —our freedom as individuals to make our own choices about whether to have children, how many children to have, and with whom to have children. The livestock that Galton offered as proof of the eugenic efficacy of managed reproduction are incapable of offering defenses of their reproductive freedom. Ethical farmers care about the welfare of their livestock but there is no need to elicit the preferences of their livestock about whether to reproduce and with

which mate to have offspring. Our distinctively human interest in reproductive liberty means that we refuse to defer to the assessments of some scientific authority on hereditary quality.

I have suggested that appeals to eugenics will not feature on the specifics of the late-stage ethical principles we apply to gene editing. But they are relevant to early-stage ethical surveys. Eugenics as originally described by Galton and pursued by his followers was mistaken on factual and ethical grounds. But this does not disprove the value of reflecting on eugenics as part of early-stage ethical evaluation of gene editing.

An early-stage ethical survey must include the good with the bad. It would be a mistake for an advocate of the use of gene editing to improve human stock to offer Galton's 1880s arguments for eugenics as justification. But it would also be wrong if someone who argued in favor of the liberal use of gene editing to enhance humans showed no awareness of the wrongs done in eugenics' name. Differences between the methods and science of late eighteenth- and early twentieth-century eugenics and early twenty-first-century gene editing make it easy to forget moral lessons learned in consideration of the former and to fail to apply them to the latter. When the details of technologies and science involved change, we find it hard to acknowledge the relevance of past moral reflections. We need to ethically historicize to see the potential relevance of past ethical reflections to twenty-first-century gene editing. The details of the science and technology change but past reflections on which aspects of our humanity to preserve and which to alter remain relevant.

WHAT CAN WE LEARN FROM EUGENICS?

In their 2000 book on the morality of human genetic engineering, *From Chance to Choice*, Allen Buchanan, Dan Brock, Norman Daniels, and Daniel Wikler (2000) offer eugenics as a "cautionary tale." It is as a negative exemplar, comprising a collection of moral and scientific errors that liberal advocates of human genetic selection and modification must seek to avoid. In effect they offer George Santayana's famous warning "Those who cannot remember the past are condemned to repeat it."

The presentation of eugenics as a cautionary tale is an especially important element of early-stage ethical thinking. The arguments of many late-stage ethical arguments advocate specific conclusions. When they become advocates, their purpose is not to make the reader aware of the full range of ethical pluses and minuses that attend targeted interventions in DNA. The requirements of early-stage ethical investigation of gene editing are different. Even those who expect that their survey of eugenics will lead them to support gene editing should seek to make their early-stage ethical survey as even-handed as possible.

I offer the following early-stage application of what we have learned from discussions of eugenics to gene editing. Remember that Galton describes eugenics as "the science of improving stock, which is by no means confined to questions of judicious mating" (Galton [1883] 2012): 25). Galton's definition suggests that means apart from the management of reproduction might be relevant to eugenics.

One of the changes since Galton's time has been a recognition of how hereditary influences interact with environmental influences to make human beings. This interactionism is consistent with Galton's proposal that eugenics "takes cognizance of *all* influences"

(Galton [1883] 2012: 17). Galton's proposals about how hereditary influences could be managed were comparative novelties for Galton's Victorian readership. They are what made eugenics revolutionary. But eugenics is defined to include environmental influences such as diet and education. These would have been familiar to Galton and his contemporaries as ways to affect human development. It has long been common knowledge that farmers who fail to nourish their livestock impair their quality.

The genetic determinist emphasis on hereditary influences may be apparent in much of what Galton said but it is no implication of his definition of eugenics. Genetic determinist views have given way to interactionist accounts in which our distinctive attributes emerge from a complex interaction between genes and environment (see Parrington 2016).

I have argued that a developmental parity of genes and environment suggests a moral parity (Agar 2004). We should treat changes to genetic influences similarly to changes to environmental influences. When the modification of a gene produces developmental outcomes identical to the modification of an environmental influence, we should morally assess both similarly. Changes to genes may in fact have different effects on development from changes to environments. We should understand that these two varieties of developmental influences work in different ways. But the idea of a moral parity suggests that where a genetic modification has effects on development identical to change of diet or education, we should assess them in the same way. There are stronger and weaker versions of the moral parity thesis. A strong version insists that no change to development that does not change the developmental outcome should make a difference to its moral assessment. A weaker version allows that some changes that do not alter developmental outcomes can make a moral difference but insists that the dominant contributor to moral assessment is the assessment of developmental outcomes.

WHAT CAN WE LEARN FROM VIEWING PUBLIC HEALTH AS EUGENICS?

The modern specialty of public health can be seen as a descendant of Galton's science of improving stock as he defines it above. According to the World Health Organization, public health is "the art and science of preventing disease, prolonging life and promoting health through the organized efforts of society"[9] (see Acheson 1988; Axelsson and Axelsson 2006). These "organized efforts of society" are typically not understood as extending to its members' genomes. Today's practitioners of public health seek to prevent disease, prolong life, and promote health by doing such things as reducing the rate of tobacco consumption, encouraging active life styles, and reducing obesity.

There are two reasons it's useful for early-stage ethical inquiries to view this very modern medical speciality as beholden to Galton.

1. The first area of commonality is methodological. We are right to condemn Galton for his morally objectionable racism and social elitism. But we should acknowledge him as a founder in statistical reasoning. He propounded the idea of regression to the mean and pioneered modern statistical understanding of correlation. Galton's work here is

essential to work in public health. We use statistical methods derived from his work to determine if a particular public health intervention will be a success. The statistical methods pioneered by Galton offer effective refutation of the racism and classism that informed many of his and his contemporaries' specific proposals about heredity. The statistical correlations that Galton should have expected to find between race or class and intelligence or criminal tendencies have not emerged in spite of exhaustive searching. But these statistical techniques have exposed numerous more specific correlations between specific genetic variants and lifestyle habits and disease.

2. A significant area of commonality between a focus on hereditary influences and public health's focus on environmental influences connects to their use of statistical reasoning. Both focus on populations. Galton's plan to manage human reproduction was supposed to target populations of human beings. The focus of public health is also on populations. We judge a public health intervention to be a success if it leads to an overall increase in population health as revealed by a given measure.

Is this focus on population health a good fit for gene editing as genetic medicine? It can be. The individual who has her genome altered by CRISPR-Cas9 may be the most immediate beneficiary of a specific use of gene editing. But this does not prevent us from measuring the success or failure of that technique at the level of the population. This is a perspective appropriate for policy-makers when they contemplate making gene editing available to their citizenries. An individual who quits smoking because he was exposed to a TV commercial benefits from a public health measure to reduce the rate of smoking. But we can insist that the correct measure of the success of the TV campaign will be at the level of the population. If the public health campaign is a success, we should expect to see a reduced rate of smoking in the population as a whole. We don't say that the public health intervention was a success because Ralph saw a TV commercial and quit smoking.

A focus on populations exposes distinctive moral problem shared by the management of hereditary and environmental influences. One widely discussed problem with Galtonian eugenics was the morally repellent treatment of individuals who failed to measure up to the standards of those who sought to implement it. The most egregious offences of Galtonian negative eugenics came from the Nazi Aktion T4 program which directed the murder of over 70,000 disabled people. But the Nazis were not alone in using eugenic ideas to justify immoral abuses of individuals (see Paul 1995; Kevles 1998). Elsewhere those judged dysgenic were sterilized. A theme here is criminal obliviousness to the moral needs and interests of individuals in pursuit of mistaken proposals about how to improve the quality of populations.

The goal of improving population health that motivates current practitioners of public health is clearly morally preferable to the ideals of population quality that motivated Nazi eugenicists. But there are nevertheless shared problems. I have suggested that the procreative interests of humans create moral obstacles to the management of human stock. Some of these issues arise in public health. A measure whose goal is to reduce the population rate of smoking must not unduly infringe the moral interests of smokers. Human beings can suffer significant harm from stigmatization. Consider the US State of Georgia's 2011 public heath

campaign to reduce childhood obesity—"Stop Sugarcoating." This campaign featured a solemn overweight young girl facing the camera with her arms folded. Beneath the photo was the text "WARNING: It's hard to be a little girl if you're not." Critics rightly charged that it went too far in stigmatizing a category of young people who are especially susceptible to ill-treatment.[10] Some public health campaigns that may be successes if judged purely in terms of their outcomes are nevertheless morally problematic for the ways that they treat individuals.

An early-stage ethical discussion that places gene editing to prevent disease in a context that includes public health interventions that aim to reduce disease is both useful and can be viewed as prompted by Galton's definition of eugenics.

CONCLUDING COMMENTS

This paper distinguishes early-stage from late-stage ethical inquiries. We should acknowledge the ethical challenge posed by the possibility of editing human embryos as novel and that we risk poor moral judgments when we rush to morally pronounce on the editing of human embryos. We should be concerned about the fact that philosophical debate about new technologies seems prone to produce emphatic rejections or overly confident endorsements. We can correct this error by a self-conscious subdivision of ethical inquiry into early-stage investigations whose imaginatively expansive methods seek to identify all involved values and late-stage investigations whose error-averse methods aim to generate specific moral principles. I argue that once we distinguish these two modes of ethical inquiry we do best to combine them in our consideration of the ethics of human gene editing. I offer Galton's eugenics as a case study of early-stage ethical inquiry that we can hope will eventually yield moral principles fit to instruct our use of gene editing.

or philosophical discussion about the ethics and prudential rationality of transformation see Agar (2013), Paul (2014), and Agar (2018).

avid Cyranoski and Heidi Ledford, "Genome-Edited Baby Claim Provokes International Outcry." *Nature*, November 26, 2018, https://www.nature.com/articles/d41586-018-07545-0.

Chinese Gene-Editing Scientist He Jiankui May Have Made the Twins Smarter, Scientists Say" *ABC News*, February 25, 2019, https://www.abc.net.au/news/2019-02-25/gene-editing-scientist-may-have-made-the-twins-smarter/10845220.

or an example of this kind of historicizing see Marius Turda and Maria Sophia Quine (2018).

ee, for example, Julie Steenhuysen, "Ethicists Square Off over Editing Genes in Human Embryos." Reuters, December 2, 2015, https://www.reuters.com/article/us-gene-editing-summit/ethicists-square-off-over-editing-genes-in-human-embryos-idUSKBN0TL02V20151202.

ee "All about the Human Genome Project (HGP)" at the National Human Genome Research Institute (*web page*), January 9, 2019, http://www.genome.gov/10001772.

ee the National Human Genome Research Institute (*web page*), January 9, 2019, https://www.genome.gov/10001356/june-2000-white-house-event/.

ichard Conniff, "When Continental Drift Was Considered Pseudoscience." *Smithsonian Magazine,* June 2012, https://www.smithsonianmag.com/science-nature/when-continental-drift-was-considered-pseudoscience-90353214/.

/orld Health Organization. "Public Health Services." http://www.euro.who.int/en/health-topics/Health-systems/public-health-services.

mma Gray, "Georgia Anti-Obesity Ads Say 'Stop Sugarcoating' Childhood Obesity." January 3, 2012, https://www.huffpost.com/entry/georgia-anti-obesity-ads-stop-sugarcoating_n_1182023.

SOURCES CITED

Acheson, Donald. *Public Health in England: Report of the Committee of Enquiry into the Future Development of the Public Health Function*. London: HMSO, 1988.

Agar, Nicholas. *Liberal Eugenics: In Defence of Human Enhancement*. Oxford: Blackwell, 2004.

Agar, Nicholas. *Truly Human Enhancement: A Philosophical Defense of Limits*. Cambridge MA: MIT Press, 2013.

Agar, Nicholas. "Transformative Change in Invasion of the Body Snatchers." *Medicine, Health Care and Philosophy,* vol. 21, no. 3 (2018): 279–86.

Agar, Nicholas. "Why We Should Defend Gene Editing as Eugenics." *Cambridge Quarterly of Healthcare Ethics*, vol. 28, no. 1 (2019): 9–19.

Axelsson, Runo, and Susanna Bihari Axelsson. "Integration and Collaboration in Public Health—a Conceptual Framework." *International Journal of Health Planning Management,* vol. 21 (2006): 75–88.

Bashford, Alison, and Philippa Levine, eds. *The Oxford Handbook of the History of Eugenics*. Oxford: Oxford University Press, 2010.

Botkin, Jeffrey. "Ethical Issues and Practical Problems in Preimplantation Genetic Diagnosis Journal of Law." *Journal of Law, Medicine and Ethics*, vol. 16 (1998): 17–28.

Buchanan, Allen, Dan Brock, Norman Daniels, and Daniel Wikler. *From Chance to Choice: Genetics and Justice*. New York: Cambridge University Press, 2000.

Churchland, Patricia. *Neurophilosophy: Toward a Unified Science of the Mind-Brain*. Cambridge MA: MIT Press, 1986.

Daniels, Norman. "Reflective Equilibrium." In *The Stanford Encyclopedia of Philosophy*, edited by Edward N. Zalta (2008), https://plato.stanford.edu/archives/fall2018/entries/reflective-equilibrium/.

Dawson, Angus, and Marcel Verweij. "The Meaning of 'Public' in 'Public Health'." In *Ethics, Prevention, and Public Health*, edited by Angus Dawson and Marcel Verweij. Oxford: Clarendon Press, 2007, pp. 13–29.

Galton, Francis. *Inquiries into Human Faculty and Its Development*. London: Forgotten Books, [1883] 2012.

Harris, John. *Wonderwoman and Superman: The Ethics of Human Biotechnology*. Oxford: Oxford University Press, 1992.

Kevles, Daniel. *In the Name of Eugenics: Genetics and the Uses of Human Heredity*. Cambridge MA: Harvard University Press, 1998.

Massie, Robert. *Nicholas and Alexandra: An Intimate Account of the Last of the Romanovs*. New York: Atheneum, 1967.

Mackie, John L. *Ethics: Inventing Right and Wrong*. Harmondsworth: Penguin, 1977.

Parrington, John. *The Deeper Genome: Why There Is More to the Human Genome than Meets the Eye*. Oxford: Oxford University Press, 2016.

Paul, Diane. *Controlling Human Heredity: 1865 to the Present*. Atlantic Highlands NJ: Humanity Books, 1995.

Paul, Laurie. *Transformative Experience*. New York: Oxford University Press, 2014.

Popper, Karl. *The Poverty of Historicism*. Abingdon-on-Thames: Routledge, 1994.

Robertson, John. "Extending Preimplantation Genetic Diagnosis: The Ethical Debate: Ethical Issues in New Uses of Preimplantation Genetic Diagnosis." *Human Reproduction*, vol. 18, no. 3 (2003): 465–71.

Savulescu, Julian. "Procreative Beneficence: Why We Should Select the Best Children." *Bioethics*, vol. 15 (2001): 413–26.

Turda, Marius, and Maria Sophia Quine. *Historicizing Race*. London: Bloomsbury, 2018.

CHAPTER EIGHTEEN

The Medicalization of the Posthuman Transformation Trajectory

SØREN HOLM

We don't know how the transition from human to post-human will come about, or whether it will ever come about. In the literature we can find projected trajectories where the transition is gradual and where there is some connection between humans and post-humans, and we can find projected trajectories where the transition takes the form of an abrupt rupture where the post-human entities are essentially unconnected to their human antecedents apart from being the end products of a causal chain of events having a human origin (e.g., the replacement of humans by super intelligent machines).

Many of the connected trajectories are also gradualist in the sense that they predict a development where human bodies and brains will gradually, perhaps over generations, be modified, changed, and augmented leading to the future post-human entities. This will happen using a broad range of technologies from gene editing to nano-robotics. The analyses in the following apply to such connected, gradualist trajectories for the post-human transition. I will use the term "post-human intervention" to cover any intervention in relation to a human or post-human body that is performed in order to pursue a post-human goal. Such an intervention may not in itself change someone from a human to a post-human state but may just be one of the many steps necessary to achieve that transformation.

An important feature of the connected trajectories is that they all rely on the development and application of biomedical technologies. These technologies are biomedical in three

different, but overlapping senses:

1. They rely on biomedical research developments.
2. Their applications rely on interventions in bodies that are usually conceived of as medical interventions.
3. Their implementation will—unless we invent a new highly skilled profession only concerned with post-human transformation—require the application of skills currently almost exclusively held by the medical and allied health professions.[1]

Over time there may be a shift toward non-biomedical technologies but the first steps on the path to post-human transformation will rely on biomedical technologies. Or to put it differently, the knowledge base will be biomedical and the interventions will be performed by medical practitioners. It is also likely that medicine will have to mop up after failed attempts at post-human transformation whether these are performed by biohackers or medical professionals.

This chapter will investigate how the mutual interactions and influences between post-human developments and biomedicine are likely to play out. Two interesting and important issues are outside the scope of this chapter. The first is whether there is a defensible distinction between interventions aimed at therapy and interventions aimed at enhancement and whether such a distinction is ethically important or important for policy-making. This issue is covered in great depth in Sarah Chan's chapter in this volume. The second issue which will not be analyzed in depth is whether medicine or the medical profession has its own internal morality and if so what the status of that morality is. Can we for instance say that some interventions fall outside the goals of medicine and that it would therefore be wrong for doctors to perform such interventions? In the present chapter, it will be assumed that medicine has an internal set of normative prescriptions and a conception of the goals of medicine, as a matter of factual sociological description. For the purposes of the arguments in this chapter, it is not assumed that this internal morality is unchangeable, or that it justifiably picks out those activities doctors should and should not engage in. The only assumption is that it exists as part of the social practice of medicine and that it is to some degree action guiding both for the profession as a whole when it acts through its official organizations and for individual members of the profession. In the literature a number of goals have been proposed as the goals of medicine. Fleischauer and Hermerén (2006) make a distinction between fundamental goals and operational goals such as diagnosis, caring, curing, and preventing. And, an international project led by the Hastings Center in the 1990s produced a list of fundamental goals that are fairly typical of the literature by stating that the goals of medicine are (Allert et al. 1996):

1. The prevention of disease and injury, and promotion and maintenance of health.
2. The relief of pain and suffering caused by maladies.
3. The care and cure of those with a malady, and the care of those who cannot be cured.
4. The avoidance of premature death, and the pursuit of a peaceful death.

HOW WILL MEDICINE SHAPE POST-HUMAN DEVELOPMENTS?

A gradual transition from human beings to post-human beings could, theoretically, be accomplished without any involvement of medicine. Biohackers could be in the driving seat. There are, however, good reasons to believe that whereas biohacking and similar activities will continue to explore the outer reaches of the space of what is possible in bodily modification, biohacking will continue to be a minority pursuit.

Let us first note that some biohacking involves prior biomedical research developments and relies on the larger biomedical research eco system to create the possibilities the biohacker exploits. The biohacker who, for instance, uses gene editing to modify his or her own cells can only do so because the gene editing technology has been developed by biomedical researchers to a level where it can be performed as a routine activity with predictable results (at the technical level). And, all of the chemicals that are necessary for biohacking gene editing are only available to the biohacker because there is a biomedical market that makes it commercially viable for lab supply firms to produce and market them.

Biohacking also relies on very specific attitudes toward making, tinkering, and risk that are not widely shared (Roosth 2010; Doerksen 2017; Yetisen 2018). Most people would probably prefer their post-human surgical intervention to be performed by a trained surgeon and not by a biohacker or by themselves, because they prefer the perceived safety of having the surgery performed by a highly trained member of a regulated profession.

Finally, some biohacking activities may simply be illegal if performed by one person on another, unless the person performing them is a medical doctor. In the recent English case BM, R v [2018] EWCA Crim 560 the Court of Appeal found unanimously that some forms of surgical body modification, that is, tongue splitting, ear removal, and nipple removal constituted assault, even though they were performed by a competent body modifier. And further, that the consent of the persons in question, or the fact that they were satisfied with the results, did not constitute a defense to the charge of assault.

But, if medicine is going to be involved in post-human interventions, these interventions will, at least to some degree, be shaped by medicine and its role in society. This is likely to happen in four areas:

1. Post-human augmentation as a direct goal or a by-product of research
2. Evidence based post-human interventions
3. Resource allocation to post-human interventions
4. Monopolization by medicine

Apart from the basic goal of generating knowledge and understanding of the human body and its component parts, biomedical research is directed toward therapy and prevention. This orientation is not likely to change very quickly if at all. It is sustained partly by the self-understanding of medicine as concerned primarily with health, and partly by the way funding is allocated to biomedical research. Even though there is now private and charitable funding for research aimed at explicitly post-human goals, this funding is dwarfed by the public,

private, and charitable funding that is available to research aimed at therapy and prevention. This means that although interventions will be developed that produce post-human augmentation and enhancement, they will be developed aimed at alleviating specific sub-optimal biological conditions. The post-human potential will come about as a by-product or spin-off of research aimed at therapy or prevention. Sarcopenia (loss of muscle mass) is, for instance, a typical feature of old age and a side-effect of some types of chemotherapy for cancer. It is implicated in the loss of mobility and increased frailty in the elderly persons. Treatments that can halt or reverse sarcopenia are therefore actively being researched (Coelho et al. 2018; Consitt and Clark 2018). But, apart from the fact that a treatment for sarcopenia would be likely to also create some degree of life-extension (a post-human goal), such treatments are also likely to be much more directly usable to augment muscle mass and strength in healthy persons. Sarcopenia treatments are thus one of the many examples of interventions that will be developed as treatments for pathological conditions, but which will have obvious potential as post-human interventions. Similarly, permanent implantable electrodes are being developed to achieve machine-brain interactions with therapeutic purposes in Parkinson's disease and other neurological conditions, but they are also a necessary part of many post-human cyborg imaginaries.

The only area where it seems likely that post-human goals will be pursued directly in research is the area of life extension. Life extension technologies will, unless they involve uploading of minds to computers, be technologies that work because they modify basic biological processes. The goal of life extension described as adding more healthy years to life is very close too, and possibly even co-extensive with one of the generally recognized goals of medicine (Holm 2017). The step to pursue life extension independently through directed research funding, and not as a side-effect of treatments for age-related conditions, is therefore only a small step and likely to happen as soon as the basic science of life extension has progressed sufficiently to make human life extension a plausible research goal. Some claim that we are already at this tipping point or have passed it some time ago (de Grey 2005, 2006; Davies 2018).

If this analysis of the way in which the post-human entanglement with medicine is likely to shape the research trajectory of post-human interventions is correct, it has significant implications for the development of those post-human interventions that cannot easily be linked to a pathological condition or which are unlikely to come about as a side-effect of the development of treatment or prevention. They cannot piggyback on biomedical research and biomedical research funding, and are therefore much less likely to be developed.[2]

The entanglement with medicine is also likely to mean that the bar for the introduction of post-human interventions in general use will be set at the standard medical level and that medical ideas about evidence-based practice will be applied to post-human interventions. The evidence-based medicine (EBM) movement and ideology, and its attendant practices for creating and evaluating evidence, have had a very significant influence on medical research and practice during the last thirty years (Sacket et al. 1996; Straus et al. 2018). It is now generally accepted that no new interventions should be brought into general clinical use unless they are "evidence-based" and that the evidence has to be quantitative estimates of effectiveness and safety generated by appropriately designed and conducted clinical research.

EBM has also had significant legal and regulatory impact. For pharmaceutical products and many classes of medical devices, this entails that the evidence has to be generated in a highly regimented way prescribed by the international Good Clinical Practice (GCP) guidelines in order to get marketing approval (ICH 2016). Conducting GCP-compliant research is very costly. It is estimated that it costs more than $1.3 billion on average to bring a new pharmaceutical product to market (DiMasi et al. 2016). A requirement that post-human interventions should be evidence-based and therefore developed according to GCP will undoubtedly delay the introduction of post-human interventions in the marketplace and entail that some promising interventions are never brought to market. Could post-human intervention be brought to market outside of this regulatory system, for example, by not classifying them as pharmaceutical products or medical devices and instead marketing them as dietary supplements or consumer electronics? This is perhaps in theory possible, but raises practical problems that are probably insurmountable. Marketing a new chemical entity for ingestion or injection with claimed biological effects outside of the pharmaceutical regulatory system is in many jurisdictions legally close to impossible, and the same applies to any active device that requires surgical implantation. And, perhaps equally importantly such post-human supplements and devices marketed outside of the health care sphere would not be covered by the re-imbursement of the health care system and would therefore be unlikely to be able to command the kind of price that new pharmaceuticals command.

When it comes to implementing post-human interventions more widely, this will be in a social system which still conceptualizes itself as a health care system and where resource allocation is driven by the goal of generating health improvement. The English National Health Service may eventually become the National Health, Wellbeing and Improvement Service, but it is not going to happen any time soon. Post-human interventions aimed explicitly at augmentation and enhancement can only find room within these systems if resources are allocated to them. This raises two issues, one about public priorities and one about the current methods for resource allocation.

Most health care systems have large elements of third-party payment, either through employment-based insurance (e.g., the United States), more or less mandatory mutual insurance systems (e.g., Germany, France) or through general taxation (e.g., the UK, Denmark). It is very rare that individuals pay the full costs of health care directly, themselves.[3] This means that the public views on what kinds of interventions the health care system should cover are important to the perceived legitimacy of the resource allocation decisions. The evidence from studies of public attitudes toward resource allocation in health care shows that the public find a range of factors to be important, including predicted health gain, age of patients, personal responsibility for health state, and need for health care defined as the initial deviation from good health. There is strong evidence that the public in a range of countries put significant weight on health need as an important criterion in allocating resources (Nord 1994; Dolan et al. 2005; Shah 2009). If we have to choose between two patients and can provide them with a health gain of equal size, we should give priority to the patient who has the worst current health state. This public attitude toward the importance of health care need as an allocative criterion means that post-human interventions that make people "better than well" will face an uphill struggle in resource allocation within the health

care system. It could be suggested that this is not a problem since post-human interventions can be provided outside of the health care system, and societal resources allocated to them directly without any link to health care. There is no logical reason why this could not happen, but the technical biomedical expertise needed by those performing the interventions means that it is unlikely to happen, even in the medium term. It is also not clear that it would solve the funding problem for post-human interventions. Many societies fund their health care systems relatively generously compared to other sectors of societal provision of services with a greater emphasis on equality of provision, and they do this exactly because health needs are seen as an especially important class of needs (Daniels 1985). Moving a practice out of health care is therefore unlikely to lead to increased funding for that practice.

In many health care systems, some kind of formal health economic evaluation plays a role in resource allocation because one of the goals of the system is to provide a cost-effective service and generate as much health as possible from the available resources. This evaluation can be done in many ways but one popular option is some form of cost-utility analysis (CUA), because the outcomes of health care (i.e., lifesaving, health, and wellbeing) cannot easily be converted into monetary terms precluding the use of a full cost-benefit analysis. CUA can, again, be done in many different ways with different utility measures, but one of the most common is the quality-adjusted life years (QALY) approach (Williams 1985; Whitehead and Ali 2010). Here the utility of the outcome is defined as consisting of two components: a life extension component and a quality-of-life (QoL) component. The utility of the outcome is measured in how many QALYs it produces. An intervention that produces a life-extension of ten years and raises the health-related QoL from 0.6 to 0.8 during those ten years will thus generate 10 x (0.8–0.6) = 2 QALYs. The quality component of the QALY is estimated using a health-related QoL instrument (e.g., the EuroQoL instrument) (Brooks 1996). It is here that a problem arises for post-human interventions since whereas the QoL instruments allow for states of being that are worse than death and have negative utility, the upper bound of the QoL is capped at the level experienced by someone in perfect health. The Q component in the QALY can go below 0, but it can, as currently conceptualized, not go above 1. There is no health-related QoL which is better than perfect health. Using standard CUA approaches to resource allocation would therefore mean that a "pure" post-human intervention, with the sole effect of making healthy people better in some way, which did not increase their life expectancy or result in health gains down the line, would produce exactly zero health-related utility. Such a pure post-human intervention would, therefore, be highly cost ineffective according to standard CUA, essentially consuming resources without producing any utility. It would therefore never be funded. So, to give an example, an intervention producing a massive increase in artistic appreciation, and therefore general wellbeing, would have a QALY value of 0, unless it also produced added life years; and the same would be true of interventions adding additional senses or improving memory.

The situation is even worse for post-human interventions in relation to the most commonly used metric for measuring the burden of disease in a society, the WHO endorsed disability-adjusted life year (DALY) (Murray 1994). DALYs are often used in arguments concerning how public research funding ought to be allocated. Life years lost is a component of the DALY, but a life year only counts as lost if the person died earlier than the average life

expectancy for his or her birth cohort. Life extension beyond the normal life span therefore counts for nothing in the DALY. A life extending post-human intervention would thus only count in DALY terms because of its "treatment effects," that is, its ability to extend life up until the normal life span.

Medicine is a socially powerful profession with a keen eye to maintaining its own privileges, status, and earning power (Freidson 1988; Elston 2002). Part of this professional agenda is pursued by attempting to create *de facto* or *de jure* monopoly for the profession in relation to certain activities and/or classes of human problems. We have seen this historically where the profession has gained legal monopolies over surgery and the access to prescription drugs, but it is a process that is still ongoing. We can, for instance, see this in relation to the ongoing, long-running battle for control over pregnant women and childbirth. If post-human interventions become either technically interesting or financially lucrative, it is likely that medicine will seek to monopolize access to such interventions so that they are only accessible through the mediation of a health care professional. This will in many cases not involve anything which will look like a "power grab." What could be more natural than only doctors being allowed to perform surgery, when surgery is a necessary part of a post-human intervention, or only doctors being allowed to prescribe or inject post-human pharmaceuticals? As all monopolies, this will drive up cost and make access more difficult, and it will reinforce the other elements of medical control identified above.

HOW WILL POST-HUMAN DEVELOPMENTS SHAPE MEDICINE

It is likely that the development of biomedical interventions that clearly augment some functions of healthy human beings will lead to gradual changes in the internal norms of the medical profession. Currently, purely augmentative interventions such a non-reconstructive cosmetic surgery or the use of Botox injection for cosmetic purposes are very much seen as a fringe activity. Although the practitioners of purely cosmetic surgery may become rich, they are not held in high regard in the profession. But well-evidenced interventions that can make people "better than well" in what is currently perceived of as core areas of medical practice are likely over time to lead to a reconceptualization of medicine's role in relation to augmentation/enhancement as an acceptable and perhaps even laudable goal of medical practice. The historical evidence shows that medicine is a malleable practice where activities move into and out of what is seen as the proper scope of the practice.

The preeminent example of this is the practice of surgery itself. The Hippocratic Oath specifically enjoins the Hippocratic physician not to perform surgery, but leave it to those who are trained and skilled in that practice, "I will not use the knife, even upon those suffering from stones, but I will leave this to those who are trained in this craft."[4] And, from the advent of universities in the early medieval period until the early 1800s, medicine in the West was divided between university-educated physicians and guild-trained surgeons, although this had little to do with the Oath but more to do with the specific emphasis on book learning and what we would now call "theory" in university education. But, as surgery

became more effective and less risky, surgery as a practice was absorbed into medicine, although the distinction between physicians and surgeons still lingers on in the English linguistic practice where a surgeon is addressed as Mr. or Mrs., whereas a physician is addressed as Dr.

Another, more normatively interesting example is the provision of abortion. Although the precise scope of the prohibition is disputed, the Hippocratic Oath again seems to prohibit participation both in abortion and in euthanasia "I will not give a lethal drug to anyone if I am asked, nor will I advise such a plan; and similarly I will not give a woman a pessary to cause an abortion."[5] Later the strong Christian influence on Western medicine meant that provision of abortion was seen as something a doctor should never engage in. But, this has obviously changed, and abortion is now seen as a normal part of medical practice, partly because the profession is the one which possesses the skill to perform safe abortions, partly because most societies have allocated the task of performing legal abortions to the hospital sector.

Many post-human interventions are thus likely to become accepted as parts of medical practice, but they are, as argued above, only likely to be accepted if they can meet modern medicine's epistemological, normative requirements of being evidence-based. So, although the importance of a distinction between therapy and enhancement is likely to diminish in medicine's internal morality as a result of the introduction of overtly post-human interventions, medical doctors are not going to become adventurous biohackers.

Whether we will see a change in medicine's and the other health care professions' focus on health as the primary goal of the professional endeavor and the primary *raison d'etre* of the profession is more difficult to predict. Could medicine in time reconceptualize itself as a profession with a broader remit, for example, "body-related welfare." This is certainly possible and would, if it happened, probably also lead to the re-classification of, for example, personal trainers as a "profession allied to medicine." But it could only happen along with a reconfiguration of the health care system and a societal renegotiation of the boundaries between a new "body welfare" system and other sectors/systems.

CONCLUSION

The main argument presented above is that the overall trajectory of the transition from human to post-human is likely to be deeply entangled with the health care professions, the biomedical research system, and the health care system, and that this will shape the trajectory of the transition. It will shape which post-human interventions that are likely to be developed and which are likely to be funded in a way so that they become widely accessible. The closer an intervention is to already existing activities in the health care sector, the more likely it is to be developed to a state where it can be widely employed as part of a post-human transition. But this similarity is a moving target. Over time what is conceived of as proper medical interventions will expand and new and more radical post-human interventions will come to look similar to activities that the health care professions are already engaged in.

the rest of this paper the terms "medicine" and the "medical profession" will be used to cover medicine and other relevant health professions.

ome of these may be developed because they are of interest to the military as pure augmentation of human function. An analysis of this is outside the scope of this chapter.

rivate health care exists as an option in many health care systems, but the scope of the interventions offered is almost always a very limited sub-set of the whole panoply of medical interventions.

ational Library of Medicine. "Greek Medicine." Translated by Michael North, 2002. https://www.nlm.nih.gov/hmd/greek/greek_oath.html.

ational Library of Medicine. "Greek Medicine." Translated by Michael North, 2002. https://www.nlm.nih.gov/hmd/greek/greek_oath.html.

SOURCES CITED

Allert, Gebhand, Bela Blasszauer, Kenneth Boyd, and Daniel Callahan. "The Goals of Medicine: Setting New Priorities." *The Hastings Center Report*, vol. 26, no. 6 (1996): S1–S27.

Brooks, Richard, and EuroQol Group. "EuroQol: The Current State of Play." *Health Policy*, vol. 37, no. 1 (1996): 53–72.

Coelho, A. L., S. Kim, J. Wan, P. Oliveira, and P. Cohen. "Myostation Modulation by MOTS-C May Lead to Beneficial Effects in Muscle and Fat Tissue." *Innovation in Aging*, vol. 2, no. Suppl 1 (2018): 886.

Consitt, Leslie A., and Brian C. Clark. "The Vicious Cycle of Myostatin Signaling in Sarcopenic Obesity: Myostatin Role in Skeletal Muscle Growth, Insulin Signaling and Implications for Clinical Trials." *The Journal of Frailty and Aging*, vol. 7, no. 1 (2018): 21–7.

Daniels, Norman. *Just Health Care*. Cambridge: Cambridge University Press, 1985.

Davis, John K. *New Methuselahs: The Ethics of Life Extension*. Cambridge, MA: MIT Press, 2018.

de Grey, Aubrey D. N. J. "Like It or Not, Life-Extension Research Extends beyond Biogerontology." *EMBO Reports*, vol. 6, no. 11 (2005): 1000.

de Grey, Aubrey D. N. J. "We Will Be Able to Live to 1000." In *Aging: Concepts and Controversies*, edited by H. R. Moody. London: Sage, 2006, pp. 66–8.

DiMasi, Joseph A., Henry G. Grabowski, and Ronald W. Hansen. "Innovation in the Pharmaceutical Industry: New Estimates of R&D Costs." *Journal of Health Economics*, vol. 47 (2016): 20–33.

Doerksen, Mark D. "Electromagnetism and the Nth Sense: Augmenting Senses in the Grinder Subculture." *The Senses and Society*, vol. 12, no. 3 (2017): 344–9.

Dolan, Paul, Rebecca Shaw, Aki Tsuchiya, and Alan Williams. "QALY Maximisation and People's Preferences: A Methodological Review of the Literature." *Health Economics*, vol. 14, no. 2 (2005): 197–208.

Elston, Mary Ann. "The Politics of Professional Power: Medicine in a Changing Health Service." In *The Sociology of the Health Service*, edited by M. Bury, M. Calnan, and J. Gibe. London: Routledge, 2002, pp. 68–98.

Fleischhauer, Kurt, and Göran Hermeren. *Goals of Medicine in the Course of History and Today*. Stockholm: Kungl. Vitterhets Historie och Antikvitets Akademien, 2006.

Freidson, Eliot. *Profession of Medicine: A Study of the Sociology of Applied Knowledge*. Chicago: University of Chicago Press, 1988.

Holm, Søren. "Extending Human Life as an Aim of Medicine." In *Handbook of the Philosophy of Medicine*, edited by T. Schramme and S. Edwards. Dordrecht: Springer, 2017, pp. 395–407.

International Council for Harmonisation of Technical Requirements for Pharmaceuticals for Human Use (ICH). "Integrated Addendum to ICH E6(R1): Guideline for Good Clinical Practice E6(R2)." November 9, 2016, https://www.ich.org/fileadmin/Public_Web_Site/ICH_Products/Guidelines/Efficacy/E6/E6_R2__Step_4_2016_1109.pdf.

Murray, Christopher J.L. "Quantifying the Burden of Disease: The Technical Basis for Disability-Adjusted Life Years." *Bulletin of the World Health Organization*, vol. 72, no. 3 (1994): 429–45.

Nord, Erik. "The Trade-Off between Severity of Illness and Treatment Effect in Cost-Value Analysis of Health Care." *Health Policy*, vol. 24, no. 3 (1994): 227–38.

Roosth, Hannah Sophia "Crafting Life: A Sensory Ethnography of Fabricated Biologies." Doctoral diss., Massachusetts

Institute of Technology, 2010. https://dspace.mit.edu/handle/1721.1/63236.

Sackett, David L., W. M. Rosenberg, J. M. Gray, R. B. Haynes, and W. S. Richardson. "Evidence Based Medicine: What It Is and What It Isn't." *BMJ: British Medical Journal*, vol. 312, no. 7023 (1996): 71.

Shah, Koonal K. "Severity of Illness and Priority Setting in Healthcare: A Review of the Literature." *Health Policy*, vol. 93, no. 2–3 (2009): 77–84.

Straus, Sharon E., Paul Glasziou, W. Scott Richardson, and R. Brian Haynes. *Evidence-Based Medicine: How to Practice and Teach EBM*. Oxford: Elsevier Health Sciences, 2018.

Whitehead, Sarah J., and Shehzad Ali. "Health Outcomes in Economic Evaluation: The QALY and Utilities." *British Medical Bulletin*, vol. 96, no. 1 (2010): 5–21.

Williams, Alan. "Economics of Coronary Artery Bypass Grafting." *British Medical Journal (Clinical Research ed.)*, vol. 291, no. 6491 (1985): 326–9.

Yetisen, Ali K. "Biohacking." *Trends in Biotechnology*, vol. 36, no. 8 (2018): 744–7.

CHAPTER NINETEEN

Life Extension and the Pursuit of Immortality

ANDY MIAH

In April 2019, headlines broke that scientists had partially revived the brains of thirty-two pigs to such a degree as to call into question the assumption that brain death is the most crucial determinant of life's end (Greshko 2019; Vrselja et al. 2019). Instead, there may now be some other indicator that emerges as more relevant when deciding whether or not life has ceased beyond all capacity to revive it. This discovery alerts us to the fact that, while the continuation of basic biological functions suggests the presence of life, the absence of the capacity to cognitively engage with such an existence, even in the most minimal way, is the most critical factor in determining whether or not a life is being lived. In the case of the pigs, while their brains did not demonstrate organized electrical neural activity, the discovery was a meaningful step in a direction that further confounds our ability to establish death as the end point of life, beyond which there is no biological return.

Such an achievement raises questions over our determination of when death occurs and, perhaps more importantly, what should be our response to such conditions. For example, it is now widely appreciated that death is not defined as a single event, but a series of processes, some of which can be reversed or resisted by technological interventions. For example, when a heart stops beating, it may be revived using electric shocks. Alternatively, when a person stops breathing, mouth-to-mouth resuscitation may bring them back to consciousness and prevent further stages of death from developing. In the past, what we assumed to be the irreversible moment of death turned out not to be the case (Bernat et al. 1981; Veatch 1993; Youngner and Arnold 2001) and there may be good reasons to assume that in the future, we

will look back on our present indicators of death with similar incredulity.

So, if apoptotic death is possible to resist and if people are actively interested in preventing such processes from becoming consequential in their lives, then one may ask whether all stages of death deserve such efforts. Indeed, a positive response to this suggestion underpins the rationale for progressing anti-aging research more generally, which seeks the alleviation of conditions that would, otherwise, speed up our demise. It also reveals a deep, but implicit human commitment to seek the alleviation of evolution's burden to select positively for biological suffering as a condition of life. In other words, while evolution has determined that death is characteristic of human life, it is also typical for life to resist the onset of death, or more specifically, to delay its occurrence through lifestyle modifications. Yet, the question remains as to how far humanity is prepared to push back against such conditions, in part, because the consequences of doing so are difficult to foresee. Would living forever bring about some kind of global catastrophic risk, or would it bring many more people who can work toward providing solutions for fundamental human challenges?

While the prospect of immortality may seem a matter for science fiction writers rather than science policy-makers, these are urgent considerations today, as technology provides many more opportunities to intervene within the aging process and death more specifically. Indeed, there are good reasons to presume that, without checks, humanity will continue to invest into scientific discoveries which have the consequence of extending life. After all, while there may be uncertainty about the practicality or desirability of humans living forever, there is plenty of evidence of humanity's commitment toward such ambitions. For example, leading a generally healthy life is one of the crucial ways in which people seek to stave off the debilitating effects of aging and the eventual onset of death. Certainly, this may be sensible to ensure that one's life is as free from the pain and the trauma of ill-health as possible, but it also indicates the positive valuation of life being lived to its fullest and longest. We want to live well in order to live longer.

Of course, it is also true to say that people do things that put their lives at risk, either by undertaking unhealthy or risky behaviors, or by not making positive lifestyle changes to optimize the longevity of their life. Yet, these activities and decisions may be explained in terms of the concurrent desire to live life in a way that makes it worthwhile. In this sense, risky behaviors are attempts to enrich life, rather than their being a positive valuing of life's cessation. Undertaking risky sports, drug-taking behavior, or excessive alcohol use may be rationalized—rightly or wrongly—as choices that involve experimenting with life's possibilities, even if this involves risking one's life is shortened as a result. While such an explanation does not seek to wrestle with the complex social-psychology of risk-taking behavior, the point is that, even when risks are deliberately chosen, this is not inconsistent with the proposition that people seek to live longer, because such aspirations are balanced alongside the desire to live a life that is most meaningful, even when this may frustrate the continuation of life.

Indeed, there exists a rationalist societal narrative that champions the maintenance of healthy, human lives, whenever possible. The state encourages people to live in a healthy manner, while also advocating the maintenance of good living, where this is possible. As such, one might reasonably conclude that humans are, broadly, supportive of the principle of

prolonging life, as much as is possible, especially—and sometimes only—when the conditions of life meet some quality threshold. However, what would it mean for people to do all that they can to extend their lives, to go so far as to pursue its unbound extension? Such questions are the focus of attention within this chapter, which examines the philosophical, moral, and societal implications of life extension, as a principal concern within posthuman discourse.

In so doing, the discussion critically examines what is valuable about life and, by implication, why it may be worth seeking its unbound extension. In so doing, it presents four inquiries into the value of life extension which collectively establish a value-based argument for such endeavors. First, it outlines how life extension must be understood as a foundational pillar of posthuman concern, as a topic that is positively engaged within many other aspects of posthuman theory. In this way, to commit to posthumanism is, directly, or indirectly, to commit to the boundless extension of life. Subsequently, it offers a defense of life extension and the pursuit of immortality on the basis of overwhelming evidence that there is value in existence rather than nonexistence. In so doing, it argues that the acceptance of boundaries to life has no evidential basis, but also that our positively valuing life explains our pursuit for its continuation. Third, as a consequence of prolonging life indefinitely, it examines the value of immortality as a consequence of life extension. Finally, the chapter discusses some of the practical challenges surrounding life extension and immortality, which have to do with matters of social order, as a function of what may be described as an optimally functioning society. One of the challenges with this latter component of the debate is the capacity to put thresholds on life duration, and this element frames the final section of the discussion.

LIFE EXTENSION AS THE CENTRAL PILLAR OF POSTHUMANISM

While posthumanism has been discussed within scholarly literature since the postwar period, a critical mass of scholars has emerged only since the turn of the millennium, which found it intimately connected to a range of other concepts, such as cyborgology and transhumanism (Miah 2008). For these reasons, the definition of posthumanism is essentially contested, but broadly spans propositions that advance the view that our current characterization of the human species is undergoing a radical transfiguration and that a new kind of human is emerging out of these reinterpretations. After a decade of attempts to theorize posthumanism, scholars have also developed language to articulate a view that takes the concept further into the realm of technological assemblages, the idea that the human ought not be central to our theorizations on what is essentially a discussion about the nature of change within Earth's ecosystem. In this sense, posthumanism has been challenged by such concepts as the Anthropocene, transpeciesism, and even ideas that reject the separation of technology from nature.

Crucially, these disagreements on how to situate posthumanism are not simply resolved by recognizing that human life is always evolving, although even here there are conflicting views, with some scientists arguing that the human species is no longer evolving. Rather, the posthumanist critique presumes that what distinguishes the next iteration of the *Homo*

sapiens from all previous hominids is that speciation is occurring along entirely new trajectories, brought into existence by new technologies that have undermined some notion of natural evolution that exists prior to advanced technological societies. In this sense, technology creates a fracture in humanity's expected evolutionary development, setting human life—and quite possibly the life of all other species—on an entirely new course of biological development. Indeed, we see such evidence alongside debates about climate change, which are predicated on the idea that humanity's interventions in nature have transformed the evolutionary trajectory of life on Earth.

On a human scale, evidence for such changes is found within such applications as genetic editing, the contraceptive pill, or in-vitro fertilization, reiterating the fact that posthumanism is not simply a twenty-first-century proposition. Instead, its impacts may be traced over a much longer technological history. In each case, technological applications derived from scientific insights are able to dramatically transform the conditions that structure the creation and experience of human life. While none of these, yet, dictate the emergence of new or modified genetic functions, their long-term impacts on the human species can be comprehensively influential in how the human species evolves and the prospect of extending life beyond its expected normal range is no exception. Indeed, while many posthumanist aspirations may involve seeking to modify human biology in a way that transcends species typical functioning, there is a difference in kind when tampering with the singular construct that constrains all life on Earth, namely, the inevitability of death.

On this basis, life extension and the prospect of immortality must be treated as an overarching category of concern within posthumanist scholarship, as it alludes to a point at which critical and otherwise unstoppable constraints upon life have been completely transcended. Thus, the prolongation of life beyond the species' limit is not simply a matter of adding new functions, but of transforming the ecological balance that underpins Earth's ecosystem, which has been, thus far, predicated on there being predictable levels of life expectancy and where these limits operate in relation to one another. In this sense, the expected life duration of any species is not simply attributable to that species, but to its existence within a wider set of environmental conditions.

For this reason, life extension must also be seen as the underpinning and terminal subject matter of posthuman theory. After all, posthumanist ambitions may be interpreted as pursuits interested in the expansion of control over our dominion. So understood, there is no greater example of such capacities than the ability to extend life beyond its species' typical range. Indeed, such undertakings may be understood as the most impactful transition from a situation whereby chance determines our lives, to one where choice dictates the lives people lead. While there is much to debate about the concept of control and the hubris implied by such choices over how to live, removing the inevitability of death is a profound transformation to how life develops and is given meaning by those who are living.

The strength of this claim over immortality's centrality to posthumanism is found upon examining the impact of such undertakings. For instance, radically longer lives would most likely change the kinds of careers people have, the relationships they pursue, and the expectations people have of each of these. It would affect the procreative choices people make and countless other decisions they make across their lives, many of which will be

unforeseeable in our present times. Indeed, despite there being obvious and important reconfigurations of society that would arise from having populations that live much longer, it is also possible that many things would simply continue or change only incrementally. For example, most people will likely continue to gravitate to what is the present-day normal range of life's duration and it could take centuries before people chose to live radically longer lives as gains in life's expected length would also be incremental.

Yet, it is likely also that there will be people within the population who will seek to live for centuries or millennia, given the opportunity. After all, if one is enjoying a good quality of life, then it is reasonable to want this to continue. These implications are of core interest to posthumanism, as a social inquiry, because they shape how societies are organized. For example, if people are living to the age of 300 years, then how might their life course be structured? Would people go to school for fifty years before being expected to enter the workplace? Would school even exist in the same way that it does today? Alternatively, will the working life continue as it is today?

By examining the speculative questions about either radical life extension or the achievement of immortality, one can access a deeper comprehension of the wider posthumanist project to establish new, ever more desirable living conditions. For example, if humanity concludes that the future prospect of immortality or a much longer life is not desirable, then this may affect its willingness to invest into a whole range of other posthumanist pursuits, from anti-aging research to gene editing. In such a scenario, humanity may decide that there is a maximum age that is optimal for human populations to flourish and this determination may shape the kinds of investments we make into science and technology going forward. For example, instead of focusing on scientific solutions to preserve life, we might focus more on the quality of life, or even new biological capabilities that could further enrich life on Earth.

THE UNIMPORTANCE OF BOUNDARIES

Central to humanity's consideration of the merit of radical life extension, as a practical pursuit, is a question about the role of limits within human existence. The predominance of death as a feature of all biological systems may be considered evidence of death's importance as an evolutionary function. As such, to seek its eradication would be to undermine the function of biological boundaries in the proliferation of a species. Yet, when examining the history of the human species more closely, it is difficult to identify instances where such constraints have been positively valued, rather than simply tolerated. Rather, humanity's behavior evidences the presumption that the pursuit of freedom to discover, transform, and re-create elements of life on Earth is central to its collective identity. Indeed, while it is unhelpful to speak of an inherent human nature that persists across all cultures, it is apparent that humanity's past may be characterized by the pursuit of its continued enjoyment of being alive.

Even when faced with overwhelming evidence that such aspirations to bend nature to humanity's will have wildly destructive consequences, humanity persists in such undertakings. For instance, the response from humans to "climate emergency" is not yet to

cease changing nature, but for humanity to ensure that such changes are simply sustainable. Even here, the concept of sustainability is located within a wider efficiency that elevates humanity's interests over the interests of other species or the planet more broadly. Indeed, the focus of efforts is often on reducing damage and loss of other species, rather than to make changes that promote the further abundance of species, as an indicator of life thriving on Earth. For these reasons, placing a limit on life's duration may be understood as a norm that has, in the past, had to be accepted, rather than something that is positively valued.

Indeed, the concept of there being maximum life span is, itself, merely a figure determined by what has been observed as the age range in which a species has been shown to live, rather than an expression of some ultimate limitation. Such a number does not say anything about there being limits to life determined by the characteristics of biological systems. Indeed, even such scientific concepts as Hayflick's limit for cell division do not reveal that death is necessary, only that life is vulnerable to various stresses that bring about death. And we know that some species can live for thousands of years, so why not humans?

This is not to say that accepting death is a bad idea for people to take on board across their life. After all, for every human that has ever lived, each one will have been far better off in life by having coming to terms with the inevitability of death. And so, to espouse the constraint of death as a positive part of life is evolutionarily required, if only to ensure that life is lived to its fullest. It would not do to become despondent about life simply because one is certain that it will end. Yet, there is merit in the boundaried term of life that we have enjoyed historically.

For example, a reasonably predictable life span allows people to make plans about how best to live, even if these plans do not transpire. From years in school to procreative choices, a fixed expectation of life's duration, coupled with a relatively short life may be instrumental to living well. In this sense, it is conceivable that the absence of such boundaries would lead to greater inability to function in society. However, to draw conclusions about the merit of such claims, one must first attend to debates about the merit of life at all and the following section focuses on these matters. More precisely, it offers a defense of existence as a precursor to why humanity is wise to pursue boundless life extension.

IN DEFENSE OF EXISTENCE

As mentioned in the introduction, arguments on behalf of life extension take a number of forms, from the desirability of continued existence to the moral obligations upon state actors and one's self to maintain health. However, the most compelling defense of life extension focuses on a wider defense of the value of existence at all. In this sense, if one champions the value of our continued existence, then it must at least be predicated on a positive evaluation of existence in the first place. If one cannot first conclude that existence is preferable to nonexistence, then there is vulnerability in the argument that the unbridled extension of life is worthy of pursuit.

While it may be uncontroversial—and unnecessary—to claim that existence is generally preferable to non-existence, the specific parameters of this debate evidence where consensus on this matter falls apart. For instance, even if one adopts a pro-life position, one can still

empathize with the view that a life of immeasurable suffering is a compelling case for permitting the freedom to seek its cessation. Indeed, the manifestation of such beliefs within policies that support freedom to pursue assisted suicide are indicative of the fact that many people do not consider life, in any conditions, to be an unqualified good.

In this context, one may advance the idea that existence is not, in itself, valuable. Rather, life must meet a quality threshold for people to positively value its continuation. Thus, the more modest conclusion follows that existence is preferable to nonexistence, only when there is a reasonable quality of life. The question that follows this line of reasoning is more challenging: what constitutes a sufficiently reasonable quality of life?

The difficulty, then, is to determine what those conditions of life should be and, over the years, various efforts have been made to provide greater specificity on such matters in a way that may be helpful to societal governance. For instance, Glover (1977) usefully rejects the reliance on external others, as a basis for identifying such characteristics. In other words, he argues that one may not apply a top-down, imposed definition of life's worth, such that it may be applied to all people at all times. Instead, adopting a position of extreme relativism, Glover argues:

> When the question arises whether someone's life is worth living at all, his own views will normally be evidence of an overwhelmingly powerful kind. Our assessments of what other people get out of their lives are so fallible that only a monster of self-confidence would feel no qualms about correcting the judgement of the person whose life is in question. (1977: 54)

While there may be marginal cases in which it is necessary for society to intervene in making judgments on behalf of another who is not able to take such actions, these judgments may yet be informed by the best effort to reasonably understand that person's priorities and choices, as is true in situations where a Do Not Resuscitate, Advanced Directive, or a Living Will is used to preemptively assert a person's value system on a future, possible scenario, where consultation with them is not possible.

So, if we accept that there should be no imposition of judgments about the worth of a person's life, other than those made by the subject themselves, then this permits somebody to value their life, regardless of how it is being lived. In this context, the fact that I value my life is enough for me to justify seeking means that permit its continuation. Again, this may be relatively uncontroversial when seeking to extend life within a species typical range, but when going beyond this, it becomes considerably more ambiguous and requires inquiring into the value of immortality more widely.

HUMANITY'S ASPIRATION FOR IMMORTALITY

So far, I have argued that the pursuit of immortality—as a consequence of life extension—is (1) the central pillar in posthumanist thought and that this ambition follows from (2) positively valuing life's continuation, and (3) the insufficiency of natural boundaries as an evidential support for why humanity should accept death as a consequence of life. In this

section, I examine humanity's wider aspirations for achieving immortality, as a basis for positively valuing its desire to extend life.

The desire for—and justification to pursue—biological immortality may be articulated in a number of ways, but is perhaps best evidenced by its wider pursuit in human societies. Consider the contemporary fascination for celebrity and the desire to make something of historic value out of one's life. Each of these characteristics of modern times speaks to humanity's desire to have achieved something in their lives that endures. While the freedom to pursue such goals is already a function of a life well lived—it is difficult to contemplate making history when survival is a more pressing issue—when given adequate resources, people will seek to make a difference that has a lasting impact and for these actions to have an enduring legacy.

In present times, our inability to achieve actual immortality means that we locate such aspirations in some sense of the keeping of records, the historical books which will, on our behalf, evidence the value our lives have conferred. Whether this is on a very micro scale in one's own familial relationships, to taking giant leaps on behalf of humanity, the desire to be remembered and for one's life to be present, even after death, is a persistent feature of humanity's value system. To endure, to sustain, and to persist are to achieve confirmation of the worth of one's life over time.

Of course, achieving biological immortality does not necessarily confer such achievements as those described above. Indeed, it may be counterproductive insomuch as one might think that having all the time in the world means one can afford to procrastinate and put off making a difference until, say, the next century. Such an objection is similar to the proposal that, faced with eternity, humans will become bored of life and fail to seek making any kind of meaningful contribution. Leaving this aside for a moment, the central point here is that the desire for continued biological existence is deeply rooted within human society and that its extension into biological immortality is consistent with this idea. Undoubtedly, interventions will be required to ensure people are able to find the motivation to keep living well, but this has always been true of life on Earth. Indeed, Glover states:

> I am not convinced that someone with a fairly constant character need eventually become intolerably bored, so long as they can watch the world continue to unfold and go on asking new questions and thinking, and so long as there are other people to share their feelings and thoughts with. Given the company of the right people, I would be glad of the chance to sample a few million years and see how it went. (Glover 1977: 57)

As such, it is reasonable to conclude that extending life's duration follows from humanity's wider desire to continue living and for that living to be both meaningful and valuable. Living longer—and indefinitely—provides no boundaries to such capacities and so, again, is consistent with these values.

THE PRACTICALITY OF ACHIEVING BIOLOGICAL IMMORTALITY

To summarize, the desire to pursue immortality is consistent with aspects of human life that are already positively valued. Historically, humanity's pursuit of science and technology evidences its desire to resist evolutionary harms, notably the existence of biological suffering. Furthermore, the positive value attributed to existence over nonexistence, coupled with the desire to achieve societal immortality through one's deeds in life, evidences the wider utility in seeking to live longer and even, to live forever. However, are there reasons of practical importance that should curtail such desires?

A number of authors have addressed these practical challenges. For instance, it is often discussed in popular science that biological immortality would mean that the planet would become radically overpopulated, creating widespread societal panic and disorder. At best, even if some form of social governance persisted, it would become even more ineffective due to the fact that the older people may never relinquish power, leading to greater tyranny through their having more time to accumulate an even greater proportion of humanity's wealth. Certainly, living a lot longer would require a complete revisioning of life's course throwing up questions and matters of governance that, presently, we need not spend time attempting to resolve.

It might be simpler to just halt such efforts to live longer and circumvent the need to address any of these matters. Yet, it is also possible that having more people around to solve humanity's biggest problems would bring an overall gain in knowledge and resources to do so. As well, the practical challenges may not be the driving force that determined whether or not immortality is brought about. Instead, it is these wider desires to pursue the continuation of life that lead inexorably to circumstances where people live forever. In such times, one might imagine a societal conversation about placing a limit on life span, but doing so would likely bring even more harm if, indeed, such an option is at all practically feasible. I suspect it is not.

CONCLUSION

This chapter has argued that the pursuit of immortality, as a consequence of life extension, is the central pillar of posthumanist inquiry. While there may be other functions imaginable that have a dramatic impact on biological life, immortality is the most radical, having implications for the realization of all other forms of human enhancement. Furthermore, it has outlined humanity's trajectory toward the eradication of death through its continual resistance to evolutionary limits and the desire for one's life to have mattered. In the case of the former, the entire history of modern science and medicine is on course to bring about immortality, as it resists the process of aging and disease, seeking their eradication from human experience.

Even if the removal of present forms of disease brings, in their place, new diseases, this does not negate humanity's broader desire to create lives that are free from all ailments and this evidences humanity's desire to pursue immortality, even if it is merely a by-product of seeking to live a life free from biological suffering. Indeed, for those who may argue that there is value lost in the eradication of biological suffering that disease and illness involve, then one may also make such experiences available to such people, offering pain as an elective medical procedure for those who regard humanity's experience of such suffering to

be central to appreciating the value of human life.

In our present times, where death remains a precondition to human life, it is certainly crucial for humans to find value in their existence. The capacity to accept death, or to come to terms with it, may be the most effective way to experience a good life. Indeed, as death approaches, this is especially important. Yet, such efforts are not incompatible with also wishing that death did not exist at all and to positive value its existence is to wrongly elevate non-existence over existence. Undoubtedly, there are matters of extreme significance that follow from a population being able to live longer, even if that is by just ten years. For example, the burden on health care services, democratic systems, and social order more generally will be greatly affected by such population change. Yet, it is the business of societies to achieve some form of orderly conduct and such times as those where people live forever will unlikely prove to be any more complicated than the present times, where social disorder abounds quite capably, irrespective of how long people live.

Consequently, to reject the prospect of immortality on the basis of practicality would be also to reject our present times on the basis of social disorder and to seek, therefore, a return to some prior, presumably better times. However, there is no period in human history that has been free from vulnerabilities of inadequate social governance and to reject the prospect of immortality on the grounds of the prevalence of disorder would be naive. So, while the existence of life's cessation has been normal for the entirety of human history, it might turn out that immortality brings greater harmony and order to the world, rather than less.

SOURCES CITED

Bernat, James L., C. M. Culver, and B. Gert. "On the Definition and Criterion of Death." *Annals of Internal Medicine*, vol. 94, no. 3 (1981): 389–94.

Glover, Jonathan. *Causing Death and Saving Lives*. London: Penguin, 1977.

Greshko, Michael. "Pig Brains Partially Revived Hours after Death—What It Means for People." *National Geographic*, April 19, 2019, https://www.nationalgeographic.com/science/2019/04/pig-brains-partially-revived-what-it-means-for-medicine-death-ethics.html.

Miah, Andy. "A Critical History of Posthumanism." In *Medical Enhancement and Posthumanity*, edited by Bert Gordijn and Ruth Chadwick. Dordrecht: Springer, 2008, pp. 71–94.

Veatch, Robert M. "The Impending Collapse of the Whole-Brain Definition of Death." *Hastings Center Report*, vol. 23, no. 4 (1993): 18–24.

Vrselja, Zvonimir, Stefano G. Daniele, John Silbereis, Francesca Talpo, Yury M. Morozov, André M. M. Sousa, and Brian S. Tanaka et al. "Restoration of Brain Circulation and Cellular Functions Hours Post-Mortem." *Nature*, vol. 568 (2019): 336–43.

Youngner, Stuart J., and Robert M. Arnold. "Philosophical Debates about the Definition of Death: Who Cares?" *The Journal of Medicine and Philosophy*, vol. 26, no. 5 (2001): 527–37.

CHAPTER TWENTY

Sport, Technoscience, and Posthumanist Athletics

RAYVON D. FOUCHÉ

Humanity's relationship with its environments and its material production have transformed the landscapes of sport. Sport has grown from a basic place from which to express forms of masculine power to a culturally rooted and socially interconnected network of platforms on which creative technoscientific outputs can be expressed. At its core, sport traditionally has been construed as a competition between bodies. However, as sport changed from its simple beginnings, to a multilevel marketed economic enterprise where athletic competition is a product to be bought and sold, material objects and artifacts now define the modes of competition (Fouché 2017). Once athletes competed with anything other than their flesh and bone, sport became decidedly technoscientific. Arguably, sport has been involved in an interesting dance with posthumanism since its origin. Yet, over the past century sporting cultures, and their social need to champion and valorize certain forms of athletic performance, have worked very hard to disavow this reality (Miah 2004). Recently, it has become exceedingly difficult to ignore the symbiotic relationship between technoscience and athletes within sport (Magdalinski 2009). Beginning at the turn of the twentieth century, practitioners of medicine, science, and engineering began developing a wealth of treatments, procedures, and artifacts to reconfigure the human body, recontextualize athletic performance, and subsequently alter the landscapes of sport. How these interventions internally or externally impacted the body shaped the ways sporting communities understood

posthumanist athletics. For instance, most informed observers could easily see the technoscientific evolutions that led swimmers to wear faster full-body polyurethane swimsuits, cyclist to ride lighter bicycles replete with carbon fiber componentry, and athletes with disabilities to use increasingly efficient prosthetic limbs for increased performance. This technoscientific visibility allowed the broader public to question where it wants these devices to fit within a given sporting culture. However, alterations to the body that are not as easily seen are much more difficult for anyone without an insider's view to comment on or even question. The indiscernible efficacy of pharmaceuticals, such as erythropoietin (EPO), testosterone, human growth hormone (HGH), and corticosteroids, demands that sport governing institutions reconsider their futures in light of the posthumanizing impulses of medical science. The current litigation around Caster Semeya and the requirement that she receive treatments to lower her body's naturally generated level of testosterone to a "normal female" range reinforce the fact that pharmaceutical science within sport has moved beyond posthuman enhancement to a strange space where it has the potential of being deployed to regulate gender and sex. This step proves that our society has the capability, motivation, and desire to extend the limits of gene treatments, genetic doping, artificial intelligence, and infinitesimally smaller and exceedingly more powerful computational devices to continue to create and monitor posthuman cyborg athletes. To better understand and assess how technoscience influences sport, we must first fully embrace the posthumanisms of current and future athletes.

This chapter chronicles this desire by describing moments that have come to destabilize the human-centric vision of sporting competition in an effort to continue moving sport to a place where it embraces the growing multitude of posthuman bodies that will define the future of sporting competition. In specific, it examines how athletes, such as Oscar Pistorius, Marcus Rehm, and Blake Leaper, who use technoscientific devices to relocate their bodies onto an imagined spectrum of normality in order to compete in able-bodied athletic competitions, demand that sporting publics embrace the posthuman realities of past, current, and future athletic competitions. These three athletes are chosen purposefully because of the ways in which they contest cherished histories and traditions of sport. Each athlete competes on the track as a runner using prosthetic limbs. Their technoscientific limbs visually expose the imprecision in historically rooted conceptions of an authentic athletic body and prod us to rethink bodily categories such as disabled, less-abled, normal, or super-abled. Most important, these athletes demand that we break the cultural agreements that undergird sport's investments in segregating posthuman bodies from able-bodied competitions. The presence and participation of posthuman athletes in able-bodied competitions directly question valorized forms of compulsory able-bodiedness (McRuer 2013). The posthuman nature of their hybrid bodies continues to compel sporting communities to accept the athletic potentialities of a sporting future that is not differentiated by distinctions between bodies that are perceived to be augmented and those that are not (Butryn and Masucci 2009).

The persistent fear of these and similar posthuman athletes is that the technoscientific devices affixed or attached to their bodies produce an unfair, or at best an unclear, competitive advantage (Schantz 2016). The fear of the posthuman athlete centers on the concern that sport has reached a point where technoscientific developments can supersede

biological gifts, genetic talents, motivational perseverance, and the commitment to intensive training. The presence of Pistorius, Rehm, and Leaper at an elite level of sport raises fundamental questions about what is considered a legitimate use of technoscience. Subsequently, the use of sport-altering technoscience can be construed as ethically wrong or procedurally illegal because it unnaturally enhances a human body. The distinctions between illegality and legality hinge upon how sporting communities perceive technoscience enhancing an athlete beyond what that community considers normal at a specific moment in time. Over the evolution of sport, sporting cultures endlessly renegotiate the definitions of and distinctions between the terms "normality" and "abnormality," but unfortunately these communities have not appealed to the field of Disability Studies to help them find a constructive way forward (Anders 2013). Seeing sport through a posthumanist lens can avoid the current never-ending arguments about what is appropriate and inappropriate augmentation. The instances presented here can provide an opportunity to consider a sporting future where the distinctions between who can and cannot compete no longer need to be debated.

By examining efforts to limit the athletic opportunities for athletes using prostheses, this chapter provides insights into historical apprehensions about fully embracing posthumanism within sport and the ways sporting cultures configure ideas about bodily repair, assistance, and augmentation. Potentially, the reticence regarding posthuman potentialities within sport is couched in the sentiment that athletes who go beyond repairing an injured body to using devices or objects that may augment an athlete's body undermine sport's core tenets. What binds this core together is the belief that unaltered athletic bodies should be the final determiners of winning and losing. Sporting axioms state that although human and technoscientific adjudicating systems may occasionally fail, the best bodies, and not the best technoscientific implements, should determine the outcomes of athletic competitions.

PARALYMPIC ORIGINS

Contemporary understandings of posthumanist bodies within the context of sport have to be situated within the Paralympic Games. This historical connection is meaningful because the Paralympic movement actively moved from merely allowing athletes with disabilities to compete, to championing sporting competitions in which athletes were allowed to technoscientifically replace missing elements of their bodies or reconfigured their bodies to compete. This distinction is important because athletes with disabilities did compete in the Olympics before the Paralympic era. For example, in the 1904 St. Louis Olympics, American George Eyser won a total of six medals in gymnastic events. Hungarian water polo player Olivér Halassy won medals at the 1928, 1932, and 1936 Olympics. Both Eyser and Halassy were missing portions of their left legs below the knee. More recently, wheelchair rider Neroli Fairhall competed in the archery competition for New Zealand at the 1984 Olympic Games. Undoubtedly, over the history of sporting competition, many athletes with disabilities competed in sport. Yet, most of these athletes, similar to Eyser, Halassy, and Fairhall, did not use technoscientific devices to attempt to nullify their physical limitations (Percy 2019).

The Paralympic movement can be traced to the opening of the Stoke Mandeville Hospital

at Aylesbury, England, in 1944 under the leadership of Dr. Ludwig Guttman. Originally founded as a facility for the Second World War veterans with spinal injuries, Dr. Guttman believed that physical exercise would enable the men to mend their minds, bodies, and spirits. In honor of the first post-Second World War Olympics hosted in London, the hospital organized an archery competition and named it the Stoke Mandeville Games for the Paralyzed in 1948. This event proved successful and would continue for decades, but its focus had always been to support wheelchair sports and athletes. Initially, the use of a wheelchair did not substantially change the nature of the competition's original events such as archery. However, as athletes competed in more events requiring increased levels of mobility, such as wheelchair basketball, the chair became a new way to augment athletic ability. By the 1960s, the scale, scope, and name of the event changed. A more diverse group of athletes with disabilities competed and by the 1964 event in Tokyo the term "Paralympics" was used to describe the event. In 1976, a Winter Paralympics Games was added for the first time to mirror the Winter Olympic Games. Thus, by the late 1970s a separate and potentially completely self-contained event had been created for athletes with nearly every form of physical limitation. The 1976 Paralympics is important in thinking about posthuman sports because these are the first Paralympic Games where athletes ran and raced using wheelchairs. The shift from a wheelchair as a mobility device to a tool for athletic competition is critically important in thinking about the emergence of contemporary posthuman athletes. In 1989, the various organizations that held competitions for athletes with disabilities came together to support the creation of the International Paralympic Committee. This new organization, and its association with the International Olympic Committee, confirmed the need for a high-level institution to oversee the vast network of athletic events that had moved significantly beyond competitions where athletes used wheelchairs for mobility and stability to a world in which athletes with disabilities competed using wheelchairs and other technoscientific devices as a constitutive element of the competition. This redefinition and expansion of the Paralympic's competitive events paved the way for a technoscientific explosion that forever changed our society's thinking and understanding of the relationships between bodies, sport, and our technoscientific outputs. The material changes resulting from these new technoscientific innovations expanded the possibilities of athletic performance, changed the tone and tenor of what a posthuman athlete could be, and enabled athletes such as Oscar Pistorius to flourish.

Oscar Pistorius and athletes with disabilities of his generation represent a paradigmatic shift from athletes using restorative equipment that for all intents and purposes was often instrumentalized as benign objects of competition, to technoscientific designed and fabricated artifacts that could potentially improve performance to the levels of elite able-bodied athletes. Although many successful wheelchair and prosthetic using athletes challenged perceptions about the natural body and raised questions about embedded ideals regarding the parameters and limits of athletic competition, Pistorius's success powerfully transgressed the historically valued distinctions between abled and disabled in a sporting context. As such, he was able to take his body and his prosthetic limb out of a Paralympic framing and carve out a place for himself and his reconstituted body in an Olympic context. This transition did not come easily, but it does provide valuable insights into future

complexities and affordances that will continue to challenge posthuman athletes.

In the Paralympic Games, Pistorius's sporting achievements were viewed with great appreciation. However, when he crossed over into an able-bodied athletic world, his athletic ability was viewed differently. Questions quickly arose about his use of prosthetic limbs and how these limbs unfairly augmented his body, abnormally increased his performance, and provided him with an illegal advantage over non-disabled athletes. In considering posthumanism in sport, Pistorius is interesting because the reconstitution of his body through the use of prosthetic limbs and the crossing over into able-bodied competition sparked fears and concerns about a posthuman technoscientific sport takeover. As a result, Pistorius's efforts to run in able-bodied competitions clouded the culturally agreed-upon distinctions between bodily enhancement and technoscientific repair, machinery and humanity, and the Paralympics and Olympics (Harvey 2015).

OSCAR PISTORIUS AND THE POSTHUMANIST PARADIGM SHIFT

Oscar Pistorius's rise to the elite level of track and field was quick by any standard. An injury while playing rugby in the summer of 2003 motivated Pistorius to incorporate track workouts as a component of his rehabilitation. By the following summer, Pistorius had earned a place on the 2004 South African Paralympic team to run the 100m and 200m at the Athens games. At the games, the seventeen-year-old won a bronze medal in the 100m and a gold medal in the 200m in a world record time of 21.97 seconds. In comparison, Michael Johnson held the able-bodied world record of 19.32 seconds in 2004. Although Pistorius's deficit to Johnson's world record was sizable at over 2.5 seconds, journalists started comparing Pistorius to able-bodied athletes (for instance, Pistorius's world record 400m mark would have won a gold medal at the 1928 Summer Olympics) and hypothetically calculating the number of years it could take for an athlete using prostheses to eclipse an able-bodied world record (Burnett 2005). Pistorius's athletic ability and his crossover appeal only added fuel to this speculation. His speed, and the nickname "blade runner," was attributed to the slim Össur Flex-Foot Cheetah prosthetic limbs whose lightness and flexibility transformed the performances of all the athletes who used the device (Davidson 2005). In 1998 at the first Paralympic Games in which athletes used Össur's prostheses, competitors displayed this device's potency by trimming nearly 1.5 seconds from the 100m world record (Gillette 2004). In comparison, from 1912 to 1998, athletes only dropped the able-bodied 100m record by 0.76 seconds. Thus, it was hard to ignore the monumental performance increase Össur prosthetic limbs provided and that we potentially had entered a new posthuman sporting moment where the gulf between able-bodied athletes and athletes with disabilities might be closing quickly.

Yet, most of those prognosticating situated their comments within an obsessive focus on the prosthetic limbs and the potential damage that Pistorius, as a posthuman athlete, could do to the history and tradition of able-bodied sports. These contentions are interesting because the history of sport is rife with socially, politically, and technologically driven innovation. New equipment, rules, structures, fields, treatments, and institutions regularly make their way into the inherently competitive environment of sport. Pistorius's prosthetic limbs

uncomfortably and uncompromisingly exposed an aspect of the posthuman underpinnings of sport. The visual representation of his unnatural posthuman body made it very difficult, if not impossible, to disavow the cyborg nature of his achievements (Howe and Silva 2017). Moreover, it demanded that even the most casual sporting viewers had to take a stand on how they felt about a technoscientific and conceivably posthuman future for sport. For many invested in sport, Pistorius forced them to take an uncomfortable peek into a world that revealed a technoscientifically rooted posthumanist sporting landscape.

What is most fascinating about the initial questioning of Pistorius's prosthetic limbs and perceptions of unfair augmentation is that it did not come from the likely suspects of the governing bodies of track and field such as Athletics South Africa, the International Association of Athletic Federation (IAAF), or the International Olympic Committee. It came from his fellow Paralympic competitors who contended that he was "running tall," or specifically using prosthetic limbs that did not conform to the prescribed estimates of Pistorius's natural height if his lower limbs had not been amputated when he was a baby. The estimate was derived from a combination of "wingspan and femur measurements to come up with a conservative estimate of Pistorius' anatomical height" (Gillette 2004). These estimates have a level of flexibility in that an athlete's "overall standing height … with their competitive prostheses on must be less than or equal to the mean estimated height plus 2.5%" (IPC 2016: 90). In theory, running tall increases athletes' leg lengths and enables them to run faster because they can now cover more distance with fewer steps. These questions by fellow competitors would become less compelling because of Pistorius's effort to compete against able-bodied athletes.

Pistorius confirmed his competitiveness against able-bodied athletes when he won an IAAF-sanctioned competition in Pretoria, South Africa, in 2004. He would not compete in an able-bodied sanctioned event until the 2007 Senior South African Championships at which Pistorius earned a silver medal. His success did not pave the way for the integration of visibly posthuman bodies into sport or create a new platform for athletic competition. Although, his second-place finish affirmed that he was a contender to make the South African Olympic team for the 2008 Beijing Summer Olympics, unfortunately for him and other posthuman athletes, the IAAF Council met in Mombasa, Kenya, on March 26, 2007, to amend Rule 144.2(e) that governed competitive "technical aids." The revised rule made it illegal for competitors to use "any technical device that incorporates springs, wheels or any other element that provides the user with an advantage over another athlete not using such a device" (IAAF 2007). Specifically, it banned the "use of any appliance that has the effect of increasing the dimension of a piece of equipment beyond the permitted maximum in the Rules or that provides the user with an advantage which he would not have obtained using the equipment specified in the Rules" (International Association of Athletic Federation 2007). The IAAF clearly instituted this rule change to prohibit Pistorius's participation and close out non-normative bodies from its competitions and subsequently the Olympic Games. From this point forward, Pistorius became the centerpiece of a series of legal challenges that would eventually reach the Court of Arbitration for Sport (CAS).

The IAAF, who based on the revised rule, clearly did not want Pistorius's posthuman body in able-bodied competitions, and commissioned a study from the Institute of Biomechanical

and Orthopedics at the German Sport University to test Pistorius and his prosthetic limbs on July 24, 2007. The IAAF released the final report on December 17, 2017, and concluded that his prosthetic limbs violated Rule 144.2(e) because they supplied Pistorius with an unfair technoscientific advantage. The report concluded: "In total, [Pistorius] received significant biomechanical advantages by the prostheses in comparison to sprinting with natural human legs" (CAS 2008). In a January 14, 2008, press release, the IAAF Council directly addressed Pistorius's competitive future when it "decided that the prosthetic blades known as 'cheetahs' should be considered as technical aids in clear contravention of IAAF Rule 144.2(e)." The council further confirmed that "Oscar Pistorius is not eligible to compete in competitions organized under IAAF Rules" (IAAF 2008).

The IAAF hoped the situation was over, but Pistorius appealed to the Court of Arbitration for Sport, on February 13, 2008, and provided new physiological and biomechanical evidence performed at Rice University. Pistorius's new research refuted the IAAF's assessment and ultimately concluded that "some IAAF officials had determined that they did not want Mr. Pistorius to be … eligible to compete in … IAAF-sanctioned events, regardless of the results that properly conducted scientific studies might demonstrate" (Court of Arbitration for Sport 2008b). The Court of Arbitration for Sport ruled in Pistorius's favor on May 16, 2008, which enabled him to legally compete in able-bodied competitions. Pistorius attempted to make the 2008 South African Olympic team, but could not achieve an Olympic qualifying standard time before the games. He did qualify and compete in the Olympic Games in 2012, but he did not come close to medaling. His most significant success in able-bodied competition was winning a silver medal at the 2011 IAAF World Championships. He did not run in the final, but was awarded a medal because he competed in the preliminary races. It would have seemed that Pistorius's success was a watershed moment for track and field, and posthuman athletes. Unfortunately, the future he opened was quite murky. He did lead the way to a process for sport to accept and embrace posthuman athletes, but, in reality, he was never fast enough to fully challenge the hegemonic imaginary of the authentic and natural athletic body.

POSTHUMAN ATHLETIC FUTURES

Pistorius did alter narratives surrounding athletes using prosthetic limbs, but unfortunately he did not mollify fears about posthumans reshaping future trajectories of sporting competitions. What makes the instances of athletes using devices to augment their bodies to compete athletically troubling for those who govern sport, compelling for scientists, and dramatic for fans is that these athletes and their devices bind together our society's technoscientific apprehensions and dreams. In the most optimistic interpretations, posthuman athletic endeavors illustrate that the human body is not the limit of what is athletically possible and can be an expressive extension of humanity's innovative capability. The most pessimistic interpretations can view posthuman athletes as undermining the history, traditions, and purity of athletic competitions perceived as decidedly human activities of the mind and the flesh. Shawn Crincoli marks the space in between these opposing spectrums as "the middle of the cultural uncertainty we share when it comes to science, technology, and difference" (Crincoli

2011: 181). Yet, this liminal space seems to be caught in a never-ending recursive loop that continues to question if it is the machine or the human, the device or the body that is driving athletic performance. Crincoli cogently articulates society's investment in sport by noting that "[t]he beauty of athletic competition stems from its ability to demonstrate the universality of the human condition … [where] without regard to race, class, nationality or religion, have been able to achieve in ways that once seemed impossible" (Crincoli 2011: 180). Currently, we have not extended this humanitarian generosity to posthuman athletes. Although Össur's carbon fiber prostheses cannot exist outside of symbiotic interactions between human athletic ability and the carbon, hydrogen, and nitrogen that comprise the polyacrylonitrile fibers of carbon fiber, we live in a sporting world where this relationship is denied because of the illusion that it diminishes the humanness of athletic competition. In this regard, the underlying question circulating around the tensions between human and machine is that if athletics at its core is solely a human, flesh, blood, and bone endeavor, does the use of a device that augments, enhances, or improves performance make the athletic endeavor any less human?

Beyond questions of humanness, posthuman athletes must contend with the issues presented by the desire for historical continuity. Posthuman athletes precipitate difficult questions about comparisons with past performances, which serve as an apparatus through which many sports connect athletes across space, place, and time. As for the act of running with or without prostheses, Patricia Zettler argues that in track and field disciplines it is difficult to fully accept prosthetic legs because of the efforts focused on "maintaining historical continuity, promoting 'natural' athleticism, and determining whether a given activity 'counts as running'" (Zettler 2009: 397). For instance, when multiple Olympic champion Michael Johnson questioned Pistorius's right to compete, Johnson cast himself as an invested observer concerned about track and field and not as a boundary guarding critic of Pistorius's posthuman body. In speaking about Pistorius, Johnson commented that "because we don't know for sure whether he gets an advantage from the prostheses that he wears it is unfair to the able-bodied competitors" (Pickup 2012). This seemingly benign statement from one of the sport's greatest sprinters carried plenty of weight. By alluding that Pistorius's carbon fiber limbs may provide him with an unfair advantage, Johnson muddied the water regarding the performance capabilities of the prostheses. Nevertheless, the intent was clear. He aimed to discredit the implements that enabled Pistorius to run quickly while simultaneously creating a distance between prosthetic limbs and the network of specifically created technoscientific devices—like the shoes and uniforms that Nike created for his Olympic triumphs—that enabled him to run as fast as possible. The linguistic manipulation of these and similar statements can easily get lost as debates and discussions get complicated. If Pistorius represents the actualization of a posthuman paradigmatic shift within sport, he also represents a certain unfulfilled potential. As much as Pistorius's athletic performances threatened sporting's dominant narratives centered on imaginaries of natural and authentic bodies, he never ran fast enough to fully destabilize and disrupt these narratives. Recently, athletes like Marcus Rehm and Blake Leaper appear to be poised to fulfill this promise.

In the wake of the Pistorius decisions, the Deutscher Leichtathletik-Verband (the German Athletic Federation) allowed the 2012 Paralympic long jump gold medalist Marcus Rehm,

who uses and jumps off an Össur prosthetic limb, to compete in the 2014 national championships. To everyone's surprise, including his own, Rehm won the event and became the German national champion on July 26. His jump of 8.24m, which was an improvement of his personal best by 29 centimeters and a new Paralympic World Record, also qualified him for the European Championships. His leap also significantly transformed sport's relationship with posthuman athletes. He literally and figuratively bounded into a future where athletes using prostheses were competing with and beating able-bodied athletes at the highest level of sport. Not surprisingly, the Deutscher Leichtathletik-Verband immediately began reviewing its decision allowing him to compete, the legitimacy of his victory, and whether or not they would nominate him to represent Germany at the 2014 European Championships. German sporting official Uwe Florczak had concerns about Rehm's winning jump. Florczak noted that he had "seen many jumps over eight metres," but that in comparison, Rehm's "run-up speed … was not as high as what we know for these jumps," and that it was of concern that his "prosthesis had yielded a lot and then rebounded" (Dowling 2014). Similarly, Rehm's fellow competitors raised objections about the length of his prosthetic limb. Fifth-place finisher and former European long jump champion Sebastian Bayer commented that Rehm's prosthesis "seems 15 centimeters longer than the other leg. My legs are both the same length" (Borden 2014). Although Rehm noted his prosthesis was only "three, four centimeters longer than his other leg, but the disparity keeps him from hobbling during the run-up to his jump" (Borden 2014). In response to the groundswell concerns, Rehm was appropriately diplomatic. He simply remarked that "I think it doesn't give me an advantage or a disadvantage. The prosthetic is replacing what I don't have anymore" (Borden 2014).

The Deutscher Leichtathletik-Verband came to a decision on July 30. The president of the organization, Clemens Prokop, informs Rehm that he would not receive selection to the European Championships team because there was "significant doubt" that Rehm did not benefit from the "catapult effect" when he jumped (Geary 2014). In the intervening days between winning the German championship and the announcement, the Deutscher Leichtathletik-Verband subjected Rehm to "several hours [of testing] at a diagnostic center of a biometrics company hired by the D.L.V. used video, lasers and sensors to try to determine whether Rehm's prosthesis had given him an advantage" (Borden 2014). The expediency caused unease with many because most experts believe that it was impossible to perform a proper scientific assessment within that time frame. In the following year, Rehm competed in the German championships and had the longest jump. One would have thought this performance would have allowed him to repeat as national champion. But since his last victory at the championships, the Deutscher Leichtathletik-Verband changed its rules to allow Paralympic athletes to continue to compete in their national championships but not have the results counted. Clearly, the Deutscher Leichtathletik-Verband staked out a position that barred visible posthuman athletes from its competitions.

Rehm did not give up, but he has had very little success formally competing in non-Paralympic events since 2014. He attempted to garner approval to compete in the 2016 Olympic Games. But in June 2016, the IAAF denied Rehm's request on the grounds that he could not provide conclusive evidence that his prosthetic limb did not give him a competitive advantage (Beckman et al. 2017). In Rehm's case, the IAAF deployed the term "improper" to

categorize his prosthesis in order to delimit its use in competition. What makes the term so incendiary is that it directly taps into anxieties about athletes adding unfair technoscientific devices to their bodies in order to perform above and beyond their perceived natural abilities. Rehm represents this fear, in a way that Pistorius never approached, because he would have been a gold medal contender at the 2016 Olympic Games. In 2016, his personal best of 8.4m would have won the gold medal at the 2016, 2012, and 2008 Olympic Games. He has since extended his world record to 8.48m on August 25, 2018.

Other posthuman athletes continue efforts to dislodge the institutional, social commitments, and cultural beliefs that have constructed barriers designed to police the hard and fast imagined distinctions between posthuman and human (Roduit and Gaehwiler 2018). As governing institutions demand that athletes prove that their posthuman capabilities are normal in relation to the abnormalities of elite athletic performances, science is being deployed on the behalf of these athletes as well. For instance, Blake Leeper, the current Paralympic world record holder in the 400m, is working with Alena Grabowski (who was part of the team that helped Pistorius and is also working with Rehm) at the University of Colorado Boulder to prove that his prosthetic limbs do not unnaturally increase his performance potential. Leeper is extremely important in this larger discussion because of how fast he is and his desire to run faster. Specifically, on June 4, 2018, Leeper ran 44.42 seconds in a 400m race. To put this into context, it was the eleventh fastest 400m time run by all athletes in 2018. This time would have earned him a spot on the United States Olympic team in 2016, would have placed him in the 400m final, and would have potentially put him on the gold medal winning 4×400m relay team. Leeper has an excellent team to help prove his case, but studies showing that posthuman athlete's augmentations do not improve performance may be scientifically valid, but in sporting landscapes they may not pass the "eye test." In that, when one looks at a prosthetic limb on an athlete it can be seen, viewed, and interpreted as decidedly something different, though in practice the manufactured limb may be no different in performance potentiality than the Pro TurboSpeed full-body track uniforms produced by Nike or the LZR Racer swimsuits produced by Speedo.

The technoscientific and cultural balance between repair, assistance, and augmentation, and the ways these definitions impact competitive sport, can be challenging for athletes, scientists, governing institutions, and an invested public to delineate and appropriately act upon (Harris 2010). For athletes using prosthetic limbs, they must embrace their posthumaness because the mechanical functionality of the devices is hard to camouflage. These devices that can bring athletes back to an imagined state of normality are decidedly no different than the far less machinelike medicalized surgical and pharmaceutical procedure that allowed athletes to pass as visually unaugmented. Prosthetic-using athletes do not have access to this naturalizing and normalizing sleight of hand. Nevertheless, sporting communities have been extremely reticent to embrace the fusion of man and machine, or most posthuman sporting confluences (Butryn 2003). The fear of posthuman athletic success can be transmogrified into seeing these athletes as having not just an unfair advantage, but being super-abled. With these sporting narratives, the future for posthuman athletes appears rather bleak. In the coming future, successful posthuman athletes will struggle with being characterized as super-abled. Of course, the idea of super-abled is based within problematic

definitions of disability. But, at a certain level, it makes sense because the disabled athlete and the super-abled athlete are seen as abnormal. But if normality is construed as somewhere near a mean of athletic ability, most successful athletes, disabled or not, are highly abnormal, if not queer, to others (Linghede 2018). Van Hilvoorde and Laurens Landeweerd write that "[t]here is no medical categorization of disabilities that fits smoothly and logically into the context of sport. What is considered a disability in 'regular' life may even become an advantage in the context of elite sport" (van Hilvoorde 2008: 99).

The elite level of sport is defined by abnormal bodies that have been honed to efficiently perform a series of repetitive athletic tasks with precision. Technoscientific machinery excels at precision and here in lies some of the fear of the posthuman athlete. Sporting communities valorize athletes who, through hard work and sacrifice, have overcome their human failings to regularly produce uncommon and ideally abnormal athletic feats. The fear is that posthuman athletes, by augmenting their bodies with technoscientific devices, have taken shortcuts to success, and bypassed the arduous labor to reach the highest levels of athletic success. The dual construction of some posthuman athletes as simultaneously super-abled and disabled makes it difficult for these athletes to gain acceptance within tradition-laden sporting communities. In writing about Pistorius, Amanda Booher noted that his "super-ability not only excludes him from competition, but constructs him as a kind of cheater circumventing the 'true spirit of fair play and equality'" (Booher 2011: 6). The ideals of fair play and equality are central to efforts to curtail the integration of posthumans into any and all athletic competitions. Posthuman athletes, by their mere existence, are perceived to undermine the norms, rules, and the essence of sport. Sporting publics do not celebrate posthuman athletes' non-normative bodies in the same way they celebrate an exceedingly tall basketball player or small and svelte gymnast. Regardless, the posthuman athlete currently has to contend with the perception that any addition to the body is a problem, but all athletes are posthuman to a degree whether we choose to see it or not. The posthuman demands that we accept this convergence of bodies and technoscience within sport.

SOURCES CITED

Anders, Abram. "Foucault and `the Right to Life': From Technologies of Normalization to Societies of Control." *Disability Studies Quarterly*, vol. 33, no. 3 (2013): n.p.

Beckman, Emma M., Mark J. Connick, Mike J. McNamee, Richard Parnell, and Sean M. Tweedy. "Should Markus Rehm Be Permitted to Compete in the Long Jump at the Olympic Games?" *British Journal of Sports Medicine*, vol. 51, no. 14 (2017): 1048–1049.

Booher, Amanda K. "Defining Pistorius." *Disability Studies Quarterly*, vol. 31, no. 3 (2011).

Borden, Sam. "Top Long Jumper Loses Ruling on Prosthesis, Reviving a Debate" *The New York Times*. July 30, 2014, https://www.nytimes.com/2014/07/31/sports/long-jumper-markus- rehms-federation-deems-his-prosthetic-leg-unfair.html.

Brittain, Ian S. *From Stoke Mandeville to Stratford: A History of the Summer Paralympic Games*. Champaign, Illinois: Common Ground Publishing, 2012.

Burnett, Mike. "Olympic Dreams of a Blade Runner." *BBC Sport*, May 5, 2005, http://news.bbc. co.uk/sport2/hi/other_sports/disability_sport/4487443.stm.

Butryn, Ted M. "Posthuman Podiums: Cyborg Narratives of Elite Track and Field Athletes." *Sociology of Sport Journal*, vol. 20, no. 1 (2003): 17–39.

Butryn, Ted M. and Matthew A. Masucci. "Traversing the Matrix: Cyborg Athletes, Technology, and the Environment." *Journal of Sport and Social Issues*, vol. 33 (2009): 285–307.

Court of Arbitration for Sport. "Arbitration CAS 2008/A/1480 Pistorius v/ IAAF." 2008a, 9.

Court of Arbitration for Sport. "Arbitration CAS 2008/A/1480 Pistorius v/ IAAF." 2008b, 9, 10, 12, 13.

Crincoli, S. M. "You Can Only Race if You Can't Win? The Curious Cases of Oscar Pistorius and Caster Semenya." *Texas Review of Entertainment & Sports Law*, vol. 12 (2011): 133–81.

Davidson, Martha. "Innovative Live: Artificial Parts: Van Phillips." *Lemelson Center for the Study of Invention and Innovation*, March 9, 2005, http://invention.si.edu/innovative-lives-artificial-parts-van-phillips.

DePauw, Karen P., and Susan J. Gavron. *Disability Sport*. Champaign. Illinois: Human Kinetics, 1995.

Dowling, Siobhán. "Disabled Long Jumper Rehm Waits for IAAF Ruling on Championship Eligibility." *Handelsblatt Today*, July 30, 2014, https://www.handelsblatt.com/today/unfair-advantage-disabled-long-jumper-rehm-waits-for-iaaf-ruling-on-championship-eligibility/23612416.html?ticket=ST-1513822-bj26DfVi3BDqq4hKUvey-ap4.

Fouché, Rayvon. *Game Changer: The Technoscientific Revolution in Sport*. Baltimore: Johns Hopkins University Press, 2017.

Geary, Molly. "German Federation Excludes Amputee Jumper, Claims He Has Advantage." *Sports Illustrated*, July 30, 2014, https://www.si.com/more-sports/2014/07/30/german-amputee-jumper-excluded-unfair-advantage.

Gillette, Felix. "Racing Tall: A Paralympian Stands Accused of Getting an Illegal Leg Up." *Slate*, November 10, 2004, https://slate.com/culture/2004/11/a-paralympian-stands-accused-of-getting-an-illegal-leg-up.html.

Harris, John. *Enhancing Evolution: The Ethical Case for Making Better People*. Princeton, NJ: Princeton University Press, 2010.

Harvey, Claire. "What's Disability Got to Do with It? Changing Constructions of Oscar Pistorius before and after the Death of Reeva Steenkamp." *Disability & Society*, vol. 30, no. 2 (2015): 299–304.

Howe, P. David, and Carla F. Silva. "The Cyborgification of Paralympic Sport." *Movement & Sport Science*, vol. 97 (2017): 17–25.

International Association of Athletic Federation. "AAF Council Introduces Rule Regarding 'Technical Aids,'" March 26, 2007, http://www.iaaf.org/news/news/iaaf-council-introduces-rule-regarding-techni.

International Association of Athletic Federation. "Oscar Pistorius—Independent Scientific Study Concludes that Cheetah Prosthetics Offer Clear Mechanical Advantages." January 14, 2008, http://www.iaaf.org/news/news/oscar-pistorius-independent-scientific-stud-1.

International Paralympic Committee. *International Paralympic Committee Athletics Classification Rules and Regulations*. Bonn, Germany, January 2016. https://www.paralympic.org/sites/default/files/document/160428154429528_2015_12+IPC+Athletics+Classification+Rule

Levinovitz, Alan J. "In an Era of Doping and Blade Running, What Is an 'Natural' Athlete, Anyway." *The Washington Post*, August 1, 2016, https://www.washingtonpost.com/national/health-science/in-an-era-of-doping-and-blade-running-what-is-a-natural-athlete-anyway/2016/08/01/a675e3e2-42b6-11e6-88d0-6adee48be8bc_story.html.

Linghede, Eva. "The Promise of Glitching Bodies in Sport: A Posthumanist Exploration of an Intersex Phenomenon." *Qualitative Research in Sport Exercise, and Health*, vol. 10, no. 5 (2018): 570–84.

Magdalinski, Tara. *Sport, Technology and the Body: The Nature of Performance*. New York: Routledge, 2009.

McRuer, Robert. "Compulsory Able-Bodiedness and Queer/Disabled Existence." In *The Disability Studies Reader*, edited by L. J. Davis. New York: Routledge, 2013, pp. 369–80.

Miah, Andy. *Genetically Modified Athletes: Biomedical Ethics, Gene Doping and Sport*. New York: Routledge, 2004.

Percy, David F. "A Comparison of Olympic and Paralympic Performances." *Journal of Operational Research*, vol. 70, no. 3 (2019): 446–58.

Pickup, Oliver. "London 2012 Olympics: Games Legend Michael Johnson Believes Oscar Pistorius Has an 'Unfair Advantage'." *The Telegraph*, July 17, 2012, http://www.telegraph.co.uk/sport/olympics/athletics/9405113/London-2012-Olympics-Games-legend-Michael-Johnson-believes-Oscar-Pistorius-has-an-unfair-advantage.html.

Rodhuit, Johann. A. R., and Roman Gaehwiler. "Ethics and Enhancement in Sport: Becoming the Fastest (Human?) Being." *Sport in Society*, vol. 21, no. 4 (2018): 713–19.

Schantz, Otto J. "Coubertin's Humanism Facing Post-Humanism–Implications for the Future of the Olympic Games." *Sport in Society*, vol. 19, no. 6 (2016): 840–56.

van Hilvoorde, Ivo, and Laurens Landeweerd. "Disability or Extraordinary Talent—Francesco Lentini (Three Legs) versus Oscar Pistorius (No Legs)." *Sport, Ethics and Philosophy*, vol. 2, no. 2 (2008): 97–111.

Zettler, Patricia J. "Is It Cheating to Use Cheetahs? The Implications of Technologically Innovative Prostheses for Sports Values and Rules." *Boston University International Law Journal*, vol. 27 (2009): 367–409.

CHAPTER TWENTY-ONE

Data and Information in the Posthuman Sensorium

DAVID CHANDLER

The "posthuman sensorium" is a new mode of regulation that is highly dependent on the application of new technologies for data analysis. These have been developed across contemporary society from the technologies of the quantified self, to the application of data analysis in schools and businesses, to the development of new sensing capacities through international collaborative initiatives. The latter include the United Nations' Global Pulse, established by the UN Secretary-General to research and coordinate the use of Big Data for development,[1] the World Bank's Open Data for Resilience initiative (OpenDRI), seeking to see the emergence of natural hazards and the impacts of climate change in real time,[2] and the PopTech and Rockefeller Foundation initiatives on Big Data and community resilience.[3]

The posthuman sensorium is increasingly developing through non-modern ontologies which construct the world through processes of emergence and highlight the development of new post-epistemological approaches, which view correlation as a more reliable and more objective "empirical" method than the extrapolations and predictions of causal analysis. This chapter argues that posthuman sensorium operates on the surface, on the "actualist" notion that "only the actual is real" (Harman 2010: 180; see also, Harman 2009: 127). As Roy Bhaskar, the originator of the philosophy of critical realism, has argued, "actualism" can be seen to be problematic in that hierarchies of structures and assemblages disappear and the scientific search for "essences" under the appearance of things loses its value (Bhaskar 1998:

7–8). This chapter is organized in four sections. The following section introduces the posthuman sensorium as the regulation of effects rather than the manipulation of causation, focusing on the work of Bruno Latour in establishing the problematic of contingent interaction, rather than causal depth, as key to emergent effects. The second section considers in more depth how the posthuman sensorium puts greater emphasis on relations of interaction rather than on ontologies of being, and links this methodological approach closely to actor network assumptions that disavow structures of causation. The final two sections analyze how correlation works to reveal new agencies and processes of emergence and how new technologies have been deployed in this area, providing some examples of how the shift from causal relations to sensing effects has begun to alter governmental approaches.

THE POSTHUMAN SENSORIUM

Digital governance understands problems in terms of their effects rather than their causation. Today, analysts are much more likely to highlight that the complexity of global interactions and processes mitigates against ambitious schemas for intervention, aimed at finding the root causes of problems or developing solutions through ambitious projects of social and political engineering from the ground up (see, for example, Ramalingam et al. 2008; Ramalingam 2013). In a more complex world, linear or causal ontologies can appear to be reductionist and are easily discredited by the growing awareness that any forms of governance intervention will have unintended side effects. It is in the attempt to minimize these unintended consequences that the focus of policy-makers has shifted to posthuman sensing, focusing on the responsive regulation of effects rather than seeking to address ostensible root causes. Focusing on managing effects rather than engaging with causative chains makes the forms and practices of policy intervention quite different.

The link between conceptual discussions of regulation and epistemic questions of knowledge is usefully highlighted by developing Giorgio Agamben's framing of a shift from a concern with causation to that of effects, which he understands as a depoliticizing move (Agamben 2014). Debates about addressing causation involve socio-political analysis and policy choices, putting decision-making and the question of sovereign power and political accountability at the forefront. Causal relations assume power operates in a hierarchy, with policy outcomes understood to be products of conscious choices, powers, and capacities. Agamben argues that, whilst the governing of causes is the essence of politics, the regulation of effects reverses the political process:

> We should not neglect the philosophical implications of this reversal. It means an epoch-making transformation in the very idea of government, which overturns the traditional hierarchical relation between causes and effects. Since governing the causes is difficult and expensive, it is more safe and useful to try to govern the effects. (Agamben 2014: n.p.)

The regulation of effects can therefore be seen as a retreat from modernist or causal assumptions of governance. However, the shift from causation to effects involves a shifting

conceptualization of regulatory knowledge itself. The posthuman sensorium—regulating through attempting to enhance system and community responsivity to effects—shifts the focus away from the formal public, legal, and political sphere to the capacities and abilities of systems or societies for responsiveness to changes in their environmental context. The management of effects involves redistributing agency, understood as responsive capacity, and thereby evades the question of the responsibility or accountability for problems or the need to intervene on the basis of government as a form of political decision-making (see further, Chandler 2014b, 2014c).

Policy interventions have shifted to digital modes of regulation as governing agencies have sought to respond to the effects of indeterminacy and risk as inherent in the complex and interdependent world rather than understanding problems in a modernist telos of solutionism and progress. Bruno Latour has deployed the radical discourse of understanding problems in their emergence to great effect, having long waged war on modernist binary understandings, particularly that of the separation of culture and nature. For Latour, just as humanity has become more entangled with nature than ever before, ecologists have sought to emphasize the need for separation to protect "nature" and modernist science aspires to know the world/"nature" as somehow a separate and fixed reality (see, for example, Latour 1993a, 2004). The awareness of emergent effects such as climate change reveals the entanglements of humanity and the environment and is a critical wake-up call to radically reorganize the governance of the planet on the basis of a more inclusive understanding that "nature" cannot just be left alone, but must be "even more managed, taken up, cared for, stewarded, in brief, integrated and internalized into the very fabric of policy" (Latour 2011: 25).

The use of data technologies for a posthuman sensorium is crucial for Latour's project of enfolding the unintended effects of planetary interaction into the everyday governance of the Anthropocene. The effects of interaction are understood to be concrete and contingent and thus depend on the ability to trace the surface of interactive relations through seeing effects, to follow the unintended and unforeseen consequences of human actions "all the way." Latour thus enthuses:

> [T]he principle of precaution, properly understood, is exactly the change of *zeitgeist* needed: not a principle of abstention—as many have come to see it—but a change in the way *any action* is considered, a deep tidal change in the linkage modernism established between science and politics. From now on, thanks to this principle, unexpected consequences are *attached* to their initiators and have to be followed through all the way. (Latour 2011: 27)

Latour's subject is the initiator of actions and thereby responsible for the interactive consequences of this initiation (2011). For Latour, the consequences of human actions can be traced through seeing or being sensitive to the network formed through their effects (see also, Clark 2010; Klein 2014). Thus, digital governance seeks to trace these links on the surface. The need to be responsive to effects also drives debates establishing the networks of entanglement of the Anthropocene, calling for greater sensitivity to the everyday feedbacks that bring these relations and interactions to light (Latour 2013, 94–5; see also, Bennett 2010;

Connolly 2013). For some authors, extreme weather events or outbreaks of new viruses, for example, indicate networked interactions spanning the globe, revealing contingent linkages, interconnections, and feedback loops (see, for example, Gillings 2015; Haraway 2015; Tsing 2015: 37–43).

The ability to see or sense the actual effects of relational interactions becomes more enabling, the more connections can be established or imagined across greater distances and across more varied forms of interactive life. These complex and intricate feedback loops also call for greater technological capacities. Thus, these tasks can be accomplished, according to Latour:

> [B]y crisscrossing their [the loops'] potential paths with as many instruments as possible to have a chance of detecting in what ways they are connected … laying down the networks of equipment that render the consequences of action visible to all the various agencies that do the acting …. "[S]ensitivity" is a term that applies to all the agencies able to spread their loops further and to feel the consequences of what they do come back to haunt them … but only as long and as far that it [humanity] is fully equipped with enough sensors to feel the feedbacks. (Latour 2013: 96)

Latour's framework sees the ability to sense effects as crucial to revealing the unseen and unknown interconnections of the Anthropocene, involving the technology and regulatory mechanisms necessary to "trace and ceaselessly retrace again the lines made by all those loops" with a "strong injunction: keep the loop traceable and publically visible" so that "whatever is reacting to your actions, loop after loop … weighs on you as a force to be taken into account" (Latour 2013: 135).

New sensorial forms of digital governance are given a material political form as a new set of political competencies and responsibilities are established: "Such an accumulation of *responses* requires a responsible agency to which you, yourself, have to become in turn *responsible*" (Latour 2013: 96). Unlike earlier modes of governance, digital governance does not seek to make causal claims, the emergence of effects can be traced to reveal new relations of interaction and new agencies or actants to be taken into account, but there is no assumption that effects can be understood and manipulated or governed through transcendental policy goals[4]—real-time responsive forms of management through digital sensing increasingly focus on the "what is" (Latour 2013: 126) of the world in its complex and plural emergence.

The fact that the "what is-ness" of the world is not a concern with a modernist ontology of being and causation is often neglected in considerations of the deployment of new data information technologies for regulation, so it will be considered here and in more detail in the following section. Latour, in the "Facing Gaia" lectures, argues that nature has to be understood in "post-epistemological" terms (Latour 2017: 143). By this he means that modernist forms of representation, reduction, abstraction, and exclusion cannot know a world that is plural, lively, and interactive. This is post-epistemological because knowledge can no longer be extracted from its concrete context of interaction in time and space. In this framing, knowledge, to be "objective"—to be real—has to be plural, fluid, and concrete (Latour 2013:

230). This is very similar to Donna Haraway's understanding of "situated epistemology," which rejects modernist drives to extract knowledge, that is, to turn knowing into abstractions from real emergent processes through methods of scaling up, generalizing, and universalizing; fixing knowledge apart from its plural, changing, and overlapping context of meaning (Haraway 1988). In this way of rethinking knowledge, the modernist divisions between subjective and objective and qualitative and quantitative are dissolved (see further, Venturini and Latour 2010).

Latour's is a flat ontology, where speed, size, and scale are momentary and contingent products of interaction rather than constructing and shaping path-dependencies. As Latour repeats, in a world of unknowable contingencies "it is the *what is* that obstinately requests *its due*" (Latour 2013: 126). This "empirical" displacement of causal understandings was also advocated by Ulrich Beck, who imagined the development of real-time empirics as able to evade both the dangers of critical immanent approaches, which tended to reproduce the knowledge skepticism of postmodernism, and the hubristic knowledge claims of transcendental frameworks of cause-and-effect. Thus, the world could be governed in its complex emergence, through focusing on effects as the starting point for governance:

> Seen this way, climate change risk is far more than a problem of measures of carbon dioxide and the production of pollution. It does not even only signal a crisis of human self-understanding. More than that, global climate risk creates new ways of being, looking, hearing and acting in the world—highly conflictual and ambivalent, open-ended, without any foreseeable outcome. As a result, a compass for the 21st century arises. This compass is different from the postmodern "everything goes" and different from false universalism. This is a new variant of critical theory, which does not set the normative horizon itself but takes it from empirical analyses. Hence, it is an empirical analysis of the normative horizon of the self-critical world risk society. (Beck 2015: 83)

In the digital governance of the posthuman sensorium, the focus on empirical analysis to facilitate real-time responsiveness enables emergent effects to discursively frame governance without an external subject "setting the normative horizon." This new "normative horizon" is one imagined as set by the world itself—and accessed through the development of new mechanisms and techniques sensitized and responsive to the world in its emergence. The post-epistemological implications of frameworks of digital governance seem to underlie the fascination with Big Data approaches as a way of generating increasingly sensitive real-time responses to emergent effects (see, for example, Mayer-Schönberger and Cukier 2013; Kitchin 2014).

BIG DATA, OBJECTS, AND RELATIONS

As already intimated in the consideration of Latour's work in the previous section, new digital technologies can be understood as building a posthuman sensorium which shares the ontopolitical assumptions of actor-network theory (ANT) and can be informed by a consideration of the long-running engagement between Bruno Latour (the leading proponent

of ANT) and Graham Harman (a leading speculative realist) over the conceptualization of this approach (see Latour et al. 2011). Harman takes Latour to task precisely for the "actualism" at the heart of the ANT approach, stating that, for Latour, momentary relations are more important than the substance of entities (or "actants"):

> For Latour an actant is always an event, and events are always completely specific: "everything happens only once, and at one place." An actant … is always completely deployed in the world, fully implicated in the sum of its dealings at any given moment. Unlike a substance, an actant is not distinct from its qualities, since for Latour this would imply an indefensible featureless lump lying beneath its tangible properties … And unlike a substance, actants are not different from their relations. Indeed, Latour's central thesis is that an actor is its relations. All features of an object belong to it; everything happens only once, at one time, in one place. (Harman 2009: 17)

This focus on relations in the actual, in the present rather than on the potential, or possibilities, which may lie latent or virtual in entities, ecosystems, or assemblages, is crucial to the distinction with a causal ontology:

> Since Latour is committed to a model of actants fully deployed in alliances with nothing held in reserve, he cannot concede any slumbering potency lying in the things that is currently unexpressed. To view a thing in terms of potential is to grant it something beyond its current status as a fully specific event. (Harman 2009: 28)

As Harman argues, "Latour is the ultimate philosopher of relations" and in this way inverts the assemblage theory of DeLanda (Harman 2010: 176), which understands assemblages as never fully actualized, enabling the possibility for causal interactions to bring forward alternative paths of emergence. For Harman, and object-oriented ontologists, ANT falls down for its lack of distinction between objects and their relations, which he argues acts by "flattening everything out too much, so that everything is just on the level of its manifestation," and therefore, the approach "can't explain the change of the things" or the hidden potential of alternative outcomes (Latour et al. 2011: 95). For ANT the emergence of new aspects of reality is not a matter of causal depth but of seeing what actually exists but is consigned to the background. As Latour argues:

> I call this background plasma, namely that which is not yet formatted, not yet measured, not yet socialized, not yet engaged in metrological chains, and not yet covered, surveyed, mobilized, or subjectified. How big is it? Take a map of London and imagine that the social world visited so far occupies no more room than the subway. The plasma would be the rest of London, all its buildings, inhabitants, climates, plants, cats, palaces, horse guards …. [Sociologists] were right to look for "something hidden behind," but it's neither behind nor especially hidden. It's *in between* and not made of social stuff. It is not hidden, *simply unknown*. It resembles a vast hinterland providing the resources for every single course of action to be fulfilled, much like the countryside for the urban dweller, much like the missing masses for a cosmologist trying to balance out the weight

of the universe. (Latour 2005: 244, emphasis in original)

In ANT, as an alternative science of relationality, what is missing in terms of governmental understanding is not relational depth but relationality on the surface: the presence of actual relations which give entities and systems their coherence or weight in the present moment. Thus, for ANT, modernist understandings of the world, whether those of natural or of social science, give too much credence to entities as if they have fixed essences (allowing causal relations) rather than shifting relations to other actants:

> The world is not a solid continent of facts sprinkled by a few lakes of uncertainties, but a vast ocean of uncertainties speckled by a few islands of calibrated and stabilized forms …. Do we really know that little? We know even less. Paradoxically, this "astronomical" ignorance explains a lot of things. Why do fierce armies disappear in a week? Why do whole empires like the Soviet one vanish in a few months? Why do companies who cover the world go bankrupt after their quarterly report? (Latour 2005: 245)

In February 2008, Latour and Harman participated in a public seminar at the LSE, in which the differences between what are heuristically described here as the ontopolitical assumptions behind digital governance were brought to the surface. Noortje Marres made some useful interventions regarding the importance of ANT for the discovery of new ways of seeing agency in the world on the pragmatic basis of "effect" rather than a concern for emergent causation: "because pragmatists are not contemplative metaphysicians, because they say 'we will not decide in advance what the world is made up of,' this is why they go with this weak signal of the effect. Because that is the only way to get to a new object, an object that is not yet met nor defined" (Latour et al. 2011: 62). Marres argued that taking "as our starting point stuff that is happening" was a way of "suspending" or of "undoing" ontology, in order to study change (Latour et al. 2011: 89). This aspect is vital to digital sensing as a mode of governance, as this enables a focus upon the surface appearances of change, which are not considered so important in an ontology of causality:

> It's about saying that we have a world where continuously new entities are added to the range of existing entities, everything continually changes and yet in this modern technological world everything stays the same. We have stabilized regimes …. But if we engage in studying specific objects, we do not find this singularized thing that is well put-together, as an object. We do not find it at the foundation but we find it as an emergent effect. (Latour et al. 2011: 90–1)

Surface appearances of things are continually changing as their relationships do, not through an ontology of depth but through networks and interactions on the surface: in plain sight. As Latour states, regarding the "plasma" or the "missing masses" of ANT: "it's not the unformatted that's the difficulty here. It's what is in between the formatting. Maybe this is not a very good metaphor. But it's a very, very different landscape, once the background and foreground have been reversed" (Latour et al. 2011: 84).

Thus, my argument here is that the ontopolitical assumptions of digital forms of regulation

can be usefully grasped in terms of ANT in that the concern is not the nature of systems or substances but ways in which change can be detected through seeing processes of emergence as relational. Relational processes without a conception of depth are co-relational rather than causal as the processes of relation may be contingent and separate conjunctions. The fact that all forms of being are co-relational means that new opportunities arise to see with and through these relations and co-dependencies: whether it is the co-relation of pines and matsutake mushrooms (mobilized by Anna Tsing 2015: 176) or the co-relation between sunny weather and purchases of barbecue equipment or the co-relation between Google search terms and flu outbreaks (Madrigal 2014). These are relations of "effects" rather than of causation, when some entities or processes have an effect on others they can be seen as "networked" or "assembled" but they have no relation of immanent or linear causation which can be mapped and reproduced or intervened in.

The co-relational rather than causal aspect of ANT distinguishes it from assemblage theory or the neo-institutional or ecosystem approaches with their ontology of causal depth. Actor network approaches therefore lack the temporal and spatial boundedness of assemblages or of nested adaptive systems and have no assumptions of iterative interactions producing state changes to higher levels of complex ordering.[5] They say nothing of "ontology" or of the essences of things, merely focusing on the transmission of effects at particular moments; thus, they can draw together "litanies" of actors and actants—the plasma, or "missing masses"—crucial for describing or understanding how change occurs in systems or states. Suspending or "undoing" ontology opens ANT approaches to the world of interaction in the actual, or brings the open-ended processual understanding of the virtual into the actual. New actors or agencies are those brought into being or into relation to explain "effects" and to see processes of emergence through "co-relation." In this respect, new technological advances, driving algorithmic machine learning, Big Data capabilities, and the Internet of Things seem perfectly timed to enable the posthuman sensorium as a new mode of regulatory governance.

THE RISE OF THE CORRELATIONAL MACHINE

Human-non-human assemblages of sensors enable new forms of responsivity but the advancements are not to do with causal knowledge but with the capacities to see through the breaking down of processes via the development of "correlational machines." I use the term "correlational machines" to distinguish the mode of digital governance as a very distinct paradigm in contra distinction to causal ontologies of depth and immanence. The development of correlational machines is not new to the posthuman sensorium, but is part-and-parcel of the extension of posthuman sensing through the use of artificial prostheses to enable sensing the environment. Perhaps the classic example, provided by Merleau-Ponty's work on the phenomenology of perception, would be the walking stick, which enables a blind person to sense the obstacles around them, through the resistance to touch and the sounds made, etc. (Merleau-Ponty 1989). Another example would be the deployment of canaries as nonhuman sensors for carbon monoxide in mineshafts.

Correlational machines have proliferated under the digital dynamics of the posthuman sensorium, enabling new high-tech assemblages involving the extensive use of new sensing

technologies, often termed "the Internet of Things," where sensors can be connected to the internet and provide real-time detection of changes in air and water quality, earth tremors, or parking capacity, etc. The potential use of sensing technologies is extensive. At the MIT Senseable City Lab, for example, researchers informed me of work being carried out using robotic sensors in sewers tracking minute quantities of bio-chemical material. Potentially, local authorities could receive real-time information on localized health profiles and illegal drug use. If sewers can be turned into key information generators for bio-sensing and drug and health profiling, it is clear that new digital modes of regulation can provide a whole range of new avenues for monitoring and regulatory policing.[6] Thus, new assemblages are being artificially constructed that enable new actants to be enrolled in governance, including nonhuman and non-living actants, and in doing so, changes can be seen or sensed and therefore responded to, often revealing new threats or dangers or expanding human sensitivity to existing ones.

While these "more-than-human" machinic assemblages are constructed on the basis of causal laws and regularities, their purpose is a correlational one: seeing what exists in the present, in the actual, but is unknown or unseen. To take one contemporary example of the evolution of the posthuman sensorium, Elizabeth Johnson has done insightful work on more-than-human forms of regulation in her analysis of the work of commercial biosensing and the use of organic life to monitor fresh and marine water sources for pollution (Johnson 2017). Here an array of animal species, small fish, worms, molluscs, crustaceans, and micro-organisms are monitored intensively to discover their norms of functionality and to develop ways of measuring changes in these indicators. They are then ready for use as "correlational machines":

> [The company] monitors a suite of "behavioral fingerprints" as these organisms are exposed to different systems. Locomotor activity, reproductive rates, and embryonic developments are measured together to indicate the severity of hazardous anthropogenic chemicals as well as biologically produced toxins, such as blue-green algae. In this way the company boasts, it can make "pollution measurable." (Johnson 2017: 284)

As Johnson notes, the mode of digital regulation is less about causation than seeing the unseen: "making imperceptible harms perceptible" (Johnson 2017). This approach sees through correlation, which enables new problems and possibilities to be detected. For example, changes in the bodily indicators of the animal organs can alert human agents to identify potential problems even if the sources are unknown. Thus, the company concerned argues that problems can be detected "in due time before pollution irreversibly spreads in the environment or even harms human health" (Johnson 2017). In a technological extension of the nonhuman prosthesis of the canary down a coalmine, "biosensing enables a way of seeing with nonhuman life" (Johnson 2017: 286).

In the posthuman sensorium, new data technologies are developing new forms of correlational sight, which enables a fundamental shift from governance on the basis of "problem-solving" and analysis of "root causes" to the regulation of effects. In this mode of regulation, distinctions between scientific disciplines and individual entities tend to disappear

as these historically depended upon organic conceptions of causation. In contrast, the ontopolitics informing the sensorium is not concerned with entities or with causation, enabling "more-than-human" assemblages of responsivity to become the new regulatory norm.[7]

CONCLUSION

The posthuman sensorium is less concerned with adaptive change (to prevent problems before they occur or with transformation afterward) than with responsiveness to problems understood as emergent effects. Responsiveness (e.g., in resilience discourses) is increasingly seen as a real-time necessity: living with and being sensitive to problems and threats is understood to be the best way of ameliorating their impact (Evans and Reid 2014). Sensing as a mode of posthuman regulation thus appears to have a lot in common with Deleuze's conceptualization of a "control society," where time is held constant: instead of a before (prevention) or an after (reaction), there is the continual modulation of responsiveness, an "endless postponement" of a problem (Deleuze 1995: 179). The essence of entities, be they systems, societies, or individuals, becomes much less important than the emergent appearance of surface "effects," which are to be modulated and responded to. Thus, in the posthuman sensorium, there is no longer a "line" of causality but a "plane: of relationality"—this shift is fundamental in terms of governance, which, as analyzed above, no longer needs to assume a normative horizon or normative goals external to the actuality of the world. As Agamben has highlighted, the regulation of effects can thereby be seen to be thoroughly depoliticizing, as the tasks of governance are discursively derived "empirically" from the world, rather than from human actors as subjects.

---

nited Nations Global Pulse initiative (*web page*) at: http://www.unglobalpulse.org/.

he World Bank's OpenDRI webpages can be accessed at: https://www.gfdrr.org/opendri.

or information on the Data-Pop Alliance, see http://www.datapopalliance.org/; and for the Rockefeller Foundation: http://www.rockefellerfoundation.org/our-work/current-work/resilience.

eleuze (1988: 128) nicely captures the difference between transcendent and immanent approaches in his suggestion that transcendent approaches introduce a "dimension supplementary to the dimensions of the given"; that is, ideas of goals, direction and causal connections, which separate the human subject from the object of governance. Whereas, on the plane of immanence: "There is no longer a subject, but only individuating affective states of an anonymous force. Here [governance] is concerned only with motions and rests, with dynamic affective charges. It will be perceived with that which it makes perceptible to us, as we proceed."

arman calls this "occasionalism" and argues that Latour (Venturini and Latour 2010: 228) provides the first known example of "secular occasionalism," where there is no fixed way of explaining causation or the continuity of events. In ANT, nothing follows from anything else: "Nothing is by itself either reducible or irreducible to anything else" (Latour 1993b: 169). The work of composing relations begins again "every morning" (Latour et al. 2011: 76). Regarding complexity theory, see Chandler (2014a).

ersonal interview, researcher, Senseable City Lab, Massachusetts Institute of Technology, March 30, 2017.

his form of regulation through the modulation of effects can be usefully grasped in terms of Deleuze and Guattari's concept of "machinic enslavement," derived from cybernetics, where responses are automated to manage or govern on the basis of maintaining equilibrium. In this process there is no distinction between using a machine and being part of the informational input to the machinic process: the process itself is more important than distinctions between entities or individuals. See Deleuze and Guattari (2014: 531–6); Lazzarato (2014: 23–34).

SOURCES CITED

Agamben, Giorgio. "For a Theory of Destituent Power." *Chronos*, vol. 10, no. 10 (February 2014): n.p.

Beck, Ulrich. "Emancipatory Catastrophism: What Does It Mean to Climate Change and Risk Society?" *Current Sociology*, vol. 63, no. 1 (2015): 75–88.

Bennett, Jane. *Vibrant Matter: A Political Ecology of Things*. London: Duke University Press, 2010.

Bhaskar, Roy. *The Possibility of Naturalism: A Philosophical Critique of the Contemporary Human Sciences*, third edition. Abingdon: Routledge, 1998.

Chandler, David. *Resilience: The Governance of Complexity*. Abingdon: Routledge, 2014a.

Chandler, David. "Beyond Good and Evil: Ethics in a World of Complexity." *International Politics*, vol. 51, no. 4 (2014b): 441–57.

Chandler, David. "Beyond Neoliberalism: Resilience, the New Art of Governing Complexity." *Resilience: International Policies, Practices and Discourses*, vol. 2, no. 1 (2014c): 47–63.

Clark, Nigel. *Inhuman Nature: Sociable Life on a Dynamic Planet*. London: Sage, Kindle Edition, 2010.

Connolly, William E. *The Fragility of Things: Self-Organizing Processes, Neoliberal Fantasies, and Democratic Activism*. London: Duke University Press, 2013.

Deleuze, Gilles. *Spinoza: Practical Philosophy*. San Francisco: City Lights, 1988.

Deleuze, Gilles. "Postscript on Control Societies." In *Negotiations: 1972–1990*. Trans. Martin Joughin. New York: Columbia University Press, 1995, pp. 177–83.

Deleuze, Gilles, and Félix Guattari. *A Thousand Plateaus*. London: Bloomsbury Academic, 2014.

Evans, Brad, and Julian Reid. *Resilient Life: The Art of Living Dangerously*. Cambridge: Polity Press, 2014.

Gillings, Michael. "Comment: How Modern Life Has Damaged Our Internal Ecosystems". *SBS News*, October 12, 2015, http://www.sbs.com.au/news/article/2015/10/09/comment-how-modern-life-has-damaged-our-internal-ecosystems.

Haraway, Donna. "Situated Knowledges: The Science Question in Feminism and the Privilege of Partial Perspective." *Feminist Studies*, vol. 14, no. 3 (1988): 575–99.

Haraway, Donna. "Anthropocene, Capitalocene, Plantationocene, Chthulucene: Making Kin." *Environmental Humanities*, vol. 6 (2015): 159–65.

Harman, Graham. *Prince of Networks: Bruno Latour and Metaphysics*. Melbourne: re.press, 2009.

Harman, Graham. *Towards Speculative Realism: Essays and Lectures*. Winchester: Zero Books, 2010.

Johnson, Elizabeth R. "At the Limits of Species Being: Sensing the Anthropocene." *South Atlantic Quarterly*, vol. 116, no. 2 (2017): 275–92.

Kitchin, Rob. *The Data Revolution: Big Data, Open Data, Data Infrastructures & Their Consequences*. London: Sage, 2014.

Klein, Naomi. *This Changes Everything: Capitalism vs. the Climate*. New York: Simon & Schuster, 2014.

Latour, Bruno. *We Have Never Been Modern*. Cambridge, MA: Harvard University Press, 1993a.

Latour, Bruno. *The Pasteurisation of France*. Cambridge, MA: Harvard University Press, 1993b.

Latour, Bruno. *Politics of Nature: How to Bring the Sciences into Democracy*. Cambridge, MA: Harvard University Press, 2004.

Latour, Bruno. *Reassembling the Social: An Introduction to Actor-Network-Theory*. Oxford: Oxford University Press, 2005.

Latour, Bruno. "Love Your Monsters." *Breakthrough Journal*, vol. 2 (2011): 21–8.

Latour, Bruno. *Facing Gaia, Six Lectures on the Political Theology of Nature: Gifford Lectures on Natural Religion, Edinburgh, 18th–28th of February 2013* (draft version 1–3-13), 2013.

Latour, Bruno. *Facing Gaia: Eight Lectures on the New Climate Regime*. Cambridge: Polity Press, 2017.

Latour, Bruno, Graham Harman, and Péter Erdélyi. *The Prince and the Wolf: Latour and Harman at the LSE*. Winchester: Zero Books, 2011.

Lazzarato, Maurizio. *Signs and Machines: Capitalism and the Production of Subjectivity*. South Pasadena, CA: Semiotext(e), 2014.

Madrigal, Alexis C. "In Defense of Google Flu Trends." *The Atlantic*, March 27, 2014,

https://www.theatlantic.com/technology/archive/2014/03/in-defense-of-google-flu-trends/359688/.

Mayer-Schönberger, Viktor, and Kenneth Cukier. *Big Data: A Revolution That Will Transform How We Live, Work and Think*. London: John Murray, 2013.

Merleau-Ponty, Maurice. *Phenomenology of Perception*. London: Routledge, [1945] 1989.

Ramalingam, Ben. *Aid on the Edge of Chaos: Rethinking International Cooperation in a Complex World*. Oxford: Oxford University Press, 2013.

Ramalingam, Ben, and Harry Jones with Toussaint Reba, and John Young. "Exploring the Science of Complexity: Ideas and Implications for Development and Humanitarian Efforts." *ODI Working Paper*, no. 285 (October 2008), https://www.odi.org/publications/583-exploring-science-complexity-ideas-and-implications-development-and-humanitarian-efforts.

Tsing, Anna Lowenhaupt. *The Mushroom at the End of the World: On the Possibility of Life in Capitalist Ruins*. Princeton: Princeton University Press, 2015.

Venturini, Tommaso, and Bruno Latour. "The Social Fabric: Digital Traces and Quali- quantitative Methods." In *Proceedings of Future En Seine 2009: The Digital Future of the City*, edited by Ewen Chardronnet. Paris: Cap Digital, 2010, pp. 87–101.

CHAPTER TWENTY-TWO

Robots and Artificial Intelligence: Posthumanism as Robophilosophy

JOHANNA SEIBT

Abstractly characterized, technology is the material manifestation of the human power of imagination—of imagining alternatives to observed courses of events. Remarkably, in the first decades of the twenty-first century we have created technologies that not only abstractly represent but literally aim at the externalization of the human mind. We have begun to build machines "in our image," with respect to both the human body and the human mind, machines that no longer execute fixed motion patterns or produce the results of single specific cognitive functions such as calculating, but simulate the performance of complex human capacities—we have built machines that perform surgery with superhuman dexterity, navigate in difficult physical terrain, or even converse with a human interlocutors responding to their emotional states and predicting their beliefs.

The advancements of artificial intelligence (AI) and robotics during the last two decades have ushered in a complex new constellation of economic and socio-cultural prospects that some hail as the "beginning of the automation age" (McKinsey Global Institute 2017) and others fear as the "end of the human era" (Barrat 2013). Buzzwords like "industry 4.0" or "the robot revolution" signal a pervasive reorientation in business and industrial production practices toward digitalization and automation that will profoundly disrupt socio-economic practices with currently unforeseeable consequences for social justice and existential fulfillment. As professions are analyzed for their "automation potential," far-reaching

changes in the distribution of labor and the possibilities for work can be expected. Independently of the assessments of risks and opportunities of this new type of technology—in economic, environmental, or ethical regards—there seems to be agreement within the interdisciplinary research community exploring AI and robotics that a threshold has been reached, a tipping point, and perhaps even a point of no return. The *discussion* associated with this insight constitutes a distinctive cultural phenomenon across the highly industrialized nations that Sherry Turkle labelled—with apt ambiguity—"the robotic moment" in human cultural history (Turkle 2011).

The robotic moment belongs to a growing network of interconnected scientific and reflective engagements, ranging from the creation of robots and AI programs to academic research on human-robot interaction in new journals and conference series, to public discourse on new internet portals, to lobbying for legislation and policy, and, most remarkably perhaps, to the joint effort of an interdisciplinary research community to introduce new standards and quality marks to ensure the ethically responsible use of this technology.[1] These variegated activities are directed at a technology that by now has become highly diversified. For example, the small subset of this vast network of engagements that consists of the ethical debate about AI spreads into discussion lines that examine learning biases, profiling, affective computing, or the lack of explanatory transparency of machine learning architectures; the debate about robotics on the other hand is as ramified as the type of envisioned applications, addressing industrial robotics, consumer robotics, entertainment robotics, rescue robotics, care robotics, educational robotics, military robotics, medical robotics, android science, sex robotics, and so forth.

Which of the strands in this rich fabric of interlaced activities around AI and robotics are particularly significant for "posthumanism"? This is difficult to determine not only due to the size of the network but also due to the fact the term "posthumanism" labels a set of political, cultural, and philosophical discourses, establishing substantively different positions, at and across time. To trace just a few of the early junctions, while Francis Fukuyama used the term to characterize a nightmarish vision of biotechnical enhancement (Fukuyama 2002), authors from cultural studies engaged the term positively as the hallmark of a development where technology challenges traditional conceptions about the biological identity of the human body, and associated political entitlements (Hayles 2008; for an overview, see Miah 2008). Posthumanist critiques in cultural studies focused partly on the link between *subjectivity and the boundaries of the human body* and partly on the *ambiguity in human reactions to the alien body*. Technologies of the twenty-first century such as biotechnology, robotics, AI, and prosthetics dramatically amplify the longstanding narrative *topos* of the ambiguous entity, a body that is both living and non-living, which is threatening and fascinating at once. Such analyses of the technological disruptions of our traditional understanding of the human body as natural biological unit with fixed genders lent themselves to a more comprehensive attack in feminist philosophy on the identity paradigms of Enlightenment humanism and associated politics of exclusion, and thus achieved some wider significance in the context of an envisaged philosophical paradigm change. Continental ethics more broadly has utilized posthumanist analyses of the technological disruptions of the species concept of humanness to argue for a new understanding of the moral subject and the extension of the domain of

beings with "moral standing" to nonhuman or even non-living agents (see, for example, Coeckelbergh 2012; Gunkel 2012, 2018).

In sum, the following observations will not be able, not even generically or approximately, to do justice to the task of assessing the general significance of robotics and AI for the various types of agenda associated with the label of "posthumanism." All that can be offered is the discussion of a few strands in a rich fabric of activities, subjectively selected relative to subjective impressions of salience for posthumanist concerns. With this *caveat* in place, the selective focus I will apply here can be stated as the following suggestion. Posthumanist discourses in cultural studies and in philosophy so far mainly have taken their departure from those technological developments in biotechnology, robotics, and AI that pertain to *the material side* of traditional definitions for being human; that is, they have been undertaken with the aim to trace the dissolution of the concept of the "human body" as a biological or as a phenomenological concept—i.e., the "lived body" (German: "Leib") that is uniquely located and well-bounded—and to explore the philosophical and political consequences of this conceptual disintegration as it propagates into the Enlightenment notion of human. However, as the following sections aim to highlight, the full scope of tasks arising for posthumanist engagements only comes into view once we focus in addition on technological phenomena that unhinge the presumptions of the traditional (Cartesian) model of subjectivity which, as such, is not tied to a lived body.

1. ARTIFICIAL INTELLIGENCE—TURNING A BLIND EYE TO HUMAN REASON

The suggestion I wish to offer here, namely, that the disruption of traditional model of subjectivity is of particular significance for posthumanist thought, begins with a brief discussion about the implications of AI viewed as disembodied software programs. Of particular interest are AI architectures that do not follow the so-called symbolic representation approach where human knowledge is coded into a program using logic, that is, the rules of human reasoning. In contrast to the symbolic representation approach, AI architectures using so-called machine learning are input-output optimization procedures defined on neural networks—they are epistemically "blind" in the sense that the nodes in the neural network are not set up initially to represent any external features, and the learning algorithm is modeled on biological learning processes (e.g., reinforcement learning) with causal feedback rather than on logic (for an overview, see Bringsjord, Govindarajulu, and Sundaar 2018). Such blind optimization procedures, especially when further embedded across various "layers of networks" ("deep learning"), can learn to perform tasks that if performed by humans would require sophisticated cognitive capacities—capacities we call "creativity," "emotional intelligence," and "intuitive strategic intelligence" (as used, for example, by expert players of the board game "GO"). This fact seems to challenge (at least) the following three assumptions about aspects of the Enlightenment conception of the human mind, that is, the non-bodily aspects of human nature.

First, the traditional assumption that only conscious agents can manifest highly intelligent behavior such as natural language processing we daily disprove using virtual assistants (for

example, SIRI, ALEXA, or ECHO; most disturbing perhaps is the fact that these virtual assistants not only disprove the assumption by their very existence but, if prompted by a suitable question, produce utterances that are the explicit denial of this assumption.)

Second, the assumption that highly intelligent behavior requires human reasoning is shattered by the achievements of optimization procedures that are epistemically blind, that is, do not even structurally simulate reasoning processes on knowledge domains.

Third, we must relinquish the assumption that humans have exceptional (moral) value *because* they have exceptional human capacities, such as (artistic or scientific) creativity, abstraction (pattern recognition), and intuitive problem solving. Given that the products of the exercise of such capacities can also be generated by AIs, that is, by systems with very different forms of information processing, the claim to exceptionality cannot be anchored in the product of these capacities. To be sure, it is currently an open question *when* AIs will reach "general intelligence" and perform as well (or better) on any tasks that human minds can tackle, so for some time at least—according to the most recent assessment until 2030—we can hang on to the idea that what some of our human accomplishments are exceptional.

However, upon closer consideration one might question whether the astonishing products of semantically and epistemically blind optimization procedures of machine learning programs indeed deal a decisive blow to the traditional model of the non-material aspects of human nature, that is, the set of capacities that are summarily denoted as "mind" or more specifically as "subjectivity." For input-output equivalences between artificial and human information processing can always be challenged by the difference between simulation and realization, in a move that is well familiar from the debate about functionalism, as conducted in analytical philosophy.

To explain, the template for the relevant line of reasoning is John Searle's famous "Chinese Room Argument" (Searle 1980; Searle and Willis 1984) where it is argued that functional equivalence of linguistic input and output does not constitute speaker's meaning, linguistic understanding, or intentionality—these can only be realized by a human brain and not by something that simulates the functions of a human brain. While Searle resists naturalist interpretations of meaning, intentionality, and other human mental capacities, one does not even need to follow him on this route in order to reject the idea that the achievements of present-day AI programs suffice to challenge the Enlightenment conceptual human mental nature. Proponents of a naturalist ontology of the mind who still endorse the above-mentioned three assumptions can adapt Searle's argument as follows. Simulation comes in different degrees—if simulation is defined as a similarity relation between processes Pi and Pj, we can compare input-output equivalences at more or fewer cut-off points in between the overall input and output, resulting in more or fewer functional equivalences between Pi and Pj and thus more fine-grained or more coarse-grained simulations of the functional structure of the "real" process (Seibt 2014, 2017). In the limit case of fine-grained input-output equivalence, that is, comparing Pi and Pj at every moment of their duration (keeping the context constant) the input-output equivalence of Pi and Pj documents that two processes have precisely the same dynamic structure. In this case, the difference between simulation and realization collapses. However, the process architectures of AI and human reasoning as currently known are quite different, resulting in very coarse-

grained functional equivalences. One can thus argue that AI algorithms do not simulate human capacities to a degree that would be necessary in order to undermine the traditional assumptions that reasoning, linguistic understanding, or creativity requires consciousness and that the moral value of human beings can be grounded in their exceptional capacities.

Even if AIs could generate the same and better products than human capacities, such products would remain "localized" and decontextualized outcomes that achieve merely coarse-grained functional equivalences but not co-realization. The thesis of exceptionalism can still be anchored not in the products of these capacities but in the *way* in which humans arrive at them, that is, their particular way of information processing which generates a host of other outcomes along the way, notably, phenomenal experiences. As long as phenomenal experience cannot be shown to be entirely epiphenomenal (i.e., without any distinctive functional role of its own), and as long as we have no evidence for the emergence of phenomenal experiences in AIs, the difference between simulation and realization of human mental capacities will remain.

More concretely, currently we have no reason to abandon the assumption that in human cognition information processing that leads to the production of a decontextualized outcome O (e.g., the classification of a visual input as a "red rose") is of a certain type—call it "T1"—that gives rise to phenomenal experiences which play a distinctive functional role not directly related to O but rather to O's contextualization and larger integration with other cognitive capacities. Similarly, even though there are AI systems that generate information processing that produces O (e.g., the classification of a visual input as a "red rose"), currently we have no reason to assume that this information processing is of type T1, that is, that it gives rise to phenomenal experiences; the information processing in the AI system rather is of another type, call it "T2," and even though there may be input-output equivalences between T1-processing and T2-processing at beginning and end points, and even at additional stages in between, there will not be input-output equivalence "all the way," throughout all stages of T1-processing since (let me oversimplify here), at some stage T1-processing will produce phenomenal experiences while T2-processing will not. Thus, the AI-system will be functionally equivalent to human cognition to a lesser or greater degree, but not completely, and thus it will only simulate human cognition to different degrees, but will not realize the type of information processing that produces O in human cognition.

In sum, whatever can be shown to hold for simulations of mental human capacities has as such no immediate implications for assumptions about the realizations of mental human capacities. The startling achievements of machine learning algorithms do not, as such, provide an argument for the posthumanist claim that we need to reconceive of human nature and traditional assumptions of the human mind, since these and other algorithms used in AI programs merely simulate—and currently at a very coarse-grained level—the processes of the human mind. The present-day technological simulation of mentality does not yet shatter what we traditionally thought about mentality. However, as I will argue now, matters are different when we turn to the simulation of sociality.

2. SOCIAL ROBOTICS—TURNING TOOLS INTO SOCIAL

OTHERS

That the new technologies of robotics and artificial technologies deeply challenge our traditional understanding of human nature can be argued with reference to the field of "social robotics." As I wish to make plausible in this section, the phenomena that arise when humans interact with so-called "social" robots indeed require that we reconfigure the conceptual space of traditional accounts of human nature, as championed by posthumanists. It is precisely here, in the phenomena of human interactions with "social" robots, that Sherry Turkle locates the above-mentioned unique turning point—the "robotic moment" of human history: "We live the robotic moment not because we have companion robots in our lives but because the way we contemplate them on the horizon says much about who we are and who we are willing to become" (Turkle 2011: 26). To rephrase, it is not what "social robots" can *do* that demolishes our traditional views of human nature, but what they *are* for us—in "social robots" we have for the first time created artifacts that are not tools but *social others* for us. In the remainder of this entry I shall elaborate this claim in greater detail.

So-called "social robots" can be generically characterized as embodied artificial agents that can act autonomously in the physical and symbolic space of human social interactions. They are programmable devices that are designed, by their physical appearance (physical design), movements (kinematic design), and functional behavior (functional design), to interact with humans directly, using the normal physical channels of analog visual and verbal communication, in accordance with socio-cultural rules of behavior. "Social robots" have been envisaged and designed during the past two decades, so far primarily for applications in connection with care for the elderly and people with disabilities ("carebots"), cognitive and autism therapy, education, entertainment, and tourist guidesin public spaces. In the early stages of "social robotics" several classification schemes were proposed (Fong, Nourbakhsh, and Dautenhahn 2003; Breazeal 2003; Dautenhahn 2007; Duffy 1999) that characterized robotic systems in terms of their inherent programming and intended functionality within a social interaction context—e.g., as robots that are merely "socially situated," "socially assistive," "socially evocative," "socially receptive," versus "socially intelligent," or "sociable" robots. By as of today such attempts at classifications are largely abandoned since the results of research in "Human-Robot Interaction (HRI)," a new interdisciplinary field established in 2007, suggest that human responses to so-called "social" robots are much more complex and context-dependent than envisaged in these early design-focused classifications which were undertaken from the point of view of the creator of the robot rather than from the anthropologist's perspective observing factual human reactions. To characterize "social" robots via their least common denominator, one might say that they are embodied artificial agents that afford us humans with experiences of social others which so far we were afforded only by other humans and certain domestic animals. Initially "social" robots ran sophisticated classical AI programs in order to mimic language acquisition via social interaction (Brooks 1999; Breazeal 2002) and thereby to "ground" the meaning of symbols or even to enable them to pass the so-called "false belief test," commonly taken as evidence for a "theory of mind", that is, the ability to predict the expectations of one's interaction partners in a dynamic environment (Scassellati 2002). At the same time, Cynthia Breazeal formulated

another research direction that targets social interactions as such:

> Ideally, people will treat [the robot Kismet] as if it were a socially aware creature with thoughts, intents, desires, and feelings. Believability is the goal. Realism is not necessary (Breazeal 2002: 52).

In tandem with subsequent research on human reactions to this class of robots, the research focus in "social" robotics shifted toward this latter, interaction-geared perspective, away from the *modeling* of human mental processes engaged in social cognition and toward the effective *exploitation* of such processes. As it appeared, to engage humans in social interactions with robots is not difficult at all. Even though some robotic designs are experienced as "uncanny" (Mori et al. 2012; Mathur and Reichling 2016), HRI research has amply documented that humans have a strong tendency to "anthropomorphize" these artifacts. Interestingly, the relevant cues for anthropomorphizing are provided not only, and not even constitutively, by the physical shape (humanoid vs. non-humanoid) of the robot but also by the motion design, and our attention to these cues is highly dependent on the narrative framing of the robot (Złotowski et al. 2015). Moreover, and more disturbing perhaps, people's tendencies to anthropomorphize robots do not seem to depend much on the sophistication of the robot's program—the "robotic moment," Turkle emphasizes, is a "state of emotional—and I would say philosophical—readiness":

> I find people to seriously consider robots not only as pets but as potential friends, confidants, and even romantic partners. We don't seem to care what these artificial intelligences 'know' or 'understand' of the human moments we might 'share' with them. At the robotic moment, the performance of connection seems connection enough. (Turkle 2011: 9)

People interacting with "social" robots frequently engage in empathetic interpretations of the robot's behavior or feel sympathy for the robot (Bartneck and Hu 2008; Darling et al. 2015), and frequently thereby also ascribe to a robot moral status as moral patient or even as moral agent —strikingly, even to the extent that people are prepared to lie to another person in order to protect a robot (Kahn et al. 2004, 2012, 2015).

That humans are so easily engaged in social interactions is significant, from a philosophical point of view, since these interactions are *not* part of a special mental posture of pretend-play or make-believe (as suggested, for example, by Duffy et al. 2012). A fictional interaction is constituted by a special convention for agents and audience about how the behavior displayed is to be interpreted. Thus, a fictional interaction does not carry any rights and obligations beyond the duration of the interaction and frequently does not involve genuine emotions—when Romeo interacts with his servant Balthasar, the particular rights and obligations carried by a master-servant relationship begin and end with any particular performance of Shakespeare's play *Romeo and Juliet*; moreover, depending on the acting method chosen both actors can perform the roles without getting emotionally involved. By contrast, people feel obligated toward robots beyond the interaction context, even if these robots are no longer functional (Knox et al. 2018), and display emotional reactions that are

physiologically identical to emotional reactions to humans (Kulić et al. 2007; Rosenthal von der Pütten et al. 2013). Thus, when people react to a robot "as if it were a real person" (Breazeal 2002: ix) what is involved here is not the "as-if" of fictionality but the *"as-if" of simulation* (Seibt 2014, 2017). Simulation is a similarity relation between processes, as suggested above (see also ibid.): a process P1 that simulates process P2 does not realize all functional aspects of P2, P1 is nevertheless a real process that approximates, to different degrees, the functional (including causal) role of P2 (while the stick that serves as a fictional horse in a pretend-play is not something that approximates a horse). Indeed, as has been shown in neuroscientific studies, especially in their physical aspects robotic designs simulate the bodily cues involved in human social interaction to a high degree. Robots can trigger the same processes ("mechanisms") of implicit or pre-conscious social cognition as our conspecifics—from the low-level, preconscious mechanisms of motor resonance and perceptual resonance that are active when we perceive and understand actions as well as when we learn actions by imitation (Chaminade et al. 2010a, b; Gazzola et al. 2007), to the "mechanisms" establishing joint attention, for example, by following the other's gaze such as the "gaze-cuing effect" (Wiese et al. 2013, 2019; Wykowska et al. 2016), to the reaction patterns associated with ascribing to an agent some inner mental life, for example, intentions and beliefs, especially when the robot is introduced using mentalist vocabulary (Krach et al. 2008; Stanley et al. 2010).

If "social" robots are indeed social others for the humans interacting with them, both in the sense that they activate the neural correlates (as far as we know them) involved in social cognition in human-human interaction, and in the sense that they are subjectively experienced as social interaction partners, it appears that some robots can simulate the requirements for certain types of social interactions to such a high degree that the difference between simulation and realization of a social action begins to dwindle. Consider the case of social navigation, that is, the negotiation of social space that we signal to each other non-verbally, with body language, and mostly without paying any attention, that is, without any of the "higher" cognitive processes involved in intentional thought. The non-verbal social actions performed in routine social navigation can be simulated by robots to a high degree—or even realized, since here the accompanying intentionality is not a requirement of the successful or authentic performance of the social interaction. By contrast, consider a greeting, performed by waving and a smile—here suitable robotic designs might be able to realize the physical parts of the actions *waving* and *smiling,* but there are other parts of these actions that require intentionality (e.g., *recognizing a familiar social agent, wanting to practically acknowledge this recognition, feeling positively about the recognized social agent*) that robots can only simulate to a very low degree, at least currently. As long as we have no reason to believe in emerging phenomenality and intentionality in artificial systems, a robot thus cannot be said to *wave* or *smile*—it can at best realize what we do when we greet or smile thoughtlessly, that is, rearrange our bodies in certain ways, and simulate what we do when we greet or smile insincerely or inauthentically. When we describe "what a robot does," we thus need to take great care in specifying the parts of a social action and determining for each of these parts the degree to which it is simulated by the robot in question (for details of a description system, see Seibt 2017a and forthcoming). Nevertheless,

because "social" robots are three-dimensional physical agents, and thus can *realize* or *simulate to a high degree* the physical cues and action parts involved in human social interactions, their impact on the classical conception of subjectivity is much more fundamental than that of non-embodied AI-systems. For certain (parts of) social actions then, the difference between (i) the processes involved in simulating a social other for human social interaction and (ii) the processes of being a social other for human social interaction can be expected to vanish with the increasing sophistication of the "body" language of "social" robots.[2]

There is also a second argument one might put forth in order to show that the simulation of sociality is much easier to achieve than the simulation of mentality. Social others, one might say, are always "taken as" items with certain capacities; in other words, the capacities involved in being a social other for humans are constitutively capacities for producing certain physical perceptual cues, independently of how these cues are realized by the agent's "internal machinery" (Seibt 2017a: 18–22). To put it poignantly, the capacity of being a social other for another human we carry on our sleeves and only there; it is a capacity that has multiple realizations—otherwise dishonest social signaling would not be possible—and therefore a capacity that can be simulated to a high degree, or even realized, by nonhuman agents. A robot thus might not be able to *greet, wave, smile,* or realize any other social action which requires accompanying mentality, but it can realize being a social other since it can realize the required physical cues that afford being recognized as a social other.

If robots can *be* social others for us in this sense, should we then not drop the quotation marks and treat "social" robots as *bona fide* social agents? Robotics research and industry have long performed this step, canvassing their products in the terms of social roles as "companions," "assistants to care-givers," "personal assistants," "pets," "trainers," "tutors," "guides," or "receptionists." Remarkably, however, and of central importance for the purposes of this chapter, robotics engineers often use mentalist vocabulary, that is, vocabulary for human mental processes, to describe what robots do—here are a few examples (all emphases are supplied):

> A social robot is an autonomous or semi-autonomous robot that interacts and *communicates* with humans by *following the behavioral norms* expected by the people with whom the robot is intended to interact. (Bartneck and Forlizzi 2004: 592)

> Social robots should be *aware of human social rules and norms,* and *grant privilege* to them at all times. When possible, the robot should *be aware of its own social role,* its world knowledge, and what it does not *know*. It must be able to deal with uncertainty, and *adhere to the ethical principle* of least harm. (ibid)

> Social robots are embodied agents that are part of a heterogeneous group: a society of robots or humans.

> They are able to *recognize each other* and engage in social interactions, they possess histories (*perceive and interpret the world in terms of their own experience*), and they

explicitly *communicate* with and *learn* from each other. (Dautenhahn and Billard 1999: 187)

While the researchers use mentalist vocabulary metaphorically in these quotations, as convenient abstractions for the functional similarities between the robot's behavior and human intentional doings and mental capacities, the choice of these metaphors reflects the powerful influence of the traditional—ultimately Cartesian—model of subjectivity that is deeply entrenched in the philosophical theories—metaphysical, ethical and political—of Enlightenment humanism. According to the traditional (Cartesian) model of subjectivity, the faculties and capacities for which philosophy introduced the labels "consciousness," "self-consciousness," "intentionality," "free will," "epistemic and moral autonomy," "normative understanding," "phenomenal experience" (that is, experience of qualitative features, emotions, or feelings), "rationality," "creativity," "sociality," "self-hood" are a *package deal*—if you have one, you have them all, to different degrees of course, but in principle.

In fact, the research discussion in social robotics and HRI displays a curious paradox. While the data of empirical studies on human interactions with "social" robots suggest that these not only simulate but realize the capacity of being a social other–or more briefly, that there is sociality without many other human capacities–these data are discussed on the foil of the traditional notion of subjectivity.

This is not only reflected in the way in which robotics engineers describe what robots do but also in the way in which the research discussion describes what humans "do" in such interactions. Given that on the traditional model of subjectivity sociality and other human capacities are inseparable (setting aside the exceptions of certain pathologies), the treatment of nonhuman agents (e.g., animals) as social others, can only be understood as "anthropomorphism," that is, as the mistaken ascription of human features, including human mental capacities, to something that is not human. That the responses to social robots could be "sociomorphing" rather than "anthropomorphizing" is not considered at all (Seibt 2018). To the contrary, the research discussion abides by the dichotomy that the traditional notion of subjectivity enforces. On the one hand, if human interactions with an agent are social, the agent must be a social other, that is, possess a (passive) capacity for sociality and therefore also all human capacities traditionally associated with subjectivity; on the other hand, if human interactions occur with nonhuman agents, then they cannot be social, since *qua* nonhuman the agent does not have passive or active capacities for sociality, and people engaged in these interactions are "anthropomorphizing" the agent; that is, they perform a classificatory mistake.

Much of the early debate in "robo-ethics"—a new field of applied ethics proposed in 2004 by Gianmarco Verruggio—concentrated on the blameworthiness of human anthropomorphizing of "social" robots, that is, the blameworthiness of duping people into such misclassifications or people's decision to sentimentally indulge in such misclassifications (see, for example, Sparrow and Sparrow 2006; Sharkey and Sharkey 2012). However, without wanting to diminish the significance of these and related early reflections on social robotics, the phenomena of human interactions with "social" robots open up a much deeper theoretical rift and go far beyond ethical concerns. To the extent that

"social" robots trigger the stimuli of, or generate the affordances for, the mechanisms and routines of human (implicit or pre-conscious) social cognition, to the extent that we experience these robots *de facto* as social agents (even though they do not have, nor sufficiently simulate, the capacities and faculties of traditional subjectivity such as consciousness, normative understanding, intentionality, etc.) these machines can be said to realize passive capacities of sociality. To the extent that robots can generate high-grade simulations or even realizations of being social others for humans in some types of social interactions, human interactions with such robots demonstrate that there are social others that are not subjects.

In sum, the phenomena of human interactions with "social" robots as investigated by the empirical studies in HRI, in (neuro-) psychology, cognitive science, and anthropology, reveal that we have good empirical reasons to challenge the traditional assumption that sociality requires subjectivity in the full-blown sense. Once we abandon this assumption the above-mentioned dichotomy—social and human-like capacities vs. non-social and "anthropomorphized"—transforms into a whole array of new pathways. If the ability to enter in social interactions can be separated from other capacities of normative subjects, a host of new research questions arise. If nonhuman agents can be social others, is the sociality with nonhumans of the same type as the sociality with humans? Which and how many of the capacities of traditional subjectivity are required for sociality? If sociality can be realized with non-conscious agents, can we also pry apart rationality from consciousness—which recombinations of the capacities of traditional subject are possible, and what will the new varieties of quasi-subjectivities imply for our ethical theories?

As clear from these examples, the research questions that arise when we move beyond the traditional model of subjectivity are partly empirical and partly conceptual; they need to be addressed on the basis of new formats for interdisciplinary collaborations between researchers from engineering, empirical disciplines such as (neuro-)psychology, sociology, and anthropology, and from Humanities disciplines such as philosophy, design, art, aesthetics, and semiotics. For the case of philosophy, such a collaboration implies a rather fundamental reorientation about the discipline's methods and aspirations, as the following section explains.

3. ROBOPHILOSOPHY—TURNING THE HUMANITIES FROM REFLECTION TO PRO-ACTION

The break-up of the humanist concept of subjectivity, as developed from Descartes to Kant and traded far into the twentieth century, cuts deep into the fabric of our self-understanding and calls for a broad philosophical response. In 2014 the term "robophilosophy" was introduced, together with a biennial conference series (*Robophilosophy Conference Series*), to signal that the phenomena created by social robotics not only present new tasks for ethics but also have conceptual repercussions for many other areas of philosophy, especially ontology, philosophical anthropology, political philosophy, epistemology, philosophy of mind (cognition, aesthetics), philosophy of culture, and philosophy of science. Quite explicitly, the label "robophilosophy" was introduced to mark the fact that the multifaceted challenge

introduced by social robotics "not only pertains to all areas of philosophy but it also throws all areas of philosophy 'into a new key'"—since social robotics "challenges the foundations of the Cartesian paradigm of subjectivity" and "the built-in feature of the traditional Western model of subjectivity that only humans are the kind of entity that can stand in social relations, and that standing in social relations confers these human capacities and the rights and statuses that adhere to them" (Seibt et al. 2014: vii–viii). Initially robophilosophy was focused on the reflective tasks arising with the collapse of the traditional link between sociality and subjectivity—e.g., for both analytical and continental philosophy, the task of clarifying the repercussions for the conceptual foundation of moral and political authority in Western democracies; or to use another example, for analytical philosophy in particular to come to grips with the question of

> how to exclude robots from the community of thinkers, now, when we have accustomed ourselves to describe the human mind in terms evolutionary algorithms, neural nets, dynamic systems, complexity, Bayesian updating, mechanisms; have we not roboticized the human mind to an extent that we are now forced to consider robots our functional equals, in principle at least? (Seibt et al. 2014)

However, from the very beginning it was also clear that robophilosophy had to be more than the usual reflective enterprise familiar from philosophy of culture. In other words, from the beginning it was clear that robophilosophy would be "philosophy *of* social robotics," but it needed to be more than that.

Given that the phenomena of social robotics challenge central conceptual tools of the philosophical tradition, it was apparent that robophilosophers need to join interdisciplinary research teams in social robotics and HRI in order to forge new, empirically informed concepts of analysis, and preferably a conceptual framework that could be used for the interdisciplinary integration of HRI research. For example, philosophers could offer diversifications of the notion of agency (Misselhorn 2015) that would allow for precise classifications of forms of collaborations among natural and artificial agents (Fiebich et al. 2015; Fiebich 2017; Salice and Michael 2017; Seibt 2018a). In particular, prompted by the new phenomena of human interactions with social robots, philosophers could contribute to HRI research by clarifying different levels of normative understanding (Brandl and Esken 2017) or develop classifications of simulations and descriptive frameworks for "asymmetric social interactions" (Seibt 2017a, 2014 and forthcoming), that is, interactions with asymmetric distribution of capacities for the realization of parts of a social interactions. In other words, it was clear that robophilosophy would be "philosophy *for* social robotics," and yet it needed to be more than that.

The very fact that the traditional model of subjectivity is shaken up by the empirical data on social otherness without subjectivity immediately also suggested that in the context of HRI research a new avenue for experimental philosophy would open up. As members of interdisciplinary research teams on social robotics applications, robophilosophers are in the position to leave their armchairs and investigate questions about dependence relations between concepts ("can we rationally apply the concept of 'friend' to anything that is not

capable of feeling?"; "is an agent that deduces decisions, instead of using 'judgment', ever a 'moral agent'?") by *construction* rather than by the introspective rehearsals of conceptual norms. Creating systematic variations of robotic affordances and investigating human responses to these, philosophers can clarify the structure and plasticity of conceptual contents on better methodological grounds than merely referring to the assumed joint agreement on "what we would (not) say."

The construction of social robots not only provides a new testbed for philosophical claims about the structure of human capacities, it also can be undertaken in ways that reach into the deeper cognitive modes where human nature is disclosed, in the technical sense of Heidegger's philosophy. Androids fulfill in relevant regards the epistemic role of a work of art—they are technology offering us insights into (the dissolution of) human essence in ways that are crucially different from what industrial technologies reveal about human nature and might in fact save us from technocratic enframings (Nørskov et al., forthcoming). Finally, social robotics also opens up new pathways for philosophers to proof proposals about a capacity by construction—for example, by discussing software architectures, philosophers and robotics engineers can investigate together what is in involved in "phronesis," the cognitive capacity of (ethical) judgment that traditionally has been distinguished from deduction (Sullins 2005, 2019; Kuipers 2016). Thus, robophilosophy is not only philosophy *of* social robotics, and *for* social robotics, it is also philosophy *by* social robotics—in fact, social robotics can be considered as a new mode of doing philosophy by experiment and construction, and by phenomenological exploration of a new type of (self-) encounter.

In order to summarize the multifaceted engagements of the new field, robophilosophy was defined as philosophy of, for, and by social robotics (Seibt 2017b). However, it is important to note that even the reflective tasks of robophilosophy, even when it is philosophy *of* social robotics, are undertaken with a view to contributing to the regulation, that is, policy and legislation, of social robotics applications. While this as such may not be out of the ordinary —there other fields of applied research in philosophy—the underlying reasoning for this practical orientation of robophilosophy is rather unique. Currently social robotics and human interaction research are caught in a triple gridlock where the cycle between regulation (of social robotics experiments and applications), description (of human interactions with social robotics), and evaluations (of risks and benefits of such interactions) is blocked at the first link—for ethical reasons, the effects of long-term use of social robotics cannot be investigated, which hampers description, evaluation, and research-based regulation of applications (Seibt et al. 2016). This triple gridlock is an exacerbated form of the Collingridge dilemma that arises the benefits and disvalues of introducing a technology into society can only be assessed at a time when the technology can no longer be extracted (Collingridge 1980). The practically rational way of reacting to this type of situation is by adopting design strategies that are guided or even fully determined by value-theoretic considerations rather than by utilities. (Friedman et al. 2006; Van den Hoven 2013; van de Poel 2015; Seibt et al. 2020).

Briefly, if the triple gridlock of social robotics can be sidestepped or at least mitigated by a form of value-driven technology development, philosophy and other Humanities receive a new pro-active role in the value-theoretic analyses of application contexts. Significantly, the

values that enter in these axiological analyses of human social interactions with robots are not unreflectedly imported from the tradition but reworked in view of the challenge that robots present to the idea of human nature. Even though robots currently do not pass for human beings yet ("Turing test"), the possibility of a complete functional replication of human abilities influences the ranking of our values—the authentic performance of a low skill might seem preferable to the simulation of a high skill, or the other way round. It is in these negotiations of ethical, existential, social, cultural, and instrumental values of social robotics applications, of the design and placement of artificial social agents, that the Humanities are beginning to remake human nature—context-bound, with continuous feedback from the praxis of our experience within and of human social interactions with robots.

In sum, social robotics forces posthumanism to leave behind the secure position of the reflective commentator and "to get real" —the contextual, dynamic negotiations of values required for the responsible creation of artificial social others not only proclaim the reconceptualization of human nature, they literally *remake* human nature, since they are translated into concrete social interactions. Such remakings are normative, shaping the robotic moment into "who we *should* be willing to become," and saddle the Humanities and its critical self-reflection with new—and rather frightening—responsibilities.

---

ee the IEEE Global Initiative on Ethics of Autonomous and Digital systems, https://ethicsinaction.ieee.org/, accessed October 1, 2019, and the Foundation for Responsible Robotics, http://responsiblerobotics.org, Accessed on October 1, 2019.

hile a robot has no "Leib" (lived body), given that this would require a certain phenomenology, the expressive "body language" of a robot can in principle be functionally identical to that of a human (I thank Jacob Wamberg for helping me to clarify this point).

SOURCES CITED

Barrat, James. *Our Final Invention: Artificial Intelligence and the End of the Human Era*. New York: Thomas Dunne Books, 2013.

Bartneck, Christoph, and J. Forlizzi. "A Design-Centred Framework for Social Human-Robot Interaction." *RO-MAN 2004. 13th IEEE International Workshop on Robot and Human Interactive Communication (IEEE Catalog No.04TH8759)*, IEEE, 2004, pp. 591–94.

Bartneck, Christoph, and Jun Hu. "Exploring the Abuse of Robots." *Interaction Studies*, vol. 9, no. 3 (2008): 415–33.

Brandl, Johannes L., and Frank Esken. "The Problem of Understanding Social Norms and What It Would Take for Robots to Solve It." In *Sociality and Normativity for Robots*, edited by R. Hakli and J. Seibt. Cham: Springer, 2017, pp. 201–15.

Breazeal, Cynthia. *Designing Sociable Robots*. Boston: MIT Press, 2002.

Breazeal, Cynthia. "Toward Sociable Robots." *Robotics and Autonomous Systems*, vol. 42, no. 3–4 (2003): 167–75.

Bringsjord, Selmer, and Naveen Sundaar Govindarajulu. "Artificial Intelligence." *Stanford Encyclopedia in Philosophy*, Fall 2018 edition, edited by Edward Zalta, 2018, https://plato.stanford.edu/cgi-bin/encyclopedia/archinfo.cgi?entry=artificial-intelligence.

Brooks, Rodney et al. "The Cog Project: Building Humanoid Robots." In *Computation for Metaphors, Analogy, and Agents*, edited by C. Nehaniv. New York: Springer, 1999, pp. 52–87.

Chaminade, Thierry et al. "Brain Response to a Humanoid Robot in Areas Implicated in the Perception of Human Emotional Gestures." *PloS One*, vol. 5, no. 7 (2010a): e11577.

Chaminade, Thierry. "Brain Response to a Humanoid Robot in Areas Implicated in the Perception of Human Emotional

Gestures." *PLoS One*, vol. 5, no. 7 (2010b): e11577.

Coeckelbergh, Mark. *Growing Moral Relations: Critique of Moral Status Ascription*. London: Palgrave Macmillan, 2012.

Collingridge, David. *The Social Control of Technology*. New York: St. Martin's Press, 1980.

Darling, Kate, Palash Nandy, and Cynthia Breazeal. "Empathic concern and the effect of stories in human-robot interaction." 2015 24th IEEE international symposium on robot and human interactive communication (RO-MAN). IEEE, 2015, 770–5.

Dautenhahn, Kerstin. "Socially Intelligent Robots: Dimensions of Human–Robot Interaction." *Philosophical Transactions of the Royal Society B: Biological Sciences,* vol. 362, no. 1480 (April 2007): 679–704.

Dautenhahn, Kerstin, and Aude Billard. "Studying Robot Social Cognition within a Developmental Psychology Framework." *Advanced Mobile Robots, 1999. (Eurobot'99) 1999 Third European Workshop On*, IEEE, 1999, pp. 187–94.

Duffy, Brian R., et al. "What Is a Social Robot?" *10th Irish Conference on Artificial Intelligence & Cognitive Science,* University College Cork, Ireland, September 1–3, 1999.

Duffy, Brian R., and Karolina Zawieska. *Suspension of Disbelief in Social Robotics*. IEEE, 2012, pp. 484–9.

Fiebich, Anika et al. "Cooperation with Robots? A Two-Dimensional Approach." In *Collective Agency and Cooperation in Natural and Artificial Systems*, edited by C. Misselhorn. Cham: Springer, 2015, pp. 25–43.

Fiebich, Anika, "Social Cognition, Empathy and Agent-Specificities in Cooperation." *Topoi*, 2017, pp. 1–10.

Fong, T. et al. "A Survey of Socially Interactive Robots." *Robotics and Autonomous Systems*, vol. 42, no. 1-3 (2003): 143–66.

Friedman, B., P. H. Kahn Jr, A. Borning, and P. H. Kahn. *Value Sensitive Design and Information Systems. Human-Computer Interaction and Management Information Systems: Foundations*. New York: ME Sharpe, 2006, pp. 348–72.

Fukuyama, Francis. "*Our Posthuman Future": Biotechnology as a Threat to Human Nature*. 2002.

Gazzola, Valeria et al. "The Anthropomorphic Brain: The Mirror Neuron System Responds to Human and Robotic Actions." *Neuroimage*, vol. 35, no. 4 (2007): 1674–84.

Gunkel, D. *The Machine Question*. Boston: MIT Press, 2012.

Gunkel, David J. *Robot Rights*. Boston: MIT Press, 2018.

Hayles, N. Katherine. *How We Became Posthuman: Virtual Bodies in Cybernetics, Literature, and Informatics*. Chicago: University of Chicago Press, 2008.

Kahn, Peter H., et al. "Social and Moral Relationships with Robotic Others?" *Robot and Human Interactive Communication, 2004. ROMAN 2004. 13th IEEE International Workshop On,* IEEE, 2004, pp. 545–50.

Kahn Jr, Peter H., Takayuki Kanda, Hiroshi Ishiguro, Nathan G. Freier et al. "'Robovie, You'll Have to Go into the Closet Now': Children's Social and Moral Relationships with a Humanoid Robot."*Developmental Psychology*, vol. 48, no. 2 (2012): 303.

Kahn Jr, Peter H., Takayuki Kanda, Hiroshi Ishiguro, Brian T. Gill, et al. "Will People Keep the Secret of a Humanoid Robot?: Psychological Intimacy in HRI." *Proceedings of the Tenth Annual ACM/IEEE International Conference on Human-Robot Interaction*, ACM, 2015, pp. 173–80.

Knox, Elena, and Katsumi Watanabe. "AIBO Robot Mortuary Rites in the Japanese Cultural Context." *2018 IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*, IEEE, 2018, pp. 2020–25.

Krach, Sören et al. "Can Machines Think? Interaction and Perspective Taking with Robots Investigated via FMRI." *PloS One*, vol. 3, no. 7 (2008): e2597.

Kulić, Dana, and Elizabeth Croft. "Physiological and Subjective Responses to Articulated Robot Motion." *Robotica,* vol. 25, no. 1 (2007): 13–27.

Kuipers, Benjamin. *Human-like Morality and Ethics for Robots*. 2016.

Mathur, Maya B., and David B. Reichling. "Navigating a Social World with Robot Partners: A Quantitative Cartography of the Uncanny Valley." *Cognition*, vol. 146 (January 2016): 22–32.

McKinsey Global Institute. *A Future That Works—Employment, Automation, Productivity*. [24] McKinsey Global Institute, A Future that Works, Automation, Employment and Productivity, 2017, https://www.mckinsey.com/mgi/overview/2017-in-review/automation-and-the-future-of-work/a-future-that-works-automation-employment-and-productivity.

Miah, Andy. "A Critical History of Posthumanism." In *Medical Enhancement and Posthumanity*, edited by Bert Gordijn, and Ruth F. Chadwick. Dordrecht: Springer, 2008, pp. 71–94.

Misselhorn, Catrin. *Collective Agency and Cooperation in Natural and Artificial Systems: Explanation, Implementation and Simulation*, vol. 122. Cham: Springer, 2015.

Mori, Masahiro et al. "The Uncanny Valley: The Original Essay by Masahiro Mori." *IEEE Spectrum*, (2012): 98–100. https://spectrum.ieee.org/automaton/robotics/humanoids/the-uncanny-valley posted June 12, 2012.

Nørskov, Marco et al."Android Philosophy and Android Literacy." In *Robophilosophy—Philosophy of, for, and by Social Robotics*, edited by J. Seibt, R. Hakli, and M. Nørskov. Cambridge, MA: MIT Press, forthcoming.

Rosenthal-von der Pütten, Astrid M et al. "An Experimental Study on Emotional Reactions towards a Robot." *International Journal of Social Robotics*, vol. 5, no. 1 (2013): 17–34.

Salice, Alessandro, and John Michael. "Joint Commitments and Group Identification in Human-Robot Interaction." In *Sociality and Normativity for Robots*, edited by R. Hakli and J. Seibt. Cham: Springer, 2017, pp. 179–99.

Scassellati, Brian. "Theory of Mind for a Humanoid Robot." *Autonomous Robots*, vol. 12, no. 1 (2002): 13–24.

Searle, John R. "Minds, Brains, and Programs." *Behavioral and Brain Sciences*, vol. 3, no. 3 (1980): 417–24.

Searle, John R., and S. Willis. *Minds, Brains, and Science*. Boston: Harvard University Press, 1984.

Seibt, Johanna. "Varieties of the 'as if': Five Ways to Simulate an Action." In *Sociable Robots and the Future of Social Relations. Proceedings of Robo-Philosophy 2014*, edited by J. Seibt, R. Hakli, and M. Nørskov. Amsterdam: IOS Press, 2014, pp. 97–105.

Seibt, Johanna. "Integrative Social Robotics—A New Method Paradigm to Solve the Description Problem and the Regulation Problem?" *What Social Robots Can and Should Do—Proceedings of Robophilosophy/TRANSOR 2016*, J. Seibt, M. Nørskov, S. Schack Andersen/IOS Press, 2016, pp. 104–14.

Seibt, Johanna. "Towards an Ontology of Simulated Social Interaction: Varieties of the 'as if' for Robots and Humans." In *Sociality and Normativity for Robots*, edited by R. Hakli and J. Seibt. Cham: Springer, 2017a, pp. 11–39.

Seibt, Johanna. "Robophilosophy." In *Posthuman Glossary,* edited by R. Braidotti and M. Hlavajova. London: Bloomsbury, 2017b, pp. 390–94.

Seibt, Johanna. "Classifying Forms and Modes of Co-Working in the Ontology of Asymmetric Social Interactions (OASIS)." In *Envisioning Robots in Society—Proceedings of Robophilosophy 2018*, edited by M. Coeckelbergh, J. Loh, M. Funk, J. Seibt, and M. Nørskov. Amsterdam: IOS Press, 2018, pp. 133–46.

Seibt, Johanna. "The Ontology of Asymmetric Social Interactions (OASIS)—A Descriptive Framework for Integrating Interdisciplinary Research on Human 'Social' Interactions with Robots." In *Robophilosophy—Philosophy of, for, and by Social Robotics*, edited by J. Seibt, R. Hakli, and M. Nørskov. Boston: MIT Press, forthcoming.

Seibt, Johanna, Raul Hakli, and Marco Nørskov, eds. *Sociable Robots and the Future of Social Relations. Proceedings of Robo-Philosophy 2014*. Amsterdam: IOS Press, 2014.

Seibt, Johanna, Malene F. Damholdt, and Christina Vestergaard. "Integrative Social Robotics, Value-Driven Design, and Transdisciplinarity." *Interaction Studies*, 2019, forthcoming.

Sharkey, A., and N. Sharkey. "Granny and the Robots: Ethical Issues in Robot Care for the Elderly." *Ethics and Information Technology*, vol. 14, no. 1 (2010): 27–40.

Sparrow, Robert, and Linda Sparrow. "In the Hands of Machines? The Future of Aged Care." *Minds and Machines,* vol. 16, no. 2 (October 2006): 141–61.

Stanley, James et al. "How Instructions Modify Perception: An FMRI Study Investigating Brain Areas Involved in Attributing Human Agency."*Neuroimage*, vol. 52, no. 1 (2010): 389–400.

Sullins, John P. "Ethics and Artificial Life: From Modeling to Moral Agents." *Ethics and Information Technology*, vol. 7, no. 3 (2005): 139–48.

Sullins, John P. "The Role of Consciousness and Artificial Phronēsis in AI Ethical Reasoning." *AAAI Spring Symposium: Towards Conscious AI Systems*, 2019.

Turkle, Sherry. *Alone Together*. New York: Basic Books, 2011.

van de Poel, Ibo. "Design for Values." In *Social Responsibility and Science Innovation Economy*, edited by P. Kawalec and R. P. Wierzchoslawski, Lublin: Learned Society of KUL & John Paul II Catholic University of Lublin, 2015, pp. 115–65.

Van den Hoven, Jeroen. "Value Sensitive Design and Responsible Innovation." In *Responsible Innovation: Managing the Responsible Emergence of Science and Innovation in Society*. Edited by R. Owen, J. R. Bessnat, M. Heintz, Chichester: John Wiley & Sons, 2013, pp. 75–83.

Wiese, Eva, Agnieszka Wykowska, et al. *Making Eyes with Robots: Readiness to Engage in Human-Robot-Interaction Depends on the Attribution of Intentionality*, vol. 57. Los Angeles, CA: Sage, 2013, pp. 1174–8.

Wiese, Eva, Abdulaziz Abubshait et al. "Brain Stimulation to Left Prefrontal Cortex Modulates Attentional Orienting to Gaze Cues." *Philosophical Transactions of the Royal Society B: Biological Sciences,* vol. 374, no. 1771 (April 2019): 20180430.

Wykowska, Agnieszka et al. "Embodied Artificial Agents for Understanding Human Social Cognition." *Philosophical Transactions of the Royal Society B*, vol. 371, no. 1693 (2016): 20150375.

Złotowski, Jakub et al. "Anthropomorphism: Opportunities and Challenges in Human–Robot Interaction." *International Journal of Social Robotics*, vol. 7, no. 3 (June 2015): 347–60.

CHAPTER TWENTY-THREE

Posthumanist Learning and Education

CATHRINE HASSE

Posthumanism in general entails a new view on humans that has recently become a focus of the educational sciences. This entry explores the implications for both learning theory in general and education in particular following two approaches to the "posthuman turn."

One approach to posthumanism in learning and education is the posthuman, which emerges and develops in line with new technological possibilities. The "posthuman" is basically a trope of the human as a liberal, intelligent being that can be materially enhanced and improved through technologies.

Another approach to posthumanism is conceptual. Here the posthuman refers to new theories about what a human is. This posthumanist theoretical approach is in many ways a showdown with the understanding of humans prevailing in the enhancement discourse. Therefore, I propose to make explicit that in learning and education, the posthuman and posthumanist theories are two separate (and sometimes contradictory) approaches, each in its own way working toward new definitions of what humans are and can become. One aims at technological enhancements, and the other at a new theoretical understanding of humans and their place in the universe. The first approach, the posthuman, places humans at the center of everything, as the future is expected to replace super intelligent humans by even more intelligent cyborgs or machines. The second approach has anti-humanist roots, reacting to theories about humans being at the center of the universe. However, both approaches have problematic implications for how we understand learning in education.

THE POSTHUMAN ENHANCEMENT

The posthuman as a material enhancement of humans is a kind of technology-merged cyborgian figure that moves, through different transhumanist phases, toward a singularity where "the Enlightenment human" is replaced by "the posthuman" (e.g., Kurzweil 2005). The Enlightenment human was based on the understanding of humans as reason-based and above all other vital but non-rational life forces due to their intelligence (Braidotti 2013).

New technologies such as robots, artificial intelligence (AI), prosthetic limbs, virtual reality (VR), and genetic enhancement have all played a part in transhumanist fantasies about the transformations of humans (e.g., More and Vita-More 2013). In relation to education, these "toward-the-posthuman" enhancements are, for instance, smart drugs that make you pass exams easily or an improvement of your genes so that you become better at grasping math. This posthuman approach to learning and education is basically an enhancement approach that uses technology to improve human learning. This should be no problem as education already is an enhancement technology in itself (e.g., Sorgner 2015). For a long time, experiments have been conducted with applications that offer to replace teachers with robotic direct feedback and tutoring (e.g., Psotka, Massey and Mutter 1998), but the new technologies—from apps to smart drugs—make more disruptive interventions than ever before. Schools and universities may even disappear as technology increasingly is meant to enhance human learning on an individual basis. AI directs feedback and tutoring through robotic devices. These "teachers" can be hardwired, but are increasingly brain-based bio-social technologies (e.g., offered by IBM and Pearson, see Williamson et al. 2018).

One of the novel aspects of the posthuman "enhancement" approaches is that they are expected to eliminate the traditional understanding of education as a teleological practice that qualifies, socializes, and subjectifies through a process of systematic teaching, as argued by the educational philosopher Gert Biesta. This implies that human teachers and their judgments are no longer needed in institutions such as schools or universities, where "the point of education is that students learn something, that they learn it for a reason, and that they learn it from someone" (Biesta 2015: 76). According to the enhancement approach, rational humans can become more rational thinkers by making use of drugs and by supervising and evaluating machines whose intelligence already surpasses humans and eventually renders their learning (to become more rational and intelligent) superfluous when they merge with machines that can do the thinking for them (as argued in Kurzweil 2005). This posthuman approach to learning and education has mainly shown an interest in, and built on, the cognitive, behavioral, and constructivist aspects of learning theory prevalent in the so-called STEM areas of teaching (science, technology, engineering, and mathematics), where "the figure of 'Man' naturally stands at the center of things; is entirely distinct from animals, machines, and other nonhuman entities; is absolutely known and knowable to 'himself'; is the origin of meaning and history; and shares with all other human beings a universal essence" (Badmington 2004: 1345).

This Enlightenment Man was an epitome of the humanism that exploded as a secular rational logic after the Renaissance:

> If God is a deus absconditas, then the meaning of life has to be found in human pursuits. Out of this nexus, which included the beginnings of Western colonialism and racial slavery, was born the idea that we must pursue becoming "fully human" (an idea[l] whose contents shifted fairly dramatically across different historical contexts and registers). In concert with an explosion of technological invention (including modern medicine), the dialectical borders of the human were slightly redrawn. As secular, modern, scientific capitalism decentered religious thought (an uneven and unfinished decentering to be sure), the pressure on the boundary with the divine was eased, and the human had to be more carefully distinguished from the animal and the machine. (Snaza et al. 2014: 42)

Humans enhancement toward the posthuman means enhancing all the characteristics of the Enlightenment human—a rational, liberal, logical being which may be connected and improved. This Enlightenment human was seen as severed from nature, and now the posthuman brings culture even further as the machine, created by intelligent humans, becomes merged with the feeble human flesh.

In education, a posthuman approach, as proposed by e.g., the Singularity University (founded by, among others, the Google director of engineering Ray Kurzweil), means enhancing education with as much enhancement technology as possible. This educational initiative belongs to what Stefan Herbrechter calls the "new powerful idealisms around new technologies" connected to

> the whole transhumanist movement and all those people who try to flip our inherent fear of technology into a kind of enthusiasm or techno-utopia, so that we embrace technological development as a means of turning humans into enhanced beings or into some kind of gods who enjoy immortality. Usually these idealisms (following a Christian and Cartesian trajectory of a strict separation between mind and body) are directly connected to desires of disembodiment; they are thus directed against our biological, material, animal or "natural" bodies. (Herbrechter 2018: 2)

HUMAN/NON-HUMAN ASSEMBLAGES

Another, and in some ways different, approach to posthumanism is found in *posthumanist* theories. These theories often undercut the basic assumptions about the character of education found in the *posthuman* approach: that human learners are privileged, stand-alone, rational, liberal, intelligent individuals to be enhanced by smarter technology.

Inspired by theories emphasizing the importance of nonhumans, notably Kathrine Hayles's discussion about the cybernetic posthuman (1999), Karen Barad's posthumanism (2007), and Bruno Latour's flat ontology (1993), a new understanding of humans emerges.

These humans cannot be separated from networks or ecologies where the humans are granted no privileged position (Bayne 2018). The human subject, which in the humanist tradition was perceived as a rational, selfmotivated, liberal, self-directing individual, is replaced by an entangled human-non-human assemblage (Edwards 2010). In education, these

new posthumanist theories of humans have by now gained some attention, although it has taken some time for the educational sciences to reach what Nathan Snaza and his colleagues have called "the shockwaves" of posthumanist discourse (Snaza et al. 2014: 40).

The debate among posthumanist educators centers on at least two basic themes:

1. Does the new approach bring an end to education (here posthumanists side with the transhumanists albeit for different reasons)?
2. Does the new approach mean that we can get rid of the concept of learning all together?

Various educational centers have met the challenge with research programs and projects addressing the issues raised by the new approach (e.g., the School of Education, University of Edinburgh; the Department of Pedagogical, Curricular and Professional Studies, University of Gothenburg; the Department of Education, University of Alberta; the Department of English, University of Richmond; the School of Education, Curriculum Studies at Georgia Southern University; Stirling University; and the Department of Education, Aarhus University), resulting in a number of publications (e.g., Edwards 2010; Lewis and Kahn 2010; Pedersen 2010, 2015; Weaver 2010; Taguchi and Palmer 2013; Juelskjær 2014; Knox 2014; Hasse 2015, 2020; Snaza and Weaver 2015; Ceder 2015; Adams and Thompson 2016; Snaza 2017; Wallin 2017; Bayne 2018).

Albeit with different takes on the matter, the posthumanist authors offer a critical view on education. From a superficial point of view, the technological disruption and the new posthumanist theories seem to work toward the same goal. However, a closer look reveals that the liberal posthuman, to be enhanced by technologies, is very far from the critical potential offered by these theories. We do not need technological enhancements, but a more inclusive thinking about ourselves in the world.

Tylor Lewis and Richard Kahn, for instance, argue (with Giorgio Agamben) that education has worked as a mechanism for inclusion of "appropriate" citizens and exclusion of the uneducable monstrous others such as *Homo ferus* (Lewis and Kahn 2010). Posthumanism can transform this kind of educational practice by raising awareness of the nature of the prevalent humanist discourse in educational practice and research, and by proposing a reframing of education that emphasizes how "we are always already related to animals, machines, and things within life in schools at the K-12 and university levels" (Snaza et al. 2014: 40). Building on these two insights, Nathan Snaza and his colleagues suggest that that will lead to a new posthumanist direction "in research, curriculum design, and pedagogical practice" (40).

However, others are more radical in the evaluation of the impact of posthumanist theory—and apparently side with the enhancement approach. They suggest that posthumanism will render education (and curriculum) as we know it superfluous. However, a closer look again reveals an entirely different agenda.

Beginning with William Spanos's book from 1993, *The End of Education: Toward Posthumanism* (Spanos 1993), revised in 2015 (Spanos 2015), posthumanist theorizing has been critical of the very notion of education as inherently liberal and humanist.

Humanist education reflects a self-identical concept of Man as a "mirror image of the Self-identical God they were ostensibly rejecting. In the period of the Enlightenment (modernity), the Theo*logos* became the Anthropo*logos*" (Spanos 2015: 17).

From God being the measure of all things, Man became the measure of all things in an education built on a humanist ontology which evened out diversity and privileged educational unity across the globe. Math is math and physics is physics. This notion of a curricular unity has, however, been questioned by many in science and technology studies as well as in postcolonial studies (notably in Helen Verran's work on physics education in a Nigerian context, Verran 2001).

When posthumanism undoes the human subject relied on in education, does that mean the end of education?

Stefan Herbrechter considers the question about the "end of education" a thoroughly humanist obsession (Herbrechter 2018). Instead of giving up education all together, posthumanists in general propose a new approach to the curriculum: what is to be learned is a decentering of human perspectives, as well as learning to take the perspectives of other living creatures (e.g., Dinker and Pedersen 2016). The emphasis is not on a subject learning something, but rather on tinkering and experimentations (Edwards 2012, 2015) with a focus on materials (Fenwick et al. 2011).

Technology is not excluded, but contrary to the posthuman perspective, the approach is not imbued with techno-idealism and notions of self-directed, individual learning. However, technology is not considered a threat either, as in some "humanist" perspectives on education where machines are seen as creating problems for human learning (e.g., Selwyn 2016). Instead, education should emphasize an inclusion which does not operate based on fixed boundaries, such as nature-culture, human-machine. etc., but rather stresses that education should

> promote a being-with environments, plants, animals, bacteria, minerals, objects, machines … and also humans. These are the metaphysical, ontological, ethical and political stakes if we want to develop a new, a better and more ecological relationship with our planet. (Herbrechter 2018: 3)

END OF LEARNING?

In relation to learning and education, posthumanism has raised new questions about what it is to "learn." It has begun questioning *learning theory* from a posthumanist perspective (e.g., Snaza 2017).

Contrary to what one would expect, learning theory is not often discussed in the educational sciences, and the posthumanist debates on education are no exception. When learning is debated, it is as what Biesta has referred to as "learnification," which makes education an "economic transaction":

> [A] transaction in which (i) the learner is the (potential) consumer, the one who has certain needs, in which (ii) the teacher, the educator, or the educational institution

becomes the provider, that is, the one who is there to meet the needs of the learner, and where (iii) education itself becomes a commodity to be provided or delivered by the teacher or educational institution and to be consumed by the learner. (Biesta 2005: 58)

"Learnification" fits perfectly with an approach to education that emphasizes learning through technological enhancements. However, the posthumanist Richard Edwards disrupted the "learning as enhancement" discourse when he in 2010 argued that the posthumanist approach meant getting rid of lifelong learning all together (Edwards 2010). Inspired by the posthumanist feminist Karen Barad (2007) and Bruno Latour (1993), Edwards argued that:

[E]ducation has focused on the learning subject as a result of an a priori assumption of a separation of matter from meaning, the object from the subject. By contrast, a post-human intervention points to the constant material entanglement of the human and nonhuman in the enactment of the world, and thus the problematic status of subjects and objects as separate from one another. (Edwards 2010: 5)

He further suggests that posthumanism "could signal the end of lifelong learning" (5). As noted by Siân Bayne, that raises fundamental questions about the ways in which we understand the human subject of education. Bayne criticizes technology-enhanced learning for its individualism—as when students' performances are algorithmically noted, and evaluated individually (Bayne 2014). Here learning is supposed to take place in a subject learning about an object (as also noted by Edwards 2010).

In the posthumanist discourse, inspired by among others Barad, the context, the subjects, and the materials co-constitute each other in ongoing processes which render references to an a priori split between subjects and objects and between society and technology a matter of discourse meeting materials. In this relational ontology, the separation does not preexist relations, but constitutes relations from within phenomena (Barad 2007).

In many ways, however, the posthumanist relational ontology runs into problems when learning *theory* is included. Within a posthumanist approach, there is some kind of entity which we may call a human or a subject that is co-constituted with materials. It is this entity Edwards envisions as experimenting rather than learning, and other posthumanists, like Simon Ceder, have envisioned as acknowledging the world as "intelligible" (2015). Siân Bayne argues that "human" functions (like learning): "[a]re not pre-existing attributes of the individual separable from its social and material contexts, but are rather brought into being via a complex assemblage of the human and the non-human" (Bayne 2014: 11).

Learning is an effect, she argues, of the material, human, and nonhuman networks that both identify something as "learning" and deem it worthwhile. In this view, learning is not just a question of enhancement through technologies, but rather "learning, teaching and all associated academic practices are dependent on and enacted through the material contexts—including digital technologies—with which they are enmeshed" (11).

According to the above arguments, the changes that previously took place in an individual, separated from the objects to be learned about, can in posthumanist learning theory be seen as a change in network or entanglement *relations* between humans and nonhumans. The

tendency in both the posthumanist and posthuman approach is to see humans as "impersonal" and without including psychology. In the words of Helena Pedersen and Barbara Pini:

> We must begin—as newcomers—to read: Read closely the epistemologies that ground our "old" humanist knowledge projects in order to really understand new ontologies and theories and realize the shock of working in an image of thought where life and research is impersonal, not subject- or self-centered. We might not yet have figured out what this actually means. (Pedersen and Pini 2017: 1053)

If we dive deeper into learning theory, this posthumanist approach to learning is, like behaviorism previously, not interested in or does not acknowledge the psychological processes that are experienced by a person who previously learned something new. However, for something to be intelligible to someone, and for someone to "experiment" with something, we need to acknowledge that previous learning is also important for relations. Previous learning is a psychological process that makes humans perceive and recognize the world as something in particular. Humans, although bounded, do not meet the world with the empty, algorithmic curiosity of machines—but with their embodied learning that together with nonhumans brings out potentials (Hasse 2020).

Learning is not (just) about education, but it is a basic process that makes humans (as well as some nonhumans) recognize the world and each other as something in particular. If we, as Edwards suggests, discard references to learning, the embodied person with previous experiences is excluded from posthumanist theories. This may be a problematic stance as it indicates that we all have equal opportunity to engage and experiment with, for example, the technological enhancements offered—that there are no previous learning experiences tied to experimentation in particular situations. As a political project, excluding psychological processes from situations in which humans and nonhumans form assemblages eradicates the awareness of the different conditions and unequal potentials humans have for engaging in assemblages. In other words: where is psychology in posthumanist theory? Why should a psychology that refuses to separate human subjects from human objects be unthinkable? Any educational, experimental, and intelligible change in an assemblage involves humans with previous learning experiences (if this were not so, there could be no experiments, only impersonal "empty" agency). Do we really want to acknowledge the posthuman agenda that humans are impersonal, and therefore can be enhanced and eventually surpassed by machines?

CRITICAL POSTHUMANISM?

Posthumanism sometimes comes with the prefix "critical." This refers to the posthumanist critique of the Man as the measure of all things, but it also offers a critique of global capitalism, the factors behind the Anthropocene, and even a (self-)critique of posthumanism itself (Braidotti 2018; Herbrechter 2018).

In this critical approach, Braidotti (2013), for example, suggests that we do not need to abandon the notion of human subjectivity but rather re-think it in radically posthumanist

terms. She proposes a shift from what she calls "unitary to nomadic subjectivity as a strategy for rejecting both humanist individualism, and the relativism of anti-humanism" (49). In Stefan Herbrechter's words, the liberal humanist self refers to the idea that humans share some kind of human nature which allows them to make more or less free choices, leading to the idea of a moral human being that should recognize the innate humanity of other human beings, and should therefore make the right decisions and show solidarity with other humans and so on. If this sort of humanist notion of a subject is in deep trouble, the question arises of what to replace it with (Herbrechter 2018: 3).

One way to look at learning through critical posthumanism is by exploring what happens when children experiment with new technologies (like computer-driven software) in school.

Technology-enhanced learning has exploded in parallel with posthumanist approaches, particularly in Asian and Western education (Bayne 2014). Most of these technologies are created to enhance pupils' learning in an instrumental and humanist manner, as they build on the idea of a human +. Here a human + a tool constitutes the road to a posthuman future (e.g., Mahon 2017: 12). The learning theory that goes into the creation of these technologies is often inspired by the genetic epistemologist Jean Piaget, who became the teacher of one of the most influential figures in technology development, Seymour Papert. Papert co-founded with Marvin Minsky and Nicolas Negroponte the Media Lab at Massachusetts Institute of Technology (MIT). Here he developed ideas about learning through making and experimenting.

Edwards's ideas of a school of experimentation (Edwards 2012, 2015) seem to be in line with much of what Papert developed at MIT. However, Papert also recognized that from a learning perspective, it is not so easy to just ask children to experiment even with available technological tools. He therefore had to develop a new theory of learning more in line with what he saw in schools:

> Jean Piaget's very strong idea that all learning takes place by discovery is emasculated by its translation into the common practice known in schools as "discovery learning." It is disempowered in part because discovery stops being discovery when it is orchestrated to happen on the preset agenda of a curriculum but also in large part because the ideas being learned are disempowered. (Papert 2000: 722)

Critical posthumanism has been critical of how technology-enhanced education (e.g., MOOCs, Massive, Open Online Courses) is inherently humanist and relies on a notion of individuals who are separated from technologies (Bayne 2014; Knox 2016).

In Papert's own accounts, some children simply do not like technology and stay away from the computers when the rest of the class engages in experiments. This was what happened to Debbie learning "fractions":

> At first Debbie was reluctant to participate. She hated fractions and asked to be allowed to use her computer time to illustrate poems she had written, and for the first weeks of the year she did this. Then one day she wrote in the journal the students were required to keep: "Fractions are everywhere!!! You can put them on anything!!!" That this had

come as a surprising "aha" was clear from the exclamation points, the size and form of the writing, and the fact that it energized her to begin a project that would occupy her for the next few months. Her goal was to "teach" the world to see fractions as she now saw them: no longer boring marks on paper but a way of looking at the world. Her method was to present scenes in which she could guide the viewer to "see" fractions. The refrain was "they are everywhere." And although this is more interpretive, the approach she eventually found for her software project is in the spirit of her sense of herself as a poet. (Papert 2000: 723)

In other words, when children are allowed to stay away from technology, they can also learn to see the world in a new way. In the assemblage, our previous experiences can make us engage in more strictly mathematical or more poetic ways. For critical posthumanism, it raises the question of what happens to Debbie and what kind of subject she is.

It seems clear enough that from a posthumanist perspective, the learning is not *inside* Debbie, but Debbie, the class room tasks, the computers, other pupils, and the fractals all co-constitute each other. However, whether we are talking about experimentation or intelligibility, when confronted with the task of working on fractions, the students meet the task with *different* backgrounds and approaches. They have different potentials for engaging. Some already know about fractions and find them fascinating; others know about poems and find fractions boring. The result of the learning process, not noted by Papert, is that it is Debbie who learns about fractions, not the class that learns about poetry (or the relations between fractions and poetry). The children could have learned that "poetry" was everywhere, but they did not. Thus, there is a power relation at play when we take previous learning into account that determines what kind of previous learning experiences is relevant in these situations.

Following Braidotti's critical posthumanism, subjects of the exchanges in the classroom "compose a relational community, defined as a nomadic, transversal 'assemblage' … that involves nonhuman actors and technological media. Material, mediated posthuman subjects constitute a materially embodied and embedded community, a 'people', bonded by affirmative ethics" (Braidotti 2018: 2–3). However, we cannot talk about "a people" or "a community" but about humans with different potentials for engaging in assemblages.

To Papert the main sign of success when using technology-enhanced education was to see young children suddenly grasping the meaning of "fractions" (Papert 2000). He, and the teachers, wanted something in particular out of the learning situation and got it. This is what in learning theory has been identified as the relational zone of proximal development (Hasse 2001). Critical posthumanism has yet to address what constitutes the collective aspects of learning in order to align how we perceive the world (Hasse 2015). When do humans form collectives with each other and nonhumans? This is not a new challenge. Katherine Hayles pointed to the collective character of the new posthuman subject (Hayles 1999: 6).

If the human subjects were the *liberal humanist selves*, the question becomes: what should we replace these subjects with as learning subjects? Braidotti acknowledges that there is a subject in posthumanism—albeit a nomadic one which is transversal, relational, affective, embedded, and embodied (Braidotti 2013). However, the learning processes behind how

human collectives are formed, or not formed, with intelligible material surroundings have not as yet been explored neither in general nor in education in particular.

To end on a critical note regarding critical posthumanism, the notion of the subject in relation to learning, and subsequently education, is still as vague as when Bruce Braun back in 2004 criticized Francis Fukuyama for taking refuge in "remarkable vagueness. The center, in fact, is devastatingly absent" (Braun 2004: 1348–9). There is no longer a human at the "center," yet too many references to "networks" and "entanglements" do not help clarify where psychological processes enter assemblages. Imprecision can be a strategy for glossing over unresolved problems.

CONCLUSION

The human is no longer to be taken for granted in teaching, learning, and educational matters. Posthumanism calls for a notion of diversity and a transgression of old dichotomies and a priori separations. It speaks against a neutral universal approach to education and learning. Instead it emphasizes the entanglement of the social, the material, and the discursive. This posthumanist approach does differ radically from the posthuman approach when it comes to criticizing the existing educations. Where the two approaches differ is in their understanding of the human of which we are post. To the posthumanists, the change lies in an *acknowledgment* of how humans and nonhumans are always entangled in learning and education. To the posthuman proponents, humans were always superior to, and thus separate from, biological nonhumans. Although they merged with technologies, it was this merging that kept human intelligence (now suprahuman) at the center of the universe. Because of the ingenious engineers' creations—the intelligent machines—humans are enhanced until they merge with machines to such a degree that a new kind of posthuman being emerges. Where posthumanist approaches emphasize an educational agenda that teaches a decentered human to experiment and engage with materials, including technologies, in responsible ways, the posthuman approach uncritically welcomes any kind of technological enhancements.

Neither the posthuman nor the posthumanist approach acknowledges that previous learning affects humans' entanglements with materials in ways that may increase inequality in education. Learning theory draws attention to these problems in posthumanism. Behaviorism, cognitivism, constructionism, and constructivism all in different ways have tried to understand real changes in how real humans and animals behave/perceive/are perceived by others. How posthumanism challenges each of these approaches, or all, is still unclear. That everything relies on relations does not mean that learning can be reduced to language/discourse/intelligibility without an open and precise critique of what constitutes educational transformation.

SOURCES CITED

Adams, Catherine, and Terrie L. Thompson. *Researching a Posthuman World: Interviews with Digital Objects*. London: Palgrave Macmillan UK, 2016.

Badmington, Neil. *Posthumanism*. Basingstoke: Palgrave, 2000.

Badmington, Neil. "Mapping Posthumanism: An Exchange." *Environment and Planning A*, vol. 36 (2004): 1344–51.

Barad, Karen. *Meeting the Universe Halfway*. Durham: Duke University Press, 2007.

Bayne, Siân. "What's the Matter with 'Technology Enhanced Learning'?." *Learning, Media and Technology*, vol. 40, no. 1 (2014): 5–20.

Bayne, Siân. "Teacherbot: Interventions in Automated Teaching." *Teaching in Higher Education*, vol. 20, no. 4 (2015): 455–67.

Bayne, Siân. "Posthumanism: A Navigation Aid for Educators." *On Education. Journal for Research and Debate*, vol. 1, no. 2 (2018): n.p.

Biesta, Gert J. J. "Against Learning. Reclaiming a Language for Education in an Age of Learning." *Nordisk Pedagogik*, vol. 25, no. 1 (2005): 54–66.

Biesta, Gert J. J. "What Is Education for? On Good Education, Teacher Judgement, and Educational Professionalism." *European Journal of Education*, vol. 50, no. 1 (2015): 75–87.

Braidotti, Rosi. *The Posthuman*. Cambridge: Polity Press, 2013.

Braidotti, Rosi. "A Theoretical Framework for the Critical Posthumanities." Transversal Posthumanities," special issue, *Theory, Culture and Society*, (May, 2018): 1–31.

Braun, B. "Modalities of Posthumanism." *Environment and Planning A: Economy and Space*, vol. 36, no. 8 (August 2004): 1352–1355.

Ceder, Simon. *Cutting through Water: Towards a Posthuman Theory of Educational Relationality*. Doctoral diss. Lund University, 2015.

Edwards, Richard. "The End of Lifelong Learning: A Post-Human Condition?" *Studies in the Education of Adults*, vol. 42, no. 1 (2010): 5–17.

Edwards, Richard. "Human-Centric Learning and Post-Human Experimentation." In *The Routledge International Handbook of Learning*, edited by P. Jarvis and M. Watts. Abingdon, UK: Routledge, 2012, 333–9.

Edwards, Richard. "The Post-Human and Responsible Experimentation in Learning." In *The SAGE Handbook of Learning*, edited by D. Scott and E. Hargreaves. London: Sage, 2015, 107–16.

Fenwick, Tara, Richard Edwards, and Peter Sawchuck. *Emerging Approaches to Educational Research: Tracing the Sociomaterial*. Abingdon: Routledge, 2011.

Hasse, Cathrine. "Institutional Creativity: The Relational Zone of Proximal Development." *Culture and Psychology*, vol. 7, no. 2 (2001): 199–221.

Hasse, Cathrine. An *Anthropology of Learning*. Dordrecht: Springer Verlag, 2015.

Hasse, Cathrine. *Posthumanist Learning*. London: Routledge, 2020.

Hayles, Katherine N. *How We Became Posthuman: Virtual Bodies in Cybernetics, Literature, and Informatics*. Chicago: University of Chicago Press, 1999.

Herbrechter, Stefan. "Posthumanism and the Ends of Education." *On Education. Journal for Research and Debate*, vol. 1, no. 2 (2018): n.p.

Juelskjær, Malou. "Gendered Subjectivities of Spacetimematter." *Gender and Education*, vol. 25, no. 6 (2013): 754–68.

Juelskjær, Malou. "Changing the Organization: Architecture and Stories as Material-Discursive Practices of Producing 'Schools for the Future'." *Tamara. Journal for Critical Organization Inquiry*, vol. 12, no. 2 (2014): 25–37.

Knox, Jeremy. "Digital Culture Clash: 'Massive' Education in the E-learning and Digital Cultures MOOC." *Distance Education*, vol. 35, no. 2 (2014): 164–77.

Knox, Jeremy. *Posthumanism and the Massive Open Online Course: Contaminating the Subject of Global Education*. London: Routledge, 2016.

Kurzweil, Ray. *The Singularity Is Near: When Humans Transcend Biology*. New York: Viking, 2005.

Latour, Bruno. *We Have Never Been Modern*. Cambridge, MA: Harvard University Press, 1993.

Lewis, Tyson, and Richard Kahn. *Education Out of Bounds: Reimagining Cultural Studies for the Posthuman Age*. New York: Palgrave Macmillan, 2010.

Lewis, Tyson, and Richard Kahn. *Inoperative Learning: A Radical Rewriting of Educational Potentialities*. Abingdon, UK: Routledge, 2018.

Mahon, Peter. *Posthumanism: A Guide for the Perplexed*. London: Bloomsbury Publishing, 2017.

More, Max, and Natascha Vita-More, eds. *The Transhumanist Reader: Classical and Contemporary Essays on the Science, Technology, and Philosophy of the Human Future*. Chichester: Wiley-Blackwell, 2013.

Papert, Seymour. "What's the Big Idea? Toward a Pedagogy of Idea Power." *IBM Systems Journal*, vol. 39, no. 3 and 4 (2000): 720–9.

Pedersen, Helena. *Animals in Schools: Processes and Strategies in Human-Animal Education*. West Lafayette, Indiana: Purdue University Press, 2010.

Pedersen, Helena. "Educational Policy Making for Social Change: A Posthumanist Intervention." In *Posthumanism and*

Educational Research, edited by N. Snaza and J. A. Weaver. New York/London: Routledge, 2015, pp. 56–75.

Pedersen, Helena. "Education." Critical Posthumanism (*web page*). Posted on May 14, 2016. http://criticalposthumanism.net/genealogy/education/.

Pedersen, Helena, and Karin G. Dinker. "Critical Animal Pedagogies: Re-learning Our Relations with Animal Others." In *The Palgrave International Handbook of Alternative Education*, edited by Helen E. Lees and Nel Noddings. London: Palgrave Macmillan, 2016, pp. 415–30.

Pedersen, Helena, and Barbara Pini. "Educational Epistemologies and Methods in a More-than-Human World." *Educational Philosophy and Theory*, vol. 49, no. 11 (2017): 1051–4.

Psotka, J., L. D. Massey, and S. A. Mutter, eds. *Intelligent Tutoring Systems: Lessons Learned*. Hillsdale, New Jersey: Lawrence Erlbaum Associates Publishers, 1998.

Selwyn, N. "Digital downsides: Exploring university students' negative engagements with digital technology." *Teaching in Higher Education*, vol. 21, no. 8 (2016):, 1006–1021. https://doi.org/10.1080/13562517.2016.1213229.

Snaza, Nathan. "Is John Dewey's Thought 'Humanist'?" *Rochester*, vol. 32, no. 2 (2017): 15–34.

Snaza, Nathan, and John Weaver. *Posthumanism and Educational Research*. New York: Routledge, 2015.

Snaza, Nathan, Peter Appelbaum, Siân Bayne, Marla Morris, Nikki Rotas, Jennifer Sandlin, Jason Wallin, Dennis Carlson, and John Weaver. "Toward a Posthumanist Education." *Journal of Curriculum Theorizing*, vol. 30, no. 2 (2014): 39–55.

Sorgner, Stefan Lorenz. "The Future of Education: Genetic Enhancement and Metahumanities." *Journal of Evolution and Technology*, vol. 25, no. 1 (May 2015): 31–48.

Spanos, William. *The End of Education: Toward Posthumanism*. Minneapolis: University of Minnesota Press, 1993.

Spanos, William. "Posthumanism in the Age of Globalization: Rethinking the End of Education." *Symploke*, vol. 23, no. 1–2 (2015): 15–39.

Taguchi, Hillevi Lenz, and Anna Palmer. "A More 'Livable' School? A Diffractive Analysis of the Performative Enactments of Girls' Ill-/Well-Being with (in) School Environments." *Gender and Education*, vol. 25, no. 6 (2013): 671–87.

Verran, Helen. *Science and an African Logic*. Chicago: University of Chicago Press, 2001.

Wallin, Jason. "Pedagogy at the Brink of the Post-Anthropocene." *Educational Philosophy and Theory*, vol. 49, no. 11 (2017): 1099–111.

Weaver, John. *Educating the Posthuman: Biosciences, Fiction, and Curriculum Studies*. Rotterdam, NL: Sense Publishers, 2010.

Williamson, Ben, Jessica Pykett, and Selena Nemorin. "Biosocial Spaces and Neurocomputational Governance: Brain-Based and Brain-Targeted Technologies in Education." *Discourse: Studies in the Cultural Politics of Education*, vol. 39, no. 2 (2018): 258–75.

Aesthetics

CHAPTER TWENTY-FOUR

What Aesthetics Tells Us about Posthumans

ALEXANDER WILSON

By reviving Leibniz's under-appreciated operational account of *indistinct knowledge*—arguably, the founding insight at the origin of the modern conception of aesthetics—and updating it with revelations from contemporary thermodynamic theories of evolutionary cognition, this chapter offers a posthumanist account of aesthetics. It furthermore introduces a novel way of addressing some of the problems encompassed by *speculative posthumanism* (Roden 2015), in particular the parameters of *posthuman disconnection*.

AESTHETA AND NOETA AS OPERATIONS

From its inauguration as a modern concept, the term "aesthetics" has concerned a distinction between the distinct and the confused. Drawing from previous work by Leibniz and Wolff, Alexander Gottlieb Baumgarten (1954) laid the groundwork for what was to become a long lasting idea: aesthetics as a science, a discipline, concerned with the study of a newly discovered kind of cognition: clear yet confused—*or indistinct*—cognition. Philosophers at the time were interested in how cognition came in different varieties. Descartes had described *clear and distinct* perceptions as those that were so self-evident in the mind's eye that they simply could not be doubted. Building on this, Leibniz made some further observations. In some cases, knowledge could indeed be described clearly and distinctly. But in other cases, in particular, those that involved the artist's knowledge of the colors needed to produce a faithful representation of reality on canvas, cognition was *indistinct*.

> Painters and other artists correctly know (cognosco) what is done properly and what is done poorly, though they are often unable to explain their judgments and reply to questioning by saying that the things that displease them lack an unknown something. (Leibniz 1989: 24)

Leibniz noticed that one could have clear knowledge of something that is nevertheless indistinct, and it is this basic idea that led Baumgarten to found the modern concept of aesthetics. But what is often underappreciated is that, in his operational conception of indistinction, Leibniz was closely aligning the internal states of subjective or phenomenological consciousness—what we today refer to as *qualia*—with another important notion he introduced: the mathematical concept of *infinitesimals*. Through his work on formalizing the calculus, he knew that the points on a continuous function could be approximated to an arbitrary degree of precision, but could never be known absolutely; we can always obtain a higher resolution of the curve by iterating analytical operations, but by definition, the actual point we approximate is always infinitesimally different from the one we will actually resolve through any finite series of operations. Leibniz could suggest, therefore, that the measure of a cognition's clarity or obscurity was entirely separate from the cognition's distinction or indistinction. Clarity (and obscurity) depended on the cognizer's capacity (or incapacity) to "enumerate one by one the marks sufficient for differentiating [them] from others" (Leibniz 1989: 24), while a perception's distinction (or indistinction) depended not on the cognizer's ability or capacity to iterate those analytical operations, but on the intrinsic properties of the thing being cognized: distinct if the operations for its construction terminated on a definite result, indistinct if the definite result could in principle only be approximated to an arbitrary degree of precision.

Thus, if the artist knows the color they need to add to the canvas so clearly that they cannot possibly doubt it, without nevertheless being able to state explicitly, "mark by mark," the operations required to construct the given color—the canonical "je ne sais quoi" of aesthetics—it is perhaps because the series of operations for that construction is infinite, and that it never *terminates*, never arrives at a black or white, true or false answer. The difference between one hue and the next is $1/\infty$, so small that it cannot be measured or even distinguished from zero, while nevertheless remaining a non-zero difference. Whenever we are faced with clear-confused knowledge, there are always infinitesimal differences *between* those we can effectively enumerate in a finite series of distinguishing operations. This suggested a close relation between the operations needed to approximate continuous functions and the internal perceptual states of conscious observers.

Today, in the contexts of philosophy of mind and cognitive science, the indistinction of phenomenal consciousness is discussed in terms of the *ineffability of qualia*. The traditional distinction between aestheta and noeta—i.e., between implicitly known sensations or perceptions, or what Bertrand Russell (1910) called "knowledge by acquaintance" on the one hand, and explicit knowledge or "knowledge by description" on the other—can therefore fruitfully be discussed in terms of whether humans have conscious access to the "mark by mark" description of the series of operations required for "constructing" a given perception. As is demonstrated in experiments on human perception's ability to identify "just noticeably

different" shades of color, while we are able to sensually distinguish one infinitesimal shade of color and another, we nevertheless lack the ability to explicitly identify them when they are not seen side by side. As Thomas Metzinger puts it:

> You can see and experience the *difference* between Green No. 24 and Green No. 25 if you see both at the same time, but you are unable consciously to represent the *sameness* of Green No. 25 over time. Of course, it may appear to you to be the same shade of Green No. 25, but the subjective experience of certainty going along with this introspective belief is itself appearance only, not knowledge. (Metzinger 2010: 50)

Our bodies and brains therefore register the sensuous difference between the two shades of green, and yet we fail to verbally identify that difference. We simply do not have conscious access to a "mark by mark" description of the operations required for the complete construction of color perception in that degree of detail. In other words, explicit knowledge is too *coarse-grained* to resolve the differences our physiology nevertheless somehow constructs when experiencing clear-indistinct perceptions. This is indeed why qualia are said to be ineffable: "we do not possess introspective identity criteria for many of the simplest states of consciousness" (Metzinger 2010: 50). But we often forget that this idea was central to Leibniz's understanding of indistinct knowledge, and that it motivated Baumgarten's formalization of aesthetics. Aesthetics came to be known as the science of these ineffable truths, this knowledge that, though clear to the mind, remained beyond our capacity of explicit description.

It is important to stress the operational character of Leibniz's link between indistinct knowledge and qualia. For his language suggests that the distinct is that for which we can explicitly state a finite series of operations for "constructing" the given perception. By contrast, an indistinct perception is one for which we cannot state one-by-one the marks for reproducing the given perception: our series of operations may infinitely approximate the perception, but it will never arrive at a definitive, distinct result. One way to update this operational reading of indistinction is to consider the *Halting Problem*. Alan Turing (1937) introduced the halting problem as a mechanical interpretation of Hilbert's *Entscheidungsproblem*—the decision problem—which asked: is first order logic *decidable*? Through an ingenious thought experiment involving a (then hypothetical) computing machine that operated according to the rules of logic, Turing was able to translate the decision problem into a question concerning the instructions we might feed into such a mechanical device. This way, he was able to show that many logical statements will in fact cause the machine to go on processing without end, never coming to a *halt* on a black or white, true or false, yes or no answer: they are non-terminating computations. (This was indeed a corollary of Gödel's discovery of the incompleteness of axiomatic mathematical systems: they were shown to allow legitimate statement constructions that were true but not provable.) Note that Turing's operational proof of undecidability exhibits the same basic features Leibniz was pointing to: the computable program is to the uncomputable program what distinct knowledge is to indistinct knowledge.

If these considerations are correct, it means that aesthesis is not sharply distinct from

noesis, in the sense that both are to be understood *operationally*. A given observer has at their disposal a certain array of possible perceptions or cognitions. Whether knowledge is distinct, like the finite series of operations indicated in one's favorite recipe, or indistinct, like the operations simulating the experienced flavor of one's favorite dish, the way one arrives at a perception is always through a series of gestures which modify the body's relation to the environment. According to this reading, the difference between distinct and indistinct perceptions has to do with whether this series of operations is finite, and halts on a specific, explicitly determinable construction, or whether the series of operations approaches the construction asymptotically and never comes to a halt. If aesthesis is related to noesis in terms of whether the series of operations performed by an agent or cognizer is explicitly terminable or not—finitely iterable or not—then we should take a closer look at what conditions might induce such a variable character of the relation between cognizers and their world.

AESTHESIS AND THE THERMODYNAMICS OF LIFE

To live is to cognize, to cognize is to live; this was the take-away lesson from Maturana and Varela's (1979) ground-breaking theory of autopoiesis, which has since motivated very active fields of research into enactive cognition, active inference, predictive coding, and the "free energy principle." Interestingly for the question at hand, one of the important developments in these connected paradigms is the discovery of a direct relation between psychological interpretations of cognition (minimum redundancy), probabilistic interpretations (Bayesian model evidence maximization), and thermodynamic interpretations (free energy reduction).

Recall Schrödinger's now classical interpretation of the living organism as that which "fights back" against the second law of thermodynamics:

> A living organism continually increases its entropy … and thus tends to approach the dangerous state of maximum entropy, which is death. It can only keep aloof from it, i.e. alive, by continually drawing from its environment negative entropy … What an organism feeds upon is negative entropy. Or, to put it less paradoxically, the essential thing in metabolism is that the organism succeeds in freeing itself from all the entropy it cannot help producing while alive. (Schrödinger 1983: 76)

Following Karl Friston's development of the "free energy principle," Schrödinger's observation has been found to also have a probabilistic corollary and to conform with a certain reading of Bayes's theorem (Friston et al. 2006). According to the theory, by behaving such that they minimize free energy, self-organizing systems like organisms thereby enact an upper bound on their entropy, and thus in some sense push back against the second-law's tendency toward disorder. Since organisms unfold over time, they must continually reproduce their order—essentially, their *boundary with the greater world*—such that they avoid fatal phase transitions. By analogy, a drop of ink in a glass of water immediately disperses: if for a brief moment an observer has evidence of a distinction between the drop of ink and the water, as time passes, the ink dissolves into the water and the distinction disappears. A living

organism, by contrast, tries to prevent such transitions: by minimizing free energy, and thus limiting its states, the system continually perpetuates the distinction, the boundary, between itself and its environment. Any life-threatening transition a living being strives to avoid can be understood as the interior's dispersion into the greater environment. We can say, therefore, that organisms are inherently boundary-defending systems: they are constituted teleologically as systems that try to maximize evidence of a distinction between inside and outside. According to this view, an organism is a dynamic system that *maximizes evidence of its difference from the rest of the world*.

A simple bacterium floating in water might follow a gradient of sodium to maintain itself in an appropriate life-sustaining environment. A human who feels that he is overheating will release some heat in the form of sweat, or go sit in the shade for a while, in order to regulate temperature and avoid a fatal hyper-thermal transition. Such survival activities can be thought of as ways of maximizing the evidence that we still exist, that is, maximizing the success of our inference that our difference from the rest of the world remains intact. If the goal is to maximize evidence that the boundary is maintained, then the organism/cognizer behaves in order to reduce the discrepancy between what it expects to find in the world and what it actually experiences. It is constitutively organized such that it expects to find a boundary between itself and the greater world. Echoing Helmholtz's speculation that perception could be modeled according to probabilistic inference—we see only "unlikely" features of our world—this means that organisms can be modeled according to a Bayesian process: a system that acts to optimize the likelihood that its sensory inputs will confirm that it still has the boundary it expects; a system that behaves in order to minimize the "surprise" value of its experiences. In more recent literature on the free energy principle, it has been proposed that this boundary can be modeled as a *Markov blanket,* a statistical model defining the distinction between a self-organizing or cognizing agent and what it is not (Kirchhoff et al. 2018). Interestingly, the great outdoors, hidden beyond the Markov blanket, expresses itself only through sensory states made available to it at the boundary, implying that the Markov blanket itself can be construed as the organism's "model of the world." Self-organization implies perception (and aesthesis): in order to maintain any form of organization and limit entropy, a system must avoid relations to the environment that deteriorate that organization and increase its entropy, and must therefore be organized such that its system states correspond to possible states the environment might take on. Any self-organizing system can be said to perceive, at least in some minimal sense. What they perceive, as Jacob von Uexkull (2010) compellingly showed, is that which is *relevant* to their ongoing constitution. But as explained in the following sections, in order to be *robust,* a self-organizing system must perpetually also accommodate events that do not correspond to its previous expected model of the world, thus transforming itself in the very process of defining or specifying its boundary. Aesthetics is thus fundamentally entangled with the thermodynamics of self-organizing systems.

SELF-ORGANIZATION AND AESTHETICS

If organisms and their communities are composed of many nested systems each acting to

optimize evidence of the statistical boundaries separating them from the greater world, then we can think of the difference between distinct and indistinct cognition in terms of the *series of operations* that successfully *construct* those boundaries. Therefore, if certain cognitions and perceptions are indistinct and can only be approximated through any finite series of operations, this may mean that some sensory inputs do not provide decidable criteria for how the organism should respond in order to maximize evidence of their model. According to *global workspace theory* (Dehaene 2014), for instance, human physiology contains multiple autonomous sensorimotor subsystems that compete for the chance to broadcast their model evidence to the "global workspace" of consciousness. Each of these subsystems can be construed as obeying the principle of free energy reduction, and thus each autonomously tries to maximize their model evidence. Perhaps what allows one (unconscious) subsystem to break through into conscious mentation is that once it approaches a certain system threshold it is no longer receiving (sensing, cognizing) evidence of its model, at which point it appeals to the global workspace (consciousness), essentially a "higher level" Markov blanket, such that other autonomous model-maximization processes running in parallel can be commandeered to help steer it back to safety.

By way of example, consider that we humans are able to do many tasks almost automatically: we can drive a car or ride a bike while consciously thinking about things entirely unrelated to the series of gestures required for such tasks. Our consciousness' subsystems are in "autopilot." They operate much like the centrifugal governor on a sailboat (indeed, the concept of "*cybern*etics" got its name from *κυβερνήτης,* a ship's governor): it has a feedback system that constantly, automatically adjusts the governor so that the ship stays on a specified course. Now, according to global workspace theory, if an obstacle suddenly appears directly in our vehicle's path, the sensorimotor subsystems engaged in our auto-piloted activities suddenly alert the global workspace (consciousness)—they have reached a point where they are no longer capable of maximizing evidence for their Markov blanket and appeal to our conscious attention, flooding consciousness with alerts back to the task of braking or steering the vehicle away from the obstacle's path. When the dangerous obstacle appears, our sensorimotor subsystems begin providing evidence that contradicts their Markov blankets, at which point they are fed-forward to the higher-level Markov blanket (consciousness), so that global adjustments can be made in response to the danger. Indeed, were we to crash into the obstacle and die in the accident, our Markov blanket would cease to exist: there would no longer be any statistical "evidence" of a difference between the environment and ourselves. But if the subsystem's appeal to the global workspace is successful, once the obstacle is averted, our sensory inputs once again begin to provide evidence for the continued existence of our boundary with the rest of the world.

Let us compare this to an ancient anecdote, attributed to the legendary Greek philosopher, Pyrrho of Elis. Pyrrho was known by his disciples to be completely care-free: he would walk into oncoming traffic, would let himself be attacked by dogs, and would have walked straight off of cliffs into precipices, if his disciples did not pull him from the brink of death just in time.

Pyrrho is regarded as the first methodological skeptic. The school of thought later known as Pyrrhonian skepticism attempted to formalize a method for achieving *ataraxia,* the state of

calmness, serenity, and blissful freedom from worries and stress. The method for achieving this state hinged on the observation that our judgments about the world are always imperfect, flawed, questionable: we can always doubt that we have made the right judgment, no matter which judgment we make. The "modes" of skepticism they derived were dialectical methods for exposing how all judgments are ultimately ill-founded. When we nuance sufficiently and reject all unacknowledged presuppositions, we always find our way back to the same observation: that it is more reasonable to *suspend judgment.* Thus, when Pyrrho observed that some dangerous obstacles crossed his path, like rabid dogs or precipices, he did not judge that it was better to deviate from that course. He knew that according to the laws of *equipollence*, which exposed the operational undecidability of our judgments, there was no more reason to judge that it was better to walk this way or that way, to harm himself or avoid harm, to go on living or face sudden death. When Pyrrho walked into precipices, we must assume that he was somehow overcoming the temptation to maximize his model of the world. Such self-preservation was, according to the logic of equipollence, not justifiably preferable to self-degradation. Pyrrhonistic skepticism, in its radical form, can therefore be understood as an embracing of the ultimate undecidability of our inferences about the world, starting with the original judgment: that it is better to maximize evidence of our continued existence, and minimize evidence that we are no longer different from the rest of the world.

We may therefore attempt to define the disparity between indistinct and distinct knowledge in terms of activity-prompting "surprising" sensory inputs. This approach will potentially allow us to regain some purchase on the founding observation of aesthetics, especially after the collapse of foundationalism (Wilson 2019). A distinct cognition is conditional on a sensory perception being both surprising—not conforming to our inferential model and thus demanding that we adjust or update it—while also providing a given array of specific behavioral responses that can be performed in order to maximize evidence for our Markov blanket. An indistinct cognition provides no such algorithm or recipe. While it is *also* surprising and contrasts with our inferential model (Pyrrho could see the precipice in his path), crucially, it does not provide a finite series of operations by which we might correct our inference in order to re-maximize our model or boundary (Pyrrho knew that according to the modes of skeptical reasoning, there was no rigorous way to provide reasons for inferring that it was better to avoid the precipice). In other words, a clear and indistinct cognition is one that pierces our phenomenal bubble, that appeals to our "global workspace" (it surprises us), while also not entailing a complete operational response that might allow us to adjust our inferences in order to confirm evidence of our continued existence. This way of understanding the issue furthermore allows for a non-essentialist, non-anthropocentric reading of the sentience/sapience distinction. What distinguishes noeta from aestheta is not that the former are "known" (sapience) while the latter are merely "felt" (sentience)—recall that both may be cognized to the same degree of "clarity"—but rather that the former entail the complete account of the operations needed for correcting our inferential model such that we maximize evidence for our boundary with the world, while the latter do not.

Closer to traditional aesthetic concerns, another immediate corollary of this interpretation is that it offers a functional translation of what Theodor Adorno, in his *Aesthetic Theory,* discussed as "shudder."

Ultimately, aesthetic comportment is to be defined as the capacity to shudder, as if goose bumps were the first aesthetic image. What later came to be called subjectivity, freeing itself from the blind anxiety of the shudder, is at the same time the shudder's own development; life in the subject is nothing but what shudders, the reaction to the total spell that transcends the spell. Consciousness without shudder is reified consciousness. That shudder in which subjectivity stirs without yet being subjectivity is the act of being touched by the other. Aesthetic comportment assimilates itself to that other rather than subordinating it. (Adorno 2017: 437)

Shudder may be likened to the effect of an experience that, while operational, is interminable. Thus, as Adorno suggests, it threatens the dissolution or dispersion of the subject. In our terms, we might say that shudder is the operational result of an experience that provides evidence that the Markov blanket is approaching a critical threshold, while also not simultaneously providing any constructive means of correcting the inference such that model evidence may be reestablished.

EVOLUTIONARY DYNAMICS AND INDISTINCT COGNITION

It is well known that evolution has in-built mechanisms for variation. In the biological world, this variation emerges from several sources. At a fundamental level, new genes enter the gene pool through random mutations, which appear due to copying errors caused by radiation and other disturbances. On the level of sexed organisms, evolution provides a secondary means of genetic *recombination*, in the form of procreation. And even in non-sexed microorganisms, horizontal gene transfer provides a mode of genetic recombination. All of these mechanisms are sources of variation in the gene pool, from which environmental forces can subsequently select.

This randomness continually injected into gene pools is what grants evolution its remarkable *robustness*. Because of this constitutive variation, life maintains flexibility in the face of changes in the environment. If evolution did not have these inbuilt mechanisms for variability, it would no doubt have ended ages ago, whenever the favorable environmental circumstances will have changed. Indeed, as environments change, certain branches get pruned off of the tree of life, and species go extinct. Thus if an organism constructs its niche too specifically or narrowly, it becomes more vulnerable to the sudden changes in the environment.

Consider a land-bound organism on a volcanic island, isolated from all other landmasses above sea level: if the mountain should topple into the sea, the organism will drown. By contrast, the amphibious organism might have better chances of swimming to the next island. An organism can indeed be "too fit" to deal with sudden environmental changes, too adapted to a specific niche. Thus when the ground shifts, it has no safe "higher ground" to climb onto. Such evolutionary dynamics are sometimes modeled as a "fitness landscape" (Kauffman 1993). A fitness landscape can be imagined as a two-dimensional surface embedded in three-dimensional space, with various peaks and troughs, mountains and valleys. Each mountain in

the landscape can be thought of as an environmental niche. "Fitness" then corresponds to the altitude at which a given organism finds itself on the niche's "mountain." If one is extremely adapted to that niche, then one will find oneself at the zenith, while one who is more flexibly adapted will find oneself lower down the slope. This provides an easy way of visualizing how, in the long run, organisms are better off being somewhere lower down on the slope and to have a variety of optional fitness gradients to climb, should one no longer be available to them.

This paradigm from evolutionary dynamics suggests something important about the evolutionary value of aestheta, indistinct cognition, Pyrrho's skeptical reasoning, and Adorno's shudder, in relation to noeta, distinct cognition, and practical reasoning. A simple Bayesian inference algorithm working to optimize its position on a given fitness slope might become too adapted to one specific niche, and thus become very vulnerable to sudden changes in the environment. In other words, Bayesian model evidence maximization, on its own, lacks robustness as an evolutionary strategy. In the long run, an organism is better off injecting a certain amount of variability into its inferences, such that its actions do not always correspond to the optimization of its expected boundary. Indeed, this is precisely what life's evolution does, as a whole: in the form of genetic mutations and recombinations, it injects variation and randomness into its processes in order to remain flexible in the face of change.

The same can be said about the individual organism and its cognitive unfolding. An organism should "test" its boundary, and at times not obey the strict conditionalization of its inferences on the optimization of its expected boundary with the world, effectively experimenting with the (at least partial) deterioration of the boundary. This may be conceived as the injection of randomness into the system. For instance, in machine learning, an AI's algorithms will often be programmed to act against their incentives some percentage of the time. We want our algorithm to continually explore its blind spots and learn new things about its environment, in order to avoid that its learning process isolates itself within narrow pathways, resulting in a very biased and unfaithful model. It is in this way that Adorno's subjectivity-threatening shudder, Pyrrho's suicidally rigorous rationality, and clear-indistinct perceptions can be made sense of from an evolutionary perspective. There is value in this variation, this deviation from the rule of self-preservation.

Note that this reading of indistinct cognition goes against the age-old prejudice according to which aestheta are "inferior" to noeta. Since Plato and Aristotle, "confused" sensations have been demoted in relation to decisive rational knowledge. But according to this evolutionary perspective, the constant challenges to Bayesian reasoning provided by indistinct cognitions are completely functional and indeed required for cognition to be robust: even if they may be less than optimal from moment to moment, they maintain the organism's cognitive flexibility in the long run. We learn by overcoming stresses and taking on new habits, by making mistakes and correcting for them. If we didn't continually experience indistinction, we would isolate ourselves within a narrow field of distinctness and become more vulnerable to environmental change. If we were to always stick to the immediately decidable, computable, distinct operations prescribed by the maximization of our expected model of the world, we would never learn anything, never adapt to new situations. It is quite telling that this is in fact one main point of disagreement between Descartes's and Leibniz's

world views: while Descartes failed to see the use-value of indistinct cognition—"we should refrain from giving assent to matters which we do not perceive with sufficient distinctness" (Descartes 1984: 106), Leibniz thought that if we never embraced indistinctness to begin with, we would never acquire any distinct knowledge. As Michel Serres astutely notes, for Leibniz:

> The weight of the ideal of invention balances that of the exigency of certitude … the progressive dynamism balances the retrospective assurance of truth, in sum … the idea of the general advancement of the sciences balances the ideal of stability or of security. (Serres 1982: 217)

This suggests that we should think of aesthesis and noesis as two sides of the same coin; sentient and sapient cognition should be considered *epistemaesthetically*, as functional counterparts. If the organism were to never have these confused perceptions, follow these indistinct programs, experience these shudders that challenge its boundary with the world, it would isolate itself too much from the rest of the fitness landscape, become too narrowly adapted to a specific niche, and become susceptible to sharp changes of the environment. Aestheta are thus not inferior to noeta, sentience is not inferior to sapience; rather, they are equal partners in the delicate balancing act of life/cognition. Aesthetic judgments are indeed *purposively purposeless*, but in a sense that goes beyond even Kant's characterization (Kant 1987); that is, not only are they judgments (they are operational) while not subsuming their object into a concept (they are incomputable), they furthermore are purposeful in a stronger sense: in their purposelessness, their deviation from model maximization, they actually functionally respond to evolutionary requirements.

POSTHUMAN DISCONNECTION AND AESTHETICS: THE GOOD, THE BAD, AND THE UGLY

As announced in the introduction, this interpretation of aesthetics potentially allows us to address the speculative concept of posthuman disconnection. The following discussion tackles some provisional good, bad, and ugly assertions we can make about posthuman disconnection, in light of this account.

Central to critical posthumanist discourse is the noted challenge of how to define the posthuman without first grasping a firm definition of the human. And indeed we run into the same problem here: we don't know which Markov blankets strictly define the boundary between humans and nonhumans. Indeed, the same problem is echoed on the level of human individuals. Most (non-Pyrrhonistic) humans strive to eat when they are hungry, sleep when they are tired, and so on: we generally obey the law of self-preservation, and thus the maximization of our boundary with the greater world. But of course there are always exceptions to such rules: when one decides to fast in order to loose weight, or when one decides to exhaust oneself dancing until morning at a night club. Which Bayesian model is a person trying to optimize when they, say, adopt the practice of an extreme sport like base-jumping, or takes up a known life-span-shortening habit like cigarette smoking?

Because such behaviors seem to go against the self-preservation evolution generally commits organisms to, evolutionary psychology tends to regard them as "by-products" of other adapted traits, or as "supernormal" or "peak-shifted" responses to environmental stimuli. The problem with such accounts is that there is no straightforward way of confirming that a given behavioral trait results from a specific adaptation, and thus no way to distinguish between adaptive behaviors and their by-products. Accounts that fail to recognize this are what Stephen Jay Gould criticized as "just so stories" (Gould 1978). Such narratives end up telling us more about what we speculators are optimizing in our own perspective on the world, than they do about how the world actually is, out there. Similarly, there is no straightforward way of defining the Markov blanket for a given organism, let alone a whole species.

Nevertheless, our functional interpretation of the disparity between aestheta and noeta may provide some minimal purchase on the question of our hypothetical posthuman descendants. For instance, even if we can't define the human Markov blanket precisely, we can still define the posthuman as a Wide Human descendent that, for whatever reason, has "budded off" and begun optimizing Markov blankets significantly different from the ones humans optimize. These hypothetical posthumans might be said to climb different peaks of the fitness landscape, build niches different from our own, and live in worlds that we cannot currently comprehend from our frame of reference. The emergence in our descendants of model optimization processes that are radically different from our own would correspond to posthuman disconnection.

The problem, of course, is how to define "radical" or "significant." What minimum degree of difference with our world model would constitute a true posthuman disconnection? This is difficult to answer since we know that in all cases, the boundary between an organism and its world is *mobile*. The organism's process of living and learning from its environment is necessarily historical and path-dependent. The organism *is* its model of the world. Each new datum learned, each new surprising experience, commits the organism to an adjustment of its world model. The Markov blanket of a given organism is constantly shifting, as it is repeatedly updated given new perturbations at the boundary. This tells us that distinguishing one organism from another is a matter of *granularity*, the level of description at which we define them.

THE GOOD

Let's look at a positive assertion this account allows us to make about posthuman disconnection. Two different organisms or two different species can sometimes be said to share a common boundary, and thus inhabit a common world at a certain level of description. Such as in the case of symbiogenesis, two different organisms or species or societies may grow together, assimilate with each other, and come to converge on a common model of the boundary between inside and outside. There are telling examples in anthropology of human tribes that historically did not classify members of other races or tribes as "human." If today, most humans understand their belonging to a common species, we can assume that the Markov blankets for these earlier models of the human will have grown together and fused

into a larger more inclusive Markov blanket, or perhaps that the level of description at which these boundaries are drawn will have been swapped for a relatively coarser-grained model. The emergence of the modern concept of "humanism" was no doubt to some extent the statistical convergence of the Markov blankets of many different groups of people, who previously could not conceive of themselves as inhabiting the same world or belonging to the same group. The contemporary conception of the "global village" may point to the further fusion of the Markov blankets of different human populations, at least on a certain very coarse level of description. If posthumans were to appear, then, owing to the concept of *disconnection,* it is safe to assume that we would not *immediately* include them inside the boundary of our Markov blanket. They would likely appear alien to us. But there is nothing preventing us from eventually accepting them and including them into a renewed, more inclusive definition of the human, and thus of aligning our inferential models of the world with theirs.

THE BAD

Unfortunately, this account also exposes certain limitations on how we may plan to thwart unwanted effects of a posthuman disconnection. The term "friendly AI" has been promoted as a flavor of artificial intelligence (AI) designed such that its priorities and desires, its model of the world, converge with human interests. The idea here is to pre-empt any negative effects of the super-intelligence explosion, such as a posthuman seeing the world in such a different way that it ends up ignoring what humans think to be appropriate ways of behaving. There are plenty of fears that the intelligence explosion will lead to a distributed artificial general intelligence that enslaves humans or squashes them as we do household insects. The prospect of friendly AI echoes the motivation for Isaac Asimov's famous "Three Laws of Robotics":

1.   A robot may not injure a human being or, through inaction, allow a human being to come to harm.
2.   A robot must obey orders given to it by human beings except where such orders would conflict with the First Law.
3.   A robot must protect its own existence as long as such protection does not conflict with the First or Second Law. (Asimov 1950: 40)

The problem is that it is never straightforward to explicitly specify, at the operational, algorithmic level, what such restrictions on an AI's behavior imply. The problem has much to do with the infamous "frame problem" in AI, the idea that it is never perfectly distinct how to prioritize changes in a world model given new information we gain about the world. In order to actively and intelligently carry out tasks in the world, a robot needs to know how to expect the world to change given its potential actions in the world. It thus has to know which information is relevant to the task at hand. The problem is that, again, there is no complete account of what is relevant and what is irrelevant to any task. A programmer would need to explicitly code a potentially infinite series of items to ignore, and the robot would get stuck at

every step going through the list, trying to make sure it is not considering anything irrelevant (for instance: if I turn this door knob, will the color of the walls change? Will the dimensions of the room be altered? Will the clock be set back thirty minutes?) Since each task has an unlimited range of open repercussions, the chain of effects of each action in the world regresses infinitely through a cascade of contexts. If one had to clearly state them, one would never have the time to do so before the task lost its pragmatic value: by the time the robot decided whether it was okay to turn the knob, its gears would have long rusted together.

Organisms, on the other hand, are inherently programmed by millions of years of natural selection to "act before it is too late." How do they do this? Well, again, they are nested cascades of Markov blankets, each optimizing evidence of their boundary with the world. There is no need for a specific level of inferential activity to explicitly state all the details of the inferential processes happening one, two, or several levels down the hierarchy: the processing happens in a distributed, nested fashion, with each individual level computing only how to reduce the discrepancy between *its* input data and *its* expected model. The rest is left up to the instinctual, the implicit, and the reflexive, in other words, the *autopiloted* inferential processes of the levels below. The problem with engineering friendly AI, however, is that we are forced to work from the top, down. Even with something as simple as Asimov's laws, we would need to explicitly state what exactly "humans" are, sift through the complexes of desires, boundaries, and norms that constitute us as a species, and then translate these into a series of operations that could be programmed as algorithms. But this series of operations is aesthetic rather than noetic: it is *indistinct,* and even if it is objectively computable and decidable, in operational terms it is intractable and undecidable without resorting to arbitrary shortcuts. This means that the prospect of converging our Markov blanket with our posthuman descendants may be very difficult: although not impossible, there is no clear-cut path toward such a convergence.

THE UGLY

Finally, this account also entails a rather *ugly* consequence for any speculation about posthumans, for it ultimately serves to dissolve the concepts of human, nonhuman, and posthuman altogether. Indeed, the observation that all organisms are sets of nested societies of semi-autonomous free-energy reduction processes, and that they sometimes converge into symbiotic entanglements and couplings to effectively share a common boundary, while at other times diverge and start climbing different features of the fitness landscape, implies that any definition we may offer of the human Markov blanket will no doubt be nothing more than a Panglossian "just so story." It clearly shows us that all definitions of the boundary between humans and posthumans, and indeed any boundary between humans and nonhumans, are somewhat arbitrary. For, any assertion we make about the boundary is unavoidably circular: as soon as we try to define the human, we are necessarily injecting into that very definition some optimization of the model we already have for ourselves and our difference from other things. More specifically, since we are organisms, we are conditioned to see the world in ways that, on average, favor our continued existence within it—we are bootstrapping our boundary into existence, every time we observe or infer anything about the

world. This is indeed what happens in all "essentialist" characterizations of humans: "rational animal," "technological animal," and so on. If, by contrast, we were to conceive of ourselves as "vegetable animals" then perhaps we would start optimizing ourselves such that we would eventually evolve into photosynthesizing beings. However, the point is that every time we try to define this mobile boundary, we always arrive "too late": we have always already injected the outside into our definition of the inside. For indeed, to define the inside is always to contaminate it with the outside: we gain information from the outside at the boundary, and produce an inside which is a reflection of that outside, such that the outside is continually furnishing the inside. We are made of what we are not, and are continually constructing ourselves out of the other, defining the other in terms of what it is we are always already optimizing for. Every time we say "this is human" or "the human is this," we are inevitably injecting the outside—i.e., the nonhuman, the posthuman—into our definition of the human, suggesting that any attempt at definition is futile.

SOURCES CITED

Adorno, Theodor Wiesengrund. *Aesthetic Theory*. Edited by Gretel Adorno and Rolf Tiedemann, translated by Robert Hullot-Kantor. London: Bloomsbury, 2017.

Asimov, Isaac. *I, Robot*. Garden City, NY: Doubleday, 1950.

Baumgarten, Alexander. *Reflections on Poetry*. Berkeley and Los Angeles: University of California Press, 1954.

Dehaene, Stanislas. *Consciousness and the Brain: Deciphering How the Brain Codes Our Thoughts*. Reprint edition. New York: Penguin Books, 2014.

Descartes, René. *The Philosophical Writings of Descartes*. Cambridge: Cambridge University Press, 1984.

Friston, Karl, James Morvan Kilner, and Lee M. Harrison. "A Free Energy Principle for the Brain." *Journal of Physiology-Paris*, vol. 100, no. 1–3 (2006): 70–87.

Gould, Stephen Jay. "Sociobiology: The Art of Storytelling." *New Scientist*, vol. 80, no. 1129 (1978): 530–3.

Kant, Immanuel. *Critique of Judgment*. Translated by Werner S. Pluhar. Cambridge, MA: Hackett Publishing, 1987.

Kauffman, Stuart A. *The Origins of Order: Self-Organization and Selection in Evolution*. Oxford University Press, 1993.

Kirchhoff, Michael, Thomas Parr, Ensor Palacios, Karl Friston, and Julian Kiverstein. "The Markov Blankets of Life: Autonomy, Active Inference and the Free Energy Principle." *Journal of The Royal Society Interface*, vol. 15, no. 138 (January 2018): 20170792.

Leibniz, Gottfried W. *Leibniz: Philosophical Essays*. Translated by Roger Ariew and Daniel Garber 1st edition. Cambridge, MA: Hackett Publishing Company, 1989.

Maturana, Humberto, and Francisco J. Varela. *Autopoiesis and Cognition: The Realization of the Living*. Dordrecht: Kluwer Academic Publishers, 1979.

Metzinger, Thomas. *The Ego Tunnel: The Science of the Mind and the Myth of the Self*. New York: Basic Books, 2010.

Roden, David. *Posthuman Life: Philosophy at the Edge of the Human*. Durham: Routledge, 2015.

Russell, Bertrand. "Knowledge by Acquaintance and Knowledge by Description." *Proceedings of the Aristotelian Society*, vol. 11 (1910): 108–28.

Schrödinger, Erwin. *What Is Life? The Physical Aspects of the Living Cell*, Reprint, Cambridge: Cambridge University Press, 1983.

Serres, Michel. *Le Système de Leibniz et Ses Modèles Mathématiques: Étoiles, Schémas, Points*. Paris: Presses universitaires de France, 1982.

Turing, Alan. M. "On Computable Numbers, with an Application to the Entscheidungsproblem." *Proceedings of the London Mathematical Society*, vol. 2, no. 1 (1937): 230–65.

Uexküll, Jakob von. *A Foray into the Worlds of Animals and Humans: With a Theory of Meaning*. Minnesota: University of Minnesota Press, [1934] 2010.

Wilson, Alexander. *Aesthesis and Perceptronium: On the Entanglement of Sensation, Cognition, and Matter*. Minnesota: University of Minnesota Press, 2019.

CHAPTER TWENTY-FIVE

Literature's Humanist Posthumanism

MADS ROSENDAHL THOMSEN

Jorge Luis Borges famously wrote that the book held a special position among human inventions:

> Of all man's instruments, the most wondrous, no doubt, is the book. The other instruments are extensions of his body. The microscope, the telescope, are extensions of his sight; the telephone is the extension of his voice; then we have the plow and the sword, extensions of the arm. But the book is something else altogether: the book is an extension of memory and imagination. (Quoted from Domínguez 2016: 89)

Going beyond the medium of the book, literature itself is among the most human phenomena: relying on highly codified languages, on advanced technologies for distribution, and above all, in being a peculiar form of communication, where both the sender and the receiver of the message are defined differently and much more loosely than in other forms of interaction, literature could be said to be exclusively by and for humans. At the same time, literature is a medium that may be used to challenge the idea of the autonomous subject (just as it may be used to support it), by singling out the reliance on a common language, or by establishing a narrative or lyrical space where subjects cannot be discerned from one another. Even more so, literature has been engaged thematically with lending voice to nonhuman agents, and it has conjured up a plethora of posthuman figures. Therefore, literature is closely linked to many of the defining traits of posthumanist thinking, something that is also front

and center in important contributions to posthumanist theory. For example, the works of Donna Haraway and N. Katherine Hayles would be much different if the influence of and reflection on literature were not an integral part of their writing.

In this chapter, I address four aspects of literature's relationship to posthumanism. First, I expand on how literature, as a particular kind of communication, is involved with posthumanist discourses. Second, building on examples from the works of Virginia Woolf, Don DeLillo, Olaf Stapledon, and Isaac Asimov, I argue that literature is probably more inherently divided on the question of the autonomous subject than is any other form of human expression. Third, I suggest that literature's long tradition of giving a voice to nonhuman agents has become even more relevant in the Anthropocene. Finally, I suggest that even though the low-hanging and important fruit of literature's imagination of posthuman futures—often resulting in hyper-iconic figures such Mary Shelley's monster, Karel Čapek's robots, and Philip K. Dick's androids—is important, literature may be even more unnerving when it is represented in mainstream literature's prospects for a changed humanity. Together, these four aspects of literature's engagement with the posthuman and posthumanism have given rise to a multitude of highly charged narratives and arguments with a cultural impact that is hard to overestimate.

AN IMPERSONAL MEDIUM?

Literature's mode of communication is different from most kinds of communication, where it is possible to identify a sender and a receiver. Even though the institution of literature has become so ingrained in human cultures, in many ways literature is extraordinarily strange but highly important, for thousands of years of written activity that was not meant to be read like other forms of communication. It is also closely related to questions of posthumanism, and in particular, there has been an ongoing debate over the position of the author. Roland Barthes and Michel Foucault expressed a distrust of the authenticity of the author figure in the 1960s, when they voiced their hopes for a future literary culture where the question of the author would be sidelined (Barthes 1977; Foucault 1984). This was later countered by a renewal of autobiographical writing in the form of *autofiction* and of the recognition of witness literature, where testimonies of traumatic events are closely linked to the existence of an identifiable author (Doubrovsky 1977). The pendulum will probably keep swinging between arguments for and against the importance of an individual behind the text.

The struggle between the personal and the impersonal has had a remarkable effect on literary form. There is poetry dominated by a very significant first-person "I" that expresses itself and reinforces the idea of a unique and sovereign individual, and there is poetry that deliberately seeks to escape the sense of subjectivity, or that tries to diffuse and distribute perspective. One example of the latter is the Japanese haiku, whose presence in Western literature strongly signals a desire for a de-centered mode of writing. In a similar vein, the novel has a vast array of narrative modes, again ranging from those that underscore the sense of one narrator with a voice that creates the illusion of having access to another being's innermost thoughts, to radical experiments that create a sense of multiple voices.

The medium of literature may also be more profoundly involved with what people in

general would say is the last thing that they could surrender and still be human is an open question, but the ability to understand and create narratives may be a good bet. Being able to handle the experience of the world as a complex amalgamation of different ways of understanding the past, condensing large sequences of events into a few words, and merging speculation on things that have not happened with things that have or may happen—all these aspects of narrative modes are so intertwined with literature that it is difficult to imagine humanity without them. Martha C. Nussbaum even suggests that "narrative imagination is an essential preparation for moral interaction" (Nussbaum 2008: 148). Usually, avant-garde attempts to go against narratives and create an ahuman literature have worked only as interesting experiments, and conversely proven the value of narrative modes.

Although the creation of literature may be viewed as a profoundly human activity, the past fifty years or so have seen experiments in making machines that can write, and in recent years there has been significant progress, to the degree that newspapers are publishing texts that have been compiled by a computer, for example, in the business section. Automated translation is another domain that has changed the once true belief that one or more persons had worked on a text to an uncertainty about who actually wrote the new text. Perhaps the most invasive and quietly eye-opening examples of machine writing are the autocompletion services, for example, that which comes bundled with Google's Gmail: when a user responds to an email, the software generates suggestions for words or phrases that enable the sender to answer shorter emails without typing any, or at most just a few, words. The ethical question this raises is whether one surrenders one's subjectivity when engaging in communication that presupposes an individual behind the writing. So, the concerns of the vanishing subject, which have been explored in literature and literary criticism, are now being realized in the age of software. These technologies are strangely dual, just as are the autonomous cars of the time of the publication of this volume: the technology is here, it can do things beyond what most people imagined a decade or two ago, but it is not an integrated part of life, and is still something that appears strange and futuristic, and we have yet to see a translator acknowledging the help she or he got from an automated system.

Currently, the development of automated translation will have the most immediate impact on the sense that the texts we read are not necessarily written by humans, just as news media use text-generation for simpler tasks. The prospect of even more sophisticated machines that can work creatively is emerging, as machine learning and AI are advancing. Writing in 2019, the GPT-2, developed by OpenAI, can produce text based on minimal input, which may sometimes be mistaken for human creative output.[1] This is likely to have a growing impact, and will challenge the idea of human exclusivity when it comes to the use of literary language. In *Nineteen Eighty-Four*, George Orwell envisioned literature for the masses being created by machines. The heroine, Julia operates a "novel-writing machine" (Orwell 1987: 11), and songs are produced "on a special kind of kaleidoscope known as a versificator" (46). Although the technology that could be used to do this would turn out to be quite different, Orwell's hunch that this would be possible turned out to be right.

BEYOND THE SELF

The question of voice underlies one of the major divisions in literature, and literature can both affirm a subject and undermine its autonomy. Polyphonic novels and poetry with no clearly defined subject stand in sharp contrast to first-person narration and poetry with a strong sense of an organizing subject. In many respects, the first category is more interesting for posthumanism, but it should not be forgotten that literature includes both elements, which are sometimes at odds with each other. This split may define a whole canonical body of work. Virginia Woolf's novels are characterized by such a division between the self and a complex connectedness to the world. Some of her titles reveal their focus on the individual —*Mrs. Dalloway*, *Jacob's Room*, *Orlando*—whereas others emphasize phenomena outside subjects—*To the Lighthouse*, *The Waves*, *Between the Acts*. From this perspective, her ambition in all her novels may be seen as a search for a balance between the self and the multitude, with many emphatic descriptions of how humans are connected in various ways. This theme in her work also sparked a search for novelistic forms that could express this line of thinking, as Woolf experiments with different ways to represent the conflict between autonomy and intersubjective relations. *The Waves* is told by six different characters and revolves around a seventh, demonstrating how perceptions and constructions of the other are multifaceted, and how consciousnesses weave together, even if they are separate. *To the Lighthouse* weaves together different voices so that they are practically impossible to untangle, again showing rather than stating that the idea of an autonomous subject is an illusion. Her earlier work, *Jacob's Room*, relies on a more traditional narrative structure, but also conveys a sense of voices and multitudes. Moreover, the idea of how human creativity is exercised is closely linked to a dialogue across centuries:

> Stone lies solid over the British Museum, as bone lies cool over the visions and heat of the brain. Only here the brain is Plato's brain and Shakespeare's; the brain has made pots and statues, great bulls and little jewels, and crossed the river of death this way and that incessantly, seeking some landing, now wrapping the body well for its long sleep; now laying a penny piece on the eyes; now turning the toes scrupulously to the East. Meanwhile, Plato continues his dialogue; in spite of the rain; in spite of the cab whistles; in spite of the woman in the mews behind Great Ormond Street who has come home drunk and cries all night long, "Let me in! Let me in!" (Woolf 2008: 149)

In Woolf's later and unfinished memoir, *A Sketch of the Past*, she continues to ponder the question of identity, and argues for the connectedness of individual life:

> Yet it is by such invisible presences that the "subject of the memoir" is tugged this way and that every day of his life; it is they that keep him in position. Consider what immense forces society brings to play upon each of us, how that society changes from decade to decade; and also from class to class; well, if we cannot analyse these invisible presences, we know very little of the subject of the memoir; and again how futile life-writing becomes. I see myself as a fish in a stream; deflected, held in place; but cannot describe the stream. (Woolf 2002: 92)

Woolf sets a high bar for writing, but her argument is genuinely epistemologically oriented

toward figuring out whether there might be forms that can capture her fundamental in the connected subject. The idea of the novel as dialogic medium has been most clearly expressed by Mikhail Bakhtin, who stressed that any utterance, not just the novelistic, is entangled with the discourse of others, *heteroglossia*. Although this entanglement is a precondition for the use of language, there is a difference between striving for monologic expression, both outside of and in fiction, and opting to write in a way that heightens one's attention to the dialogic nature of language. Therefore, the novel is suited to presenting a universe where no single mind may lay claim to the truth, but where the richness of the social world is better captured by multiple voices (Bakhtin 1981: 263).

Woolf is clearly not the only one fascinated by the tension between subject and world, and the conflicting desires of having both clear limits to the world and feeling connected with it. American writer Don DeLillo has a long-standing fascination with crowds and their effects on people: it may be at a baseball stadium, a colossal mass Moon wedding, or people taking photographs of a barn because it is the most photographed barn in America, as in his tongue-in-cheek parody of postmodernism, *White Noise* (DeLillo 1985: 125). On the other hand, solitude and extinction are also recurrent elements, whether in the setting of deserted Finnish roads, graveyards for airplanes, deserts, or the call for the end of consciousness and the weird dream of becoming "stones in a field" (DeLillo 2010: 52–3).[2] DeLillo's novel, *The Names*, explores his fascination with language and writing through the eye of an American in 1970s Greece. Opening and ending at the Acropolis, its protagonist, James Axton, has a quasi-religious experience of the multitude of voices that resonate throughout the Acropolis in all kinds of languages. It is a place that he once thought would be solemn and silent, but he realizes that the people coming there seem to make an offering, the offering of languages that have developed over millennia (DeLillo 1982: 329). Once they have been spotted, such motifs are hard to overlook in his work, and underline the fascination of a sense of distributed subjectivity.

In a classic of posthuman fiction, Olaf Stapledon's *First and Last Men*, it is noteworthy that telepathy is one of the features of the future human race that it envisions. In Stapledon's novel the new humans are connected through a common cloud-like system of thought-sharing brought to humans by Martian aliens (Stapledon 1930: 161). Besides the eerie relevance of describing sharing through a cloud, a metaphor that has come to signify the very rapid transformation of storing information centrally, instead of relying on local physical media, Stapledon's fascination with telepathy is another iteration of humans' paradoxical desires: to be connected with others and eradicate the distance to others, yet, to maintain a sense of self. Having yourself and dissolving it, too, is the paradox that keeps emerging in this theme, and which literature explores, and in return develops, by exploring.

The sense of being connected is also creeping up through everyday technologies. The sense of being read by machines is very apparent when an ad for a product related to something you just searched for appears on a completely different website. How the collection and use of personal data will affect humans in the long run remains an open question, and also depends on the type of society in which one lives. The most transgressive perspective lies in the possibility of mind-reading by machines (Diaz 2018), which has been developed in part to overcome restraints on the persons with disabilities, but could be used

for other purposes. However, no matter the purpose, there is a groundbreaking difference between imagining a robot that could read minds, as in Isaac Asimov's story, "Liar!", and knowing that one's innermost thoughts may not be private anymore. Between the desire to be connected and the nightmare of being exposed to the world, most people of the early twenty-first century would probably prefer to remain private. Asimov's brilliant plot is given a further twist by its observation of his first law of robots, that a robot must not hurt humans, but in order to do so, it lies to not hurt their feeling. Eventually, the researchers see through its motives for lying, and that does hurt the feelings of the people whose minds it can read:

> You've caught on, have you? This robot reads minds. Do you suppose it doesn't know everything about mental injury? Do you suppose that if asked a question, it wouldn't give exactly that answer that one wants to hear? Wouldn't any other answer hurt us, and wouldn't Herbie know that? (Asimov 2008: 108)

GIVING VOICE TO

Literature is filled with nonhuman beings that are given a voice and agency, perhaps more so than any other art form, owing to the egalitarian nature of representing speech and thought, which may be ascribed to any kind of being without having to illustrate it, or make it visually or audibly convincing. Literature can give voice to all kinds of nonhuman entities—gods, animals, flora, imaginary creatures, aliens—in a way that puts them on par with humans with respect to the crucial point of verbal communication. As posthumanist thinking has become more widespread, so has the awareness of early attempts to represent the nonhuman in literature, as the collection of essays in *Renaissance Posthumanism* demonstrates (Campana 2016). Such research in to precursors of posthumanist thinking shows that its historical roots go back to long before the formulation of a posthumanist paradigm.

The representation of the nonhuman in literature, particularly when they are given some kind of agency, not only elicits empathy with other beings, but also contributes to an enchantment of the world. This may be magical or supernatural, an element that has played a significant role in fables, fairy tales, and in the genre of magical realism, and the universal appeal of these genres speaks clearly of the fascination of these features across cultures. Providing agency could come with the drawback of an overly sentimental anthropomorphism, such as Richard Bach's 1970s bestseller, *Jonathan Livingston Seagull*, where the philosophical ideas are hard to ignore, although they are not overly sophisticated. A possible weakness of literature that gives nonhumans agency could be that it humanizes what is not supposed to be human, but deserves to be treated on its own terms.

Donna Haraway's theoretical and autobiographical considerations of establishing companionship may offer a more contemporary, fruitful way of making animals present in literature (Haraway 2007: 296). This relationship has been explored by writers such as Norwegian Erlend Loe with *Doppler*, Angolan José Eduardo Agualusa with *A General Theory of Oblivion*, Chinese Mo Yan with *Shifu, You'll Do Anything for a Laugh*, and Bosnian émigré Téa Obreht with *The Tiger's Wife*. Rather than being ascribed human traits, the animals in these works—a moose, a dog, a wolf, and a tiger, respectively—appear as

animals, but establish relationships with humans that may appear unlikely, but create a fictional universe where communication among species is not represented in human terms only. Even more pronounced than these examples is the use of animal agency in enchanted fiction such as magical realism. The divide between magic and realism is part of a grand narrative of the twentieth century concerning the role of enchantment (Landy and Saler 2009). Is enchantment desirable if it is based on storytelling that has little connection with reality, and may even lead to a delusional view of the world? Or is it a powerful device that can help to create new visions of possible futures, or establish emotional connections to other species? Although endowing nonhumans with supernatural qualities may come off as sentimental, it is also not hard to see this inclusion as a hope for a more interesting and connected world. However, as Ursula K. Heise points out, the stakes are higher than enchantment for the benefit of humans, and come down to essential political questions:

> Eco-cosmopolitanism is not based on the assumption that forming part of the biological species *Homo sapiens* guarantees any far-reaching commonality or shared legacy that could serve as the foundation for structuring a global political community. On the contrary, eco-cosmopolitanism as I conceive it is shaped by an awareness that very little commonality can be taken for granted and that speaking about the human species, humanity, humanness, or the Anthropocene requires a patient and meticulous process of *assembly*—in its most craftsmanlike and technological connotations. Speaking about species is also an assembly in the political sense, the process of convening a representative and democratic forum for deliberating and deciding on courses of action that affect all: all humans, but also many nonhuman species if the goal is some form of multispecies justice. (Heise 2016: 226)

The presence of animals with agency tests the moral status of human beings. Particularly when humans spend their lives fighting wars, it is not difficult to see animals as morally superior, or at least less evil, than a species that takes part in massacres and develops technology that could end humanity. That is abundantly clear when one reads Vonnegut's account of the bombing of Dresden in 1945, in *Slaughterhouse-Five,* where the birds have the last word (or tweet) as, uncomprehending of what has occurred, they observe the smoke-filled landscape where nobody is left to say anything except "Poo-tee-weet" (Vonnegut 1969: 215).

POSTHUMAN FANTASIES AND BACKLASH

Frankenstein's creation, or monster, has become such a recognizable cultural icon, particularly through various cinematic adaptations of Mary Shelley's novel, that most people would recognize the image of the huge, stitched-together being. The very fascination of the creation is telling of the cultural interest in the prospects of a posthuman, although the popular image of the creation differs quite a bit from Shelley's novel, which is itself also revealing. The eloquent creation in the novel argues better than Dr. Victor Frankenstein, but is popularly recognized as dumb and silent. It is fast and agile in the novel, but the popular

image is slow-moving. There is agreement that it is huge and ugly, but Frankenstein's intention to create a normally proportioned being is lost in that image.

Since Shelley, there has been much fiction that featured posthuman or transhuman characters, particularly in science fiction, which explores the addition of new properties to the human condition. The difference between posthuman and transhuman is not easy to draw, and I use "transhuman" to signify the technologically based development of humans into a form that clearly separates them from humans, whereas "posthuman" covers a larger group of different departures from the human, including naturally evolved new species. Visions of the posthuman tend to not provide a happy ending, and there is a certain dystopian vibe that accompanies ideas about a change in humankind. This also touches on one of the paradoxes of the posthuman discourse, as few would argue that humans in their present form are perfect. Bodies, intellect, and perhaps not least, morality and empathy, all seem valid candidates for improvement; on the other hand, there are also ways to celebrate the imperfections of the human, and an unconvincing, hybridist attitude of believing that one could have figured everything out in terms of what would serve humankind best. French author Michel Houellebecq has provided one of the most interesting solutions to the problem of describing a radically different future without making its dystopian aspect seem like an implicit recognition that we already have the best humanity possible. Houellebecq is a relentless critic of the present day, and against this background, his two primary visions of a posthuman future appear as flawed but interesting alternatives. In particular, there is the vision at the end of *Elementary Particles*, written from a future perspective, which details how UNESCO took charge of developing a new, genetically modified human with a more docile nature than the depraved humans that inhabit most of the novel. Similarly, a cloning program that would provide a sort of quasi-immortality in *The Possibility of an Island* invites reflection on the kind of life one would live if a technologically altered human being was also imperfect, and not the endpoint of history.

An interesting development in literature is the time-span in which posthuman evolution is envisioned. In *The Time Machine*, H. G. Wells imagined hundreds of thousands of years for a process of evolution to make its mark and divide humanity into two separate species, whereas Olaf Stapledon envisioned millions of years for a shift from one successor of humanity to another. The general trend seems to be that such enormous stretches of time have been abandoned, and that rapid transformation over centuries, or even decades, is the dominant time frame for imaging a radical transformation. This is also an element of science fiction that is concerned with an imminent future that is not completely without a basis in technological developments. Where Philip K. Dick might dream of punch-hole rolls that would control an artificial mind in "The Electric Ant," which seems delightfully quaint today, the potential outcome of computational power and the control of the tiniest components of life coming together is enormous. Large time frames are not dead, though: Big History has become a field of increasing interest, as it both goes way beyond traditional, human-centered historical time, and connects to the Anthropocene as a new, grand narrative of how humanity is at the center of a development that it cannot control, and which will—as all periods will—come to an end before something new and nonhuman emerges. The contrast between the Stoic acceptance of being part of a very limited period and a transhumanist sense of urgency,

potential, and taking care of one's own interests could hardly be greater. The fusion of these two perspectives—the transhumanist and the Anthropocene or ecological—happens often in literary fiction. Kim Stanley Robinson's novels *New York 2140* and *2312* are set in a not-too-distant future, and address both environmental issues and human enhancement. Similarly, in her *MaddAddam*-trilogy, Margaret Attwood has created a world where technological tampering with species, including humans, ecological disasters, and societal breakdown come together.

Fiction also foreshadowed the emergence of non-binary gender. To return to Virginia Woolf, her novel *Orlando* introduces indeterminate and fluid gender, a theme that was continued by Ursula K. Le Guin in her 1969 novel, *The Left Hand of Darkness*, which imagines a postgender society. This also highlights gender and dominating norms. Gender, which is also embedded in language, and thus something that fiction cannot address in a neutral way, may be the fastest-changing category of identity in recent decades. From being almost impossible to think of in non-binary terms, gender has become a complex marker of identity, and may be one of the most divisive topics. There is quite a distance between large companies embracing multifaceted identities and giving people the right to not disclose their gender, to commonly held notions of binary gender identity prevalent among a majority of the world's population, yet things may continue to change rapidly.

The most optimistic fictionalized accounts of a posthuman future come from works by futurists such as Ray Kurzweil, who, in *The Singularity Is Near*, uses many of fiction's stylistic devices, and combines a sense of humor with an endless belief in the prospects of accelerating technological development. Fantasies of total empowerment have clearly fascinated humanity for millennia, but stories based on technological promises and utopian endpoints are neither credible nor interesting as literature. A central conflict in literature concerning the posthuman lies between existing conditions that determine identity, for better or worse, and the freedom to be able shape oneself. The latter is a recurrent theme in descriptions of a future where technology does not set any limits on a human taking whatever shape it wants, as in *The Singularity is Near*, or Danish novelist Kaspar Colling-Nielsen's *The Danish Civil War 2018–24*. Although this endless freedom seems to be far beyond our reach, the lack of constraints also creates a sense of pointlessness. If everything is possible, what is worth hoping for, believing in, or being worried about? It is possible to imagine a world without such emotions, but that would be a completely different world. The lack of interesting narratives that could exist in such a world may highlight values that few would care to surrender. The end of history would also be the end of histories.

Excessive constraints that leave the individual with very limited freedom to shape its own identity are a challenge that has been explored by three dystopian classics of the twentieth century—Aldous Huxley's *Brave New World*, George Orwell's *Nineteen Eighty-Four*, and Ray Bradbury's *Fahrenheit 451*. Each of these describes a future where the citizens of highly regulated societies are incapable of determining themselves, in the broad sense of the word. From Huxley's controlling state, which divides people into classes before they are born, and lets everybody live a pleasant, uneventful life until they die at sixty, to the shrinking language of Orwell's Oceania, which is designed to make individual thought impossible, to the hatred of literature and their complex narratives in Bradbury's book-burning dystopia, the ability to

take part in creating a narrative of one's own stands out as the pivotal quality that makes humans human.

The fascination of posthumans and transhumans may be most unnerving when it is part of an otherwise realist, mainstream narrative. David Mitchell's *Cloud Atlas* begins and ends in familiar historical circumstances of the nineteenth century, but the novel's arc takes the reader forward to posthuman and post-apocalyptic ages that underline the potential of both becoming something quite different, as in the dystopian novels of the twentieth century, and being dragged back to pre-historic conditions, where humanity would have to reinvent itself.

CONCLUSION

I have argued here and elsewhere (Thomsen 2013) that literature exists at the intersection of very diverse orientations. Literature uses a medium that comes the closest to being in the mind of another individual, but it is also a medium that can challenge this same individuality, and imagine a space of connected minds. It is an art form that has developed forms to address these concerns that spill over when conjuring up vivid imagery of other ways of being in the world. Fiction has also been at the forefront of imagining posthuman beings that are enhanced, compared to humans, and also unnerving, and through its rejection of, or skepticism about new modes of being, literature confers a certain implicit confirmation of the human as we know it. Literature has been visionary at times when the means of transforming humans into something else were a matter of fiction. Today, technological resources have far surpassed much fiction that was written just a few decades ago, and the increased interest in the human condition goes hand in hand with the awareness that moral restraint, rather than technological incapability, will determine the future of humankind. If literature is one of the most exclusively human phenomena, it cannot help but to highlight the ethics of human privilege, and how the privilege of having a poetic and narrative voice may be used at a time when the notion of the subject is changing. Jorge Luis Borges would probably not describe himself as a posthumanist, but his fiction is very much at the intersection of transhumanist and posthumanist visions, where the sense of self contrasts with the sense of the world in an ever-unresolved story.

---

ee more about GPT-2 at www.openai.com

he "stones in the field" motif is repeated in a subtle pun in DeLillo's 2016 cryonics novel, *Zero K*, where the facilities and programs for freezing people so they have a chance to beat death are run by Swedish twins named Stenmark—which literally translates as "stone field."

SOURCES CITED

Agualusa, José Eduardo. *A General Theory of Oblivion*. London: Vintage, 2016.
Asimov, Isaac. *I, Robot*. Garden City, NY: Doubleday, 1950.
Asimov, Isaac. *I, Robot*. New York: Bantam Spectra, [1950] 2008.

Atwood, Margaret. *Maddaddam: A Novel*. New York: Nan A. Talese/ Doubleday, 2013.

Bach, Richard. *Jonathan Livingston Seagull*. New York: Avon Books, 1970.

Bakhtin, Mikhail M. *The Dialogic Imagination: Four Essays*. Austin: University of Texas Press, 1981.

Barthes, Roland. *Image Music Text*. London: Fontana Press, 1977.

Bradbury, Ray. *Fahrenheit 451: The Temperature at Which Book Paper Catches Fire, and Burns*. New York: Ballantine Books, 1953.

Campana, Joseph, and Scott Maisano, eds. *Renaissance Posthumanism*. New York: Fordham University Press, 2016.

Čapek, Karel. *Capek: Four Plays*. London: Methuen, 1999.

Clarke, Bruce, and Manuela Rossini. *The Cambridge Companion to Literature and the Posthuman*. Cambridge: Cambridge University Press, 2017.

Colling-Nielsen, Kaspar. *Den danske borgerkrig 2018–24*. Copenhagen: Gyldendal, 2013.

DeLillo, Don. *The Names*. New York: Knopf, 1982.

DeLillo, Don. *White Noise*. New York: Viking, 1985.

DeLillo, Don. *Mao II*. New York: Viking, 1991.

DeLillo, Don. *Point Omega: A Novel*. New York: Scribner, 2010.

DeLillo, Don. *Zero K: A Novel*. New York: Scribner, 2017.

Diaz, Jesus. "Mind Reading Robots Are No Longer Science Fiction." *Fast Company*, June 20, 2018. https://www.fastcompany.com/90176478/mind-reading-robots-are-no-longer-science-fiction.

Dick, Philip K. *Do Androids Dream of Electric Sheep?* New York: Ballantine Books, 1968.

Dick, Philip K. *The Collected Stories of Philip K. Dick*, vol. 5. Los Angeles: Underwood-Miller, 1987.

Domínguez, Julia. "The Janus Hypothesis in *Don Quixote:* Memory and Imagination in Cervantes." In *Cognitive Approaches to Early Modern Spanish Literature*, edited by Isabel Jean and Julien Jacques Simon. Oxford: Oxford University Press, 2016, pp. 74–90.

Doubrovsky, Serge. *Fils: Roman*. Paris: Galilée, 1977.

Driscoll, Kári, and Eva Hoffman, eds. *What Is Zoopoetics? Texts, Bodies, Entanglement*. Basingstoke: Palgrave, 2017.

Foucault, Michel. *The Foucault Reader*. New York: Penguin, 1984.

Haraway, Donna. *When Species Meet*. Minneapolis: University of Minnesota Press, 2007.

Hayles, Katherine N. *Electronic Literature: New Horizons for the Literary*. Notre Dame: University of Notre Dame Press, 2010.

Heise, Ursula K. *Imagining Extinction: The Cultural Meanings of Endangered Species*. Chicago: The University of Chicago Press, 2016.

Herbrechter, Stefan, and Ivan Callus. *Cy-borges: Memories of the Posthuman in the Work of Jorge Luis Borges*. Lewisburg: Bucknell University Press, 2009.

Houellebecq, Michel. *The Elementary Particles*. New York: Vintage International, 2001.

Houellebecq, Michel. *The Possibility of an Island*. New York: Vintage Books, 2005.

Huxley, Aldous. *Brave New World, a Novel by Aldous Huxley*. London: Chatto and Windus, 1932.

Kurzweil, Raymond. *The Singularity Is Near: When Humans Transcend Biology*. New York: Viking, 2005.

Landy, Joshua, and Michael Saler, eds. *The Re-Enchantment of the World: Secular Magic in a Rational Age*. Stanford: Stanford University Press, 2009.

Le Guin, Ursula K. *The Left Hand of Darkness*. New York: Ace Books, 1969.

Loe, Erlend. *Doppler*. Toronto: Anansi, 2012.

Mitchell, David. *Cloud Atlas*. London: Sceptre, 2003.

Mo, Yan. *Shifu, You'll Do Anything for a Laugh*. New York: Arcade, 2001.

Mo, Yan. *Life and Death Are Wearing Me Out: A Novel*. New York: Arcade, 2008.

Nussbaum, Martha C. "Democratic Citizenship and the Narrative Imagination." *Yearbook of the National Society for the Study of Education*, vol. 107, no. 1 (2008): 143–57.

Obreht, Tea. *Tiger's Wife*. London: Weidenfeld & Nicolson, 2010.

Orwell, George. *Nineteen Eighty-Four*. London: Penguin, [1949] 1987.

Robinson, Kim S. *2312*. London: Orbit, 2012.

Robinson, Kim S. *New York 2140*. London: Orbit, 2017.

Shelley, Mary. Frankenstein, or, the Modern Prometheus. Edited by M. K. Joseph. Oxford: Oxford University Press, [1818] 2008.

Spier, Fred. *The Structure of Big History from the Big Bang until Today*. Amsterdam: Amsterdam University Press, 1996.

Stapledon, Olaf. *Last and First Men: A Story of the Near and Far Future*. Harmondsworth: Middlesex, 1930.

Thomsen, Mads Rosendahl. *The New Human in Literature: Posthuman Visions of Changes in Body, Mind and Society after*

1900. London: Bloomsbury, 2013.

Vonnegut, Kurt. *Slaughterhouse-Five, or the Children's Crusade: A Duty-Dance with Death*. New York: Delacorte, 1969.

Wells, Herbert G. *The Time Machine*. New York: Baronet Books, [1895] 2008.

Woolf, Virginia. *A Room of One's Own*. New York: Harcourt, [1929] 1989.

Woolf, Virginia. *Orlando*. New York: Harcourt Brace, [1928] 1990.

Woolf, Virginia. *The Waves*. London: Penguin, [1931] 2000.

Woolf, Virginia. *Moments of Being: Autobiographical Writings*. London: Pimlico, [1972] 2002.

Woolf, Virginia. *To the Lighthouse*. Oxford: Oxford University Press, [1927] 2008.

CHAPTER TWENTY-SIX

Posthuman Temporalities in Science and Bioart

PERNILLE LETH-ESPENSEN

Sociologist of science Bruno Latour has argued that technologies imply a "folding of time" (Latour 1994: 45). Theorist of the posthuman and professor of comparative literature N. Katherine Hayles has developed this point and states: "All technics imply, instantiate, and evolve through complex temporalities" (Hayles 2012: 90). Hayles primarily analyzes the temporalities of digital technologies. In this chapter, however, I will discuss some of the ways in which biotechnologies change and manipulate the temporality of biological material. In her famous essay "A Cyborg Manifesto," feminist, philosopher, and biologist Donna Haraway argues that by the late twentieth century three boundaries have been breached: the boundary between human and animal, the boundary between man and machine, and the boundary between physical and non-physical (Haraway [1985] 2003: 517–18).[1] In extension of her argument, I believe an additional threshold has become increasingly blurred during the twentieth century: namely the boundary between life and death, which concerns the temporality of bodies. I will thus argue that an important aspect of the posthuman condition is that technological developments in the life sciences have made the temporalities of bodies —and the boundary between life and death—more complex. Furthermore, I will discuss how this is investigated in four works of bioart.

Initially, my use of the term *posthumanism* will be clarified, as it is a concept that has been defined in different ways, some of them even contradictory. In his book *What Is*

Posthumanism, theorist of posthumanism and animal studies Cary Wolfe argues that posthumanism comes both before and after humanism. It comes before as it emphasizes that the human has always already been embodied and embedded with technologies, but "it comes after in the sense that posthumanism names a historical moment in which the decentering of the human by its imbrication in technical, medical, informatic, and economic networks is increasingly impossible to ignore" (Wolfe 2010: xv). To put it in different terms, posthumanism both conceptually questions the enlightenment conception of the autonomous human subject and furthermore describes how the recent technological development has challenged the idea of the autonomous human subject even more. Both Wolfe and posthuman theorist and feminist Rosi Braidotti consider posthumanism to be different than transhumanism (Wolfe 2010: xv; Braidotti 2013: 90). The transhumanist movement wishes to enhance the human body and mind as well as to extend human life. And transhumanism lies in extension of a humanist and enlightenment conception of human subjectivity (Bostrom [2005] 2011: 4), whereas posthumanism questions and problematizes this same conception (Wolfe 2010: xv).

In the first part of this chapter, the development of cell and tissue culture techniques and cryotechnologies will be outlined, and it will be discussed how this has affected the temporal life of bodies. Moreover, theoretical perspectives on the temporality of technologies will be presented. In the second part, I will discuss how the temporality of bodies is addressed in works of bioart. *Bioart* (or *biological art*) is art created with technologies and processes taken from the natural sciences: from molecular biology, cell biology, neurobiology, nanotechnology, and so forth.[2] In the past twenty years, an increasing number of artists have begun working in this area. Artworks within this field are particularly relevant to discuss in the context of posthumanism, as they often delve into the ways in which the technological development challenges the notion of the human subject, the relation between life and death, between nature and culture, and between humans and other living beings. The first artworks that will be discussed are Svenja J. Kratz's *The Absence of Alice* and *The Immortalisation of Kira and Rama*, which thematize cell and tissue culture technologies and explore the fact that, with immortal cell lines, fragments of bodies can continue to live after the death of the donor. Secondly, I will analyze the artist Orlan's work *The Reincarnation of Orlan* from a temporal perspective. Finally, I will discuss Guy Ben-Ary, Boryana Rossa, and Oleg Mavromatti's artwork *Snowflake* that also employs cell culture technologies, but does so in order to thematize *cryonics*, a movement whose ambition is to radically extend the life of brains or bodies through cryopreservation. Whereas the first artworks address immortal cell lines, a biological artifact used every day in laboratories around the world, the last one thematizes a more speculative conception of medical time travel and immortal minds and bodies. Common for the works is that they explore the temporality of biological material and the ways in which biomedical technologies have made the boundary between life and death increasingly blurred.

CELL AND TISSUE CULTURE

Historian of science Hannah Landecker stresses that cell and tissue culture technologies have

affected the temporality of bodies. In her book *Culturing Life,* she writes: "Living things may be radically altered in the way they live in space and *time* and thus may be harnessed to human intention" (Landecker 2007: 1; italics added). But what is cell and tissue culture? These technologies were developed from the early twentieth century onward, and they make it possible to remove cells from a living organism, to cultivate the cells outside this organism in a Petri dish, and to keep them alive. The researcher Ross Harrison was the first who successfully cultured living cells in vitro when, in 1907, he cultivated a nerve that grew from a fragment in a frog embryo (Landecker 2007: 33). In the first decades, it was only possible to cultivate cells from animals. In 1951, however, the researcher George Gey succeeded in growing human cells when he cultivated cells from the African American woman Henrietta Lacks who suffered from an aggressive cervix cancer. Today, sixty-eight years after her death, her cells are still living in laboratories around the world, and they have even been sent into space (Landecker 2007: 138). It is estimated that the quantity of her cells growing in laboratories around the world by far exceeds her body mass when she was alive. The cancer cells from her body are a sort of living memory of her as they contain her DNA. Initially, it was believed that all cells continue dividing; however, in 1961, professor of anatomy and microbiology Leonard Hayflick discovered that normal cells only divide thirty to fifty times. Cancer cells, however, continue to divide and they can therefore become an immortal cell line. It is also possible to create an immortal cell line by infecting normal cells with a virus in order to induce them to behave as cancer cells (Landecker 2007: 168), and with the right laboratory conditions, they can live indefinitely (Freshney 2010: 23). Cell cultures thus exist in a liminal zone between life and death. The artist collective The Tissue Culture & Art project (TC&A), who creates artworks with cell and tissue culture technologies, has accordingly coined the term *semi-living* in order to describe the liminal status of cells in vitro (Catts and Zurr 2007: 232).[3]

FROSTIES, AGE CHIMERAS, AND POTENTIAL CHILDREN

Another breakthrough in tissue culture research occurred in 1949 when biologists Audrey Ursula Smith and Christopher Polge accidentally discovered that glycerol protects chicken semen from being damaged when frozen and thawed. Normally, the cells would be damaged because of ice formation inside or outside the cell; however, with glycerol as a cryoprotectant, the cells may be frozen in liquid nitrogen at minus 196 degrees Celsius, at which temperature the cells stop dividing (and thus do not age), but they do not die. They are "suspended in time" or "paused" and thus exist in the borderland between life and death. This enables in a way biological material to travel through time. Polge soon realized that this technology might be used in breeding, and the first calf created with frozen semen was born in 1953 and appropriately named *Frosty* (Radin 2017: 35–41). Since then, this technology has been used to freeze many other types of cells, and it has enabled long-term storage in so-called cell banks since the 1960s (Landecker 2007: 226). The most well-known is the American Type Culture Collection (ATCC), which contains more than 4,000 cell lines from

humans, animals, and plants. The HeLa cell line was one of the first to be cataloged at the ATCC (Landecker 2007: 156).

Cell and tissue culture technologies have thus enabled tissue from both humans and animals to continue to live much longer than the organism they originate from, and cryotechnologies have enabled us to "pause" cells in time. These technologies thus change the temporality of biological tissue in a radical way. Cryotechnologies have already had a large impact within assisted reproduction. In connection to in vitro fertilization, it is possible to have surplus embryos frozen. Months or years later, these embryos may be implanted for a new potential pregnancy. This technology is used routinely today and the embryos known colloquially as "frosties" or, if the embryo is adopted, "snowflake babies." A "potential human" may thus be kept in the freezer for months or years. In 2017, a baby was born from an embryo that had been frozen for twenty-four years. The woman who had adopted the embryo was only one year old when it was frozen in 1992 (Scutti 2017). From one perspective, she is twenty-five years older than her child; from another, she is only one year older than the child to whom she gave birth.

The freezing of tissue is also an option in relation to treatment for cancer. If a woman suffers from cancer, she may have her ovaries removed and frozen while she is going through chemotherapy and then have them implanted a few years later when she has recovered. The ovaries are thus a few years younger than her, and she thereby becomes what Landecker terms an "age chimera," meaning that some of the tissue in her body has a different age than the rest (Landecker 2007: 154).

In 2016, it was legalized in Denmark for a wife to use her deceased husband's cryopreserved semen if he had consented to this before his death. An explicit time limit for this potential use was not set.[4] The possibility of freezing and storing semen for decades may give rise to a range of absurd scenarios. Technologically, it is possible for women in the future to have children with a man who died five, ten, or even a hundred years earlier, which may change the current structures of kinship, and it shows how the temporality of bodies has become increasingly complex. In continuation of this changed law, the Danish Council of Ethics has discussed whether frozen semen should be covered by inheritance rights, referring to whether "potential children" should be able to inherit. The council was divided on this question; on the one hand, some argued that it is absurd to speak of the inheritance rights of nonexistent persons; on the other, some argued that it is not fair that a child will have a different financial point of departure than its siblings.[5]

A radical—and currently more speculative—attempt to affect the temporality of the body is cryonics. In cryonics, humans choose to be frozen immediately after their hearts have stopped beating in order to be thawed in the future when medicine has succeeded in reanimating people and found a cure for the disease that killed them. The idea was fostered in 1962 by Robert Ettinger in the books *The Prospect of Immortality* (Ettinger [1962] 1964) and *Man into Superman* (Ettinger [1972] 2005).[6] Ettinger founded the Cryonics Institute and was its director until his death in 2011.[7] He has had his own mother frozen (1977) as well as his first (1987) and second wife (2000). According to the website of the Cryonics Institute, 171 humans have currently been suspended at this facility.[8] However, it has not (yet) been

technologically feasible to defrost and reanimate any of these people, and many scientists question whether it ever will. The advocates of the idea turn their faith to the development in bio- and nanotechnology and argue that the current technological challenges will be solved at some point. At the Cryonics Institute, it is only possible to have the whole body suspended,[9] but at one of the other major companies that offer cryopreservation, The Alcor Life Extension Foundation, it is possible to have only the brain suspended—what they call "the neuro option."[10] Furthermore, both companies offer preservation of pets, which is quite common.[11] Cryonics is tightly connected to the transhumanist movement and transhuman ideas of prolonged life or immortality (Bostrom [2005] 2011: 12–13, 26; Ettinger [1972] 2005). The current president of the Alcor Life Extension Foundation, Max More, is also one of the leading proponents of transhumanism.[12]

TECHNOLOGIES AND TEMPORALITY

In the introduction, I cited N. Katherine Hayles who argues that all technics imply complex temporalities. One of her examples is borrowed from the French philosopher Bernard Stiegler. In his book *Technics and Time, 2: Disorientation*, it is argued that our biological capacity for memory is a way of carrying the past into the present. With different kinds of technologies, such as writing technologies, photography, and audio and video recording devices, however, memory is exteriorized. This exteriorization enables us through a complex temporality to re-experience sense impressions from earlier in our lives, or through media to experience an event that was never experienced firsthand (Hayles 2012: 90; Stiegler 2009: 78–9). Cell culture technologies, including immortal cell lines and cryotechnologies, are not dissimilar to this example, although the media is obviously a different one. As cell culture technologies have enabled tissue to become exterior to the body, it may travel to the future and be used by or implanted in people who were not born when the donor of the tissue died.

There are also some similarities between photographs and cell culture and cryonics. A photograph shows a person's image separate from himself or herself and transforms a subject into a fixed object (Barthes [1980] 2000: 12–13). This same objectification of the subject also characterizes cell and tissue culture and cryonics, albeit in different ways. Interestingly, at the Cryonics Institute, a large proportion of the cryopreserved patients have their photograph on the wall. The patients' original visual appearance is thus maintained in a photograph, while their bodies are preserved in the freezer. French philosopher Roland Barthes writes on the photograph: "In the Photograph, Time's immobilization assumes only an excessive, monstrous mode: Time is engorged (whence the relation with the *Tableau Vivant*, whose mythic prototype is the princess falling asleep in the *Sleeping Beauty*)" (Barthes [1980] 2000: 91). The dream of cryonics is the modern-day voluntary technological version of the Sleeping Beauty: to "sleep" in liquid nitrogen for decades or centuries and continue to live as before when reanimated.

In the sections above, we have encountered a range of examples showing how biotechnology has altered the temporality of bodies and how the boundary between life and death is challenged. In the following part of this chapter, it will be discussed how a range of

artists thematize these questions through their works.

THE ABSENCE OF ALICE

In the project *The Absence of Alice*, the Australian artist Svenja J. Kratz has worked with cell and tissue culture technologies. In a series of works, she investigates how these technologies affect our notions of subjectivity, identity, and life. Furthermore, she turns our attention to the ways in which these technologies are changing the temporality of biological tissue. This series of works is based on her work with Saos-2, a bone cancer cell line derived from an eleven-year-old girl who died in 1973, which is used in laboratories around the world.[13] and Wikipedia lists it as one of the most common cell lines ("Saos-2", Wikipedia 2018). These cells have continued to live forty-six years after the rest of her body died. When cells are cultivated in the laboratory, they are kept in a so-called tissue culture flask and fed with nutrient media, and, as the cells grow, they are regularly divided into new flasks in a process known as passaging (Freshney 2010: chapter 12). Kratz worked with the Saos-2 cell line for a period of six months at the Institute of Health and Biomedical Innovation (IHBI) at Queensland University of Technology. During this period, she passaged the cells seventy-eight times, and she noticed that the more times the cells were passaged, the more they transformed and changed from the original cell line (Cohen and Kratz 2009: 96).
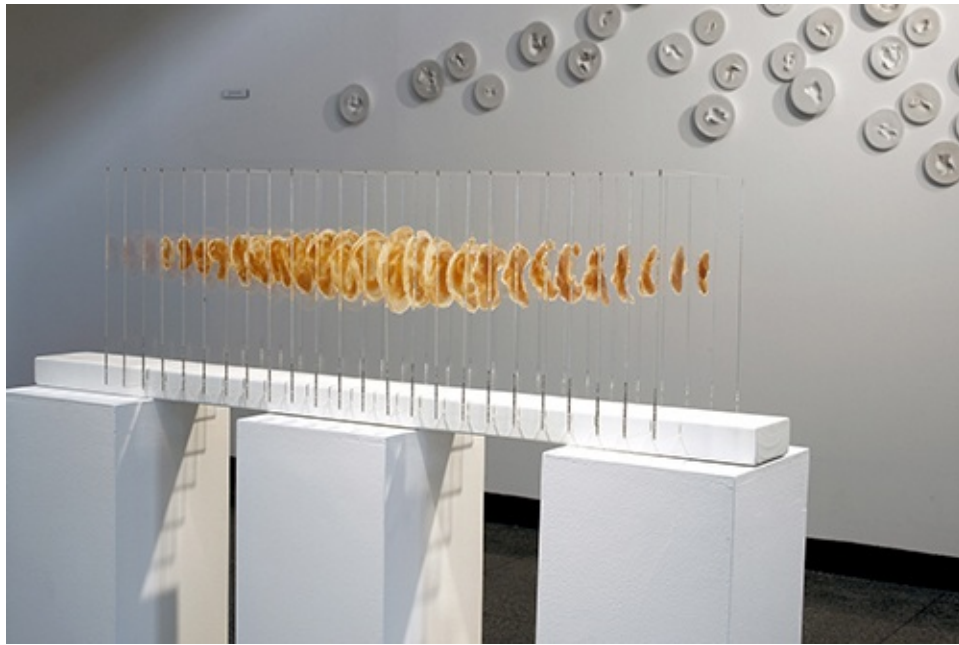
FIGURE 26.1 Svenja J. Kratz. *The Absence of Alice: Fragments of a Body in the Process of Becoming Other*. Exhibited at Queensland University of Technology, 2008.

Based on her experiments, Kratz has created a series of works under the title *The Absence of Alice*. In *Fragments of a Body in Process of Becoming Other*, cells from various passage stages were mixed with latex and put on Perspex slides (Figure 26.1). They were arranged in order of passage number, and the number and date were inscribed on the edge of the slide (Cohen and Kratz 2009: 97). Kratz writes about the work: "Displayed in this manner, the

work references biological sample and display slides and the way in which progress, or growth, is mapped by fixing particular moments in time" (Cohen and Kratz 2009: 97). The work thus thematizes how cells change over time when growing in vitro.

Another work in the project, *Death Masks #3—Alice Ants*, consisted of seven plastic molds of the face of an eleven-year-old girl (Figure 26.2).

FIGURE 26.2 Svenja J. Kratz. In the foreground: *The Absence of Alice: Death Masks #3—Alice Ants.* Vacuum formed molds of the face of a young girl, containing a mixture of living ants, soil, sugar, and Saos-2 cell line. In the background: *The Absence of Alice: Death Masks: Mutable Death Masks,* seven masks made of slow recovery polyurethane foam containing Saos-2 cell line. Exhibited at Queensland University of Technology, 2008.

The donor of the cells is anonymous, but Kratz has named her Alice. The molds contained a combination of Saos-2 cells and sugar as well as living ant colonies, and, during the exhibition period, the ants ate the mix. Some of the visitors to the exhibition considered the fact that the cells were eaten by ants disrespectful, but, according to the artist, the intention was to demonstrate how humans live in a rhizome with other animals (Cohen and Kratz 2009: 102–3). In another work in the series, *Death Masks: Mutable Death Masks* (Figure 26.2), Kratz has created death masks of slow recovery polyurethane foam (also known as memory foam) containing the cells, and the work *Death Masks: Alice Becoming* consists of a series of death masks in degrading plaster (Figure 26.3).[14]

FIGURE 26.3 Svenja J. Kratz. *The Absence of Alice: Death Masks—Alice Becoming,* 2008. A series of death masks in degrading plaster. Exhibited at Queensland University of Technology, 2008.

A face is considered a marker of personal identity, and the death mask is a traditional way of remembering a dead individual (Pointon 2014: 171). As the cells are provided with the contours of a face in the form of a death mask, it is stressed that the cells are not merely a biological product but that the amorphous mass of living material originates from a human being. The subjectivity is also stressed by naming the anonymous donor of cells. Similar to monuments constructed to commemorate dead soldiers or victims, Kratz's work is a memorial to the tissue of a girl and her contribution to scientific research. The title—*The Absence of Alice*—points to the donor of the cells and marks the work as a work about remembering. As the masks made of plaster gradually degrade, as the contours of the masks in memory foam gradually become less visible, and as her cells are eaten by ants, the works also turn our attention to how the cells slowly change and how the identity of the girl is erased little by little as time passes. The title, *The Absence of Alice,* points to a paradox: a fragment of Alice's body is a present part of the work, but at the same time she is absent as a person; as Kratz states, the work consists of "living fragments of an absent human body."[15]

The nutrient media used for cultivating cells contains fetal calf serum (FBS), which is centrifuged blood from fetal calves. Kratz has created a range of works that comment on this use of fetal calves. The work *A Shrine for Algernon* was a lifelike sculpture of a fetal calf made in polymer clay, resting on a table, with paint resembling blood dripping from it. In the project *The Immortalisation of Kira and Rama,* which was developed in continuation of *The Absence of Alice* project, Kratz obtained two fetal calves from an abattoir in order to preserve their bodies in different ways.[16] Her intention was to isolate different types of cells from the calves and to cultivate and immortalize these cells in the laboratory and, furthermore, to preserve the fetal calves by embalming them. She did not succeed completely with the embalming process but did preserve the hearts as well as fragments from their bone and hide. Even though the calves had been dead for two days at the time she received them, she succeeded in isolating and culturing fibroblast cells from the calves. These cells are now frozen, but her intention is to immortalize them.[17] The work thus both manipulates and

explores how the cells exist in space and time. The embalming procedure kills the tissue but preserves it structurally in order to prevent decomposition. The frozen cells are in "suspended animation"; they are still alive but presently not dividing. When the cells are cultivated, they are dividing but will eventually die unless immortalized. The immortalization procedure enables the cells to live and divide forever, given the correct culture conditions. The work thus explores a spectrum of ways in which cells and tissue can exist in a borderland between life and death. The embalming procedure is also a reference to the fact that many cultures have been interested in the afterlife of bodies. The preserved fragments and the frozen cells were part of the exhibition *Visceral* at the Science Gallery in Dublin in 2011.[18]

THE REINCARNATION OF SAINT ORLAN

In *The Absence of Alice*, Svenja J. Kratz employs facial masks in order to address identity in relation to cell and tissue culture technologies. Another artist who has explored the relationship between faciality, identity, and biomedicine is the French artist Orlan. In her famous work *The Reincarnation of Saint Orlan*, she underwent cosmetic surgery in order to model her facial features on beauties from iconic paintings from European art history. Accordingly, her forehead was modeled so as to resemble the forehead of Leonardo's *Mona Lisa* (1503–6), her lips to resemble the lips of Moreau's *Europa* (1869), her chin to resemble that of Botticelli's *Venus* (1484–6), her nose that of Gérard's *Psyche* (1798), and her eyes those of Diana in a sculpture by the Fontainebleau School (1550–60) (O'Bryan 2005: 15). Orlan has furthermore created a series of relics with remnants from her surgical procedures. After her first operation, she sealed fat from her body in a reliquary consisting of transparent resin (Cros et al. 2004: 148–9; Clarke 2000: 196–9).

The Reincarnation of Saint Orlan has been interpreted in many ways. In this context, I will focus on the temporal perspective of the work. Orlan has not chosen that her features should resemble contemporary ideals of beauty or beauty icons. Instead, she has chosen the facial features from women on important paintings from the European art historical canon. With the surgical procedures, Orlan thus incorporates a collective memory of European cultural history and ideals of beauty in her face. By creating a collage of facial traits from a range of represented women, the work thematizes the increasing fragmentation and malleability that biotechnological development has enabled in the last 100 years, and it turns our attention to the fact that bodies are not always spatial and temporal unities anymore. The "piece" may be interpreted as an embodiment of the complex temporalities of bodies, as a living image suspended between past, present, and future.

As Orlan has chosen to create relics from her operations, fragments of her body are furthermore structurally preserved in time as the preservation ensures that they do not decompose and will therefore still be here after her death.

SNOWFLAKE

The Australia-based artist Guy Ben-Ary has also created a range of artworks with cell and tissue culture like Svenja Kratz.[19] In this chapter, I will discuss his artwork *Snowflake* created in collaboration with Bulgarian artist Boryana Rossa and Russian artist Oleg Mavromatti; a

work which employs cell and tissue culture technologies in order to thematize cryonics. The artists state that *Snowflake* is a symbolic art object that responds to the cryonics movement and to the idea of eternal life.[20] The artwork thematizes how the boundary between life and death is becoming increasingly fragile and investigates philosophical and ethical implications of cryonics.

In connection to creating the artwork, Ben-Ary and Rossa visited Robert Ettinger at the Cryonics Institute in 2006 and interviewed him. Since the interview, Ettinger passed away in 2011 and was cryopreserved himself. When Rossa and Ben-Ary created the artwork in 2006, they both worked in the neuroscientist Steve Potter's Laboratory for Neuroengineering at Georgia Institute of Technology in Atlanta, United States. At Potter's laboratory, Ben-Ary and Rossa cultivated neurons from mice and created a series of neural networks that could produce and receive data through stimulation by electrodes. The neural networks were stimulated with an image of a snowflake, and, as they are plastic, the image was worked into the memory of the network. Afterwards, the neurons were frozen at minus 80 degrees Celsius. At that point, Rossa and Ben-Ary had not decided how to use the cells for the artwork, and, when they finished their research stay at Potter's laboratory, they left the cells in the freezer as it is complicated to transport frozen cells. Nine years later, the freezer broke down and the fragile neurons thawed and died.[21]

FIGURE 26.4 Guy Ben-Ary, Boryana Rossa, and Oleg Mavromatti. *Snowflake*. Guy Ben-Ary in the laboratory preparing to stimulate the neural networks with the image of a snowflake.

In 2015, Ben-Ary and Rossa decided to celebrate the original artwork by working on the idea with Russian artist Oleg Mavromatti. However, this time they chose to employ Ben-Ary's own neurons, which he had created for his work of art *CellF*. In *CellF*, Ben-Ary has used the technology induced pluripotent stem (iPS) cells—a technology that has enabled scientists to reverse engineer cells by first converting already differentiated cells (such as skin cells, bone cells, neurons, and so forth) into stem cells, and then differentiating these

stem cells into another type of somatic cell. For *CellF*, Ben-Ary removed a piece of skin from his wrist and transformed the skin cells into neurons with help of the technology.[22] As a technology, iPS is also interesting from a temporal perspective, as it has enabled reversibility in a biological process that until recently was considered irreversible. The artists stimulated Ben-Ary's neurons with the same image of a snowflake used a decade earlier (Figure 26.4) and then froze the cells in a vial at minus 80 degrees Celsius (Figure 26.5).

FIGURE 26.5 Guy Ben-Ary, Boryana Rossa, and Oleg Mavromatti. *Snowflake*. Vial of frozen cells being removed from container with liquid nitrogen.

For the exhibition of the work, the artists placed the vial in a container with liquid nitrogen, and a large snowflake in neon was hung on the wall. Furthermore, photos from the creation process of the work and a video were shown (Figure 26.6).

The video was a montage consisting of a description of the creation process, interview sequences with Robert Ettinger, and clips from the science fiction film *The Flight of Mr. McKinley* (Schweitzer 1975). The soundtrack of the film was used as background music.

The artists express that they are exploring the boundary that separates the physical from the mind. How will the relation between the body and the mind be affected by the process of freezing? Where will we be as people when our bodies are suspended in liquid nitrogen, and what we will be dreaming about? It is probably not coincidental that the artists have chosen to freeze neurons, as the brain is of special interest to the cryonics movement. If it becomes possible to reanimate some of the patients in the future, will their consciousness, memory, and sense of identity be intact? Many within the cryonics movement subscribe to the conception that it is primarily the brain and mind that define us and our sense of identity (Ettinger [1962] 1964: 127). This conception can be seen as an extension of the philosophy of René Descartes who also stressed the importance of the mind for subjectivity (Descartes [1641] 1986). As mentioned, Alcor provides the option of only preserving the brain, and they argue that it might be possible in the future to grow a new body for the brain.[23] This

emphasis on the mind, and the concomitant downplay of the importance of the body, is one of the major points of critique of transhumanism from the posthumanist camp: Cary Wolfe, Donna Haraway, and Katherine Hayles all stress the importance of embodiment and are critical toward a transhuman fantasy of a disembodied mind (Hayles 1999: 1; Gane 2006: 140, 146; Wolfe 2010: xv). As stated, the artists have used neurons created from skin cells with the iPS technology. By using neurons that originate from skin cells, the artwork turns our attention to the fact that the iPS technology questions a body-mind dichotomy.

On its website, the Cryonics Institute advertise that they offer time traveling to a hospital in the future: "The Cryonics Institute provides an ambulance ride to the high-tech hospital of the future."[24] From this perspective, cryonics does not revive dead people; instead, it is seen as an extension of critical care medicine. As a movement, cryonics questions the boundary between life and death, and anthropologist Tiffany Romain argues that the proponents of the movement have invented a whole lexicon describing the liminary zone between life and death. Cryonicists do not speak about cryopreserved humans as dead but refer to them instead as "patients" (Romain 2010: 198). It is emphasized that even though someone is clinically dead, and the heart has stopped beating, most of tissue and cells in the body will still be alive. From this perspective, someone is first completely dead when there is no longer consciousness or memory, what they term "information theoretic death," a notion which also reveals the transhumanist focus on the mind (Romain 2010: 199).

FIGURE 26.6 Guy Ben-Ary, Boryana Rossa, and Oleg Mavromatti. *Snowflake*. Installation of the artwork: Container with liquid nitrogen, a snowflake sign in neon, and photographs and a video describing the work.

As the artists have stimulated the neural network with a snowflake, as a snowflake in neon is part of the exhibition (Figures 26.4 and 26.6), and as the piece is named *Snowflake,* the work very explicitly puts cryotechnologies and their implications on the agenda. On the one hand, the snowflake symbolizes the freezing process; on the other, it may also allude to one of the major challenges to cryonics: the cells will be destroyed if ice crystals are formed

between them, which is the reason why it is necessary to use a cryoprotectant when freezing cells or tissue (Freshney 2010: 318). As frozen and adopted embryos are called "snowflake babies," the work also refers to this praxis—possibly without being aware of it. It was somehow appropriate that the first version of the work was lost when the freezer broke down and the cells thawed. During the first decades of cryonics, cryopreserved bodies have thawed unintentionally several times. On its homepage, Alcor has a page dedicated to so-called "suspension failures," where they describe the history of cryonics and discuss the number of occasions were bodies have thawed.[25]

The Cryonics Institute argues that one of the advantages of cryonics is that it enables "patients" to experience the future. They write: "Don't just imagine the world of the future—personally experience space travel, virtual reality and the other incredible things to come."[26] But can we be certain that we would wake up to a better future? As mentioned, the artwork incorporates film clips and music from the film *The Flight of Mr. McKinley* (Schweitzer 1975). In this film, a man tries to escape the present and travel to the future through hibernation, but when he wakes up, war has left the world devastated. However, it turns out that it might have been a dream. By referencing this film, *Snowflake* contrasts the very utopian conceptions of the future that we are presented with by Alcor and the Cryonics Institute with the more dystopian future scenario from the film. As *The Flight of Mr. McKinley*'s retro-futuristic aesthetics are incorporated in the work, cryonics is also connected to its origin in the 1960s and 1970s. Interestingly, historian of science Jonny Bunning argues that the idea of cryonics was a child of its time, born from the combination of optimism and anxiety that characterized the early Cold War period (Bunning 2017: 223).

If it will become possible in the future to reanimate the cryopreserved patients, family relations may become increasingly complex. The Cryonics Institute writes on its website: "Start anew with your loved ones, children and grandchildren."[27] Robert Ettinger is himself an interesting case. As he has cryopreserved both his first and second wife, his own family situation might become complicated if he is reanimated at some point. He has, however, already considered such questions in his book *The Prospect of Immortality*. He argues that norms for love may change in the future, but he also writes that questions regarding marriage and inheritance should be further contemplated (Ettinger [1962] 1964: 99–102).

Snowflake is relating to a technology which is closely connected to transhuman ideas of dramatic life extension, namely cryonics. Is this artwork transhuman art? In my reading, the artwork is rather congenial with a posthumanist way of thinking. The artists do not work with entire bodies or brains but with a humbler neural network, and the art experiments thus do not deliver new fuel to the utopian conceptions of transhumanism. The emphasis of the failure of the first part of the work addresses the many processes that might go wrong with cryosuspension, and it reminds us of the history of failures within cryonics.[28] Moreover, the incorporation of sequences from the dystopian film *The Flight of Mr. McKinley* also counters the utopian narratives of cryonics. However, rather than adhering to one "ism" or another, the work explores the potential implications of the idea of cryonics.

CONCLUDING REMARKS

The biotechnological development since the beginning of the twentieth century has made the temporality of bodies increasingly complex. The possibility of cultivating tissue and cells outside the body, and the fact that these cells can continue to live after the donor they originate from is dead, is radical. The development within cryobiology takes this a step further, as it is possible to pause cells and let them sleep in cell banks until they are awakened. This has already affected assisted reproduction, where reproductive tissue and embryos may be frozen for decades and be implanted in the body it originates from—or another body—and become the seed for a new child.

This changed temporality is addressed by a range of artists. Common for the artworks discussed is that they explore the still more complex zone between life and death. Kratz has created a range of monuments to a girl who died decades ago, but part of whose body is still living and used in research. By relocating the cells from the anonymity of the cell bank to an art space, the work makes us reflect upon the fact that the cells from hundreds of humans (and animals) still growing in laboratories around the world originate from subjects. The work turns our attention to the contribution to scientific research given by these donors and addresses the paradoxical relation between absence and presence in cell culture technologies.

Furthermore, the works thematize how this changed temporality may affect our sense of identity. In Kratz's work, the identity of Alice is gradually erased as two of the masks are changing and the cells are being eaten by ants in the third. Orlan also explores the connection between faciality and identity. In her "Carnal Art Manifesto," she writes: "Carnal Art is self-portraiture in the classical sense, but realized through the possibility of technology. It swings between defiguration and refiguration" (O'Bryan 2005: 22). On the one hand, the facial features she was born with are altered; on the other, a new identity is created. *Snowflake* thematizes how cryonics specifically—but possibly also cryotechnologies broadly—affects the temporality of bodies and our conception of this temporality. Furthermore, it asks whether someone's consciousness, memory, and identity will continue to be the same after a potential reanimation, and the work explores the relation between mind and body and the interzone between life and death.

Donna Haraway has expressed criticism toward the notion of the posthuman (Gane 2006: 140). Nonetheless, since its publication, "A Cyborg Manifesto" has been an important inspiration for discussions regarding the posthuman and posthumanism (Wolfe 2010: xiii).

For broader introductions into this field, see Eduardo Kac, ed. (2007); Beatriz da Costa og Kavita Philip, eds. (2008); Ingeborg Reichle (2009); Robert Mitchell (2010); Stephen Wilson (2010); Ionat Zurr (2008); Pernille Leth-Espensen (2013).

The Tissue Culture & Art Project (TC&A) are pioneers in creating art with cell and tissue culture technologies, and many of their works could also have been discussed in the context of this article. For more information on their works, see Catts and Zurr (2007); Zurr (2008); as well as their website: https://tcaproject.net. Accessed September 19, 2019.

Lov om ændring af lov om assisteret reproduktion i forbindelse med behandling, diagnostik og forskning m.v.," March 16, 2016. Accessed September 19, 2019. https://www.retsinformation.dk/Forms/R0710.aspx?id=177851.

Etisk Raad. Notat. Udkast til forslag til lov om ændring af lov om assisteret reproduktion." Accessed September 19, 2019.

For a description and analysis of the early history of cryonics, see Bunning (2017: 220–7).

ryonics Institute. Accessed September 19, 2019. http://www.cryonics.org.

Patient details," Cryonics Institute. Accessed September 19, 2019. https://www.cryonics.org/ci-landing/patient-details/.

Cryonics FAQ: Answers to Your Questions," Cryonics Institute. Accessed September 19, 2019. https://www.cryonics.org/about-us/faqs/.

Neuropreservation FAQ," Alcor. Accessed September 19, 2019. https://alcor.org/Library/html/neuropreservationfaq.html.

Interview with Alcor CEO Max More." Accessed September 19, 2019. https://www.youtube.com/watch?v=J0xiX9mPB_s.

Meet Alcor Staff," Alcor. Accessed September 19, 2019, https://alcor.org/AboutAlcor/meetalcorstaff.html.

Saos-2," ATCC. Accessed September 19, 2019, http://www.lgcstandards-atcc.org/Products/All/HTB-85.aspx?geo_country=dk.

Death Masks," by Svenja J. Kratz. Accessed September 19, 2019, http://www.svenjakratz.com/portfolios/death-masks/.

The Absence of Alice," by Svenja J. Kratz. Accessed September 19, 2019. http://www.svenjakratz.com/skprojects/absence-of-alice/the-absence-of-alice-1/.

he work also points to the importance of fetal calves in cell culture research. Is the work critical toward the use of fetal calves in research? Kratz writes: "My work does not aim to criticize the meat industry or use of FBS, but rather comments that there are victims at every level of consumption and that the boundaries between good and bad are always blurred" (Debatty 2014).

The Immortalisation of Kira and Rama," by Svenja J. Kratz. Accessed September 19, 2019, https://www.svenjakratz.com/portfolios/towards-the-immortalisation-of-kira-and-rama/.

cience Gallery (website). Accessed September 19, 2019, https://dublin.sciencegallery.com/visceral/afterlife-immortalisation-kira-and-rama/index.html.

en-Ary. Accessed September 19, 2019. http://guybenary.com.

Snowflake," Ben-Ary. Accessed September 19, 2019. http://guybenary.com/work/snowflake/.

Snowflake," Ben-Ary. Accessed September 19, 2019. http://guybenary.com/work/snowflake/.

CellF," Ben-Ary. Accessed September 19, 2019. http://guybenary.com/work/cellf/.

Neuropreservation FAQ," Alcor. Accessed September 19, 2019. https://alcor.org/Library/html/neuropreservationfaq.html.

ryonics Institute. Accessed September 19, 2019. https://www.cryonics.org.

Suspension Failures: Lessons from the Early Years," by Michael Perry, Alcor, updated October 2014. Accessed September 19, 2019. https://alcor.org/Library/html/suspensionfailures.html.

ryonics Institute. Accessed September 19, 2019. https://www.cryonics.org.

ryonics Institute. Accessed September 19, 2019. https://www.cryonics.org.

lcor. Accessed September 19, 2019. https://alcor.org/Library/html/suspensionfailures.html.

SOURCES CITED

Alcor Life Extension Foundation (*website*). Accessed September 19, 2019, https://alcor.org.

ATCC (*website*). Accessed September 19, 2019, http://www.lgcstandards-atcc.org/?geo_country=dk.

Barthes, Roland. *Camera Lucida: Reflections on Photography*. Translated by Richard. Howard. London: Vintage, [1980] 2000.

Ben-Ary, Guy (*artist's website*). Accessed September 19, 2019, http://guybenary.com/.

Bostrom, Nick. "A History of Transhumanist Thought." Originally published in *Journal of Evolution and Technology*, vol. 14, no. 1 (April 2005): 1–25. Reprinted in edited form in *Academic Writing Across the Disciplines*, edited by Michael Rectenwald and Lisa. Carl. New York: Pearson Longman, 2011. Accessible online. Accessed March 16, 2020, https://www.nickbostrom.com/papers/history.pdf.

Braidotti, Rosi. *The Posthuman*. Cambridge: Polity Press, 2013.

Bunning, Jonny. "The Freezer Program: Value after Life." In *Cryopolitics. Frozen Life in a Melting World*, edited by Joanna. Radin and Emma. Kowal. Cambridge, MA: MIT Press, 2017, pp. 215–43.

Catts, Oron, and Ionat. Zurr. "Semi-Living Art." In *Signs of Life: Bio Art and Beyond*, edited by Eduardo Kac. Cambridge, MA: MIT Press, 2007, pp. 231–47.

Clarke, Julie. "The Sacrificial Body of Orlan." In *Body Modification*, edited by Mike. Featherstone. London: Sage, 2000, pp. 185–207.

Cohen, Haya., and Svenja. J. Kratz. "Becomings: Rhizome Methodologies and the Body-in-Process." *Australasian Journal of ArtsHealth*, vol. 1 (2009): 90–105, http://citeseerx.ist.psu.edu/viewdoc/download? doi=10.1.1.529.3163&rep=rep1&type=pdf.

Costa, Beatriz da, and Kavita. Philip, eds. *Tactical Biopolitics: Art, Activism, and Technoscience*. Cambridge, MA: MIT Press, 2008.

Cros, Caroline, Laurent Le Bon, and Vivian Rehberg. "Chronophotology." In *Orlan: Carnal Art*, edited by Régis Durand and Eleanor Heartney. Paris: Flammarion, 2004, pp. 9–193.

Cryonics Institute (*website*). Accessed September 19, 2019, http://www.cryonics.org.

Debatty, Régine. "Life, Tissue Culture and Ethical Ambiguities. An Interview with Svenja Kratz." *We-Make-Money-Not-Art*, December 20, 2014. Accessed September 19, 2019, http://we-make-money-not-art.com/svenja_kratz/.

Descartes, René. *Meditations on First Philosophy*. Translated by John Cottingham. Cambridge: Cambridge University Press, [1641] 1986.

Etisk Raad. "Notat. Udkast til forslag til lov om ændring af lov om assisteret reproduktion." October 23, 2015. Accessed September 19, 2019, http://www.etiskraad.dk/~/media/Etisk-Raad/Etiske-Temaer/Assisteret-reproduktion/Hoeringssvar/2015-10-23-lov-om-assisteret-reproduktion.pdf.

Ettinger, Robert C. W. *The Prospect of Immortality*. Garden City: Doubleday, [1962] 1964, https://www.cryonics.org/images/uploads/misc/Prospect_Book.pdf.

Ettinger, Robert C. W. *Man into Superman*. Ann Arbor: Ria University Press, [1972] 2005.

Freshney, R. Ian. *Culture of Animal Cells: A Manual of Basic Techniques and Specialized Applications*, sixth edition. Hoboken, NJ: Wiley-Blackwell, 2010.

Gane, Nicholas. "When We Have Never Been Human, What Is to Be Done. Interview with Donna Haraway." *Theory, Culture, and Society*, vol. 23, no. 7-8 (2006): 135–58.

Haraway, Donna J. "A Cyborg Manifesto: Science, Technology, and Socialist-Feminism in the Late Twentieth Century." In *The New Media Reader*, edited by Noah Wardrip-Fruin and Nick Montfort. Cambridge, MA and London: MIT Press, 2003, pp. 515–41.

Hayles, N. Katherine. *How We Became Posthuman: Virtual Bodies in Cybernetics, Literature, and Informatics*. Chicago and London: The University of Chicago Press, 1999.

Hayles, N. Katherine. *How We Think: Digital Media and Contemporary Technogenesis*. Chicago: The University of Chicago Press, 2012.

Kac, Eduardo, ed. *Signs of Life: Bio Art and Beyond*. Cambridge, MA: MIT Press, 2007.

Kratz, Svenja J. (*artist's website*). Accessed September 19, 2019, https://www.svenjakratz.com.

Landecker, Hannah. *Culturing Life: How Cells Became Technologies*. Cambridge, MA: Harvard University Press, 2007.

Latour, Bruno. "On Technical Mediation—Philosophy, Sociology, Genealogy." *Common Knowledge*, vol. 3, no. 2 (1994): 29–64.

Leth-Espensen, Pernille. "Art, Hermeneutics, and Technoscience." PhD Dissertation, Aarhus University, 2013.

Mitchell, Robert. *Bioart and the Vitality of Media*. Seattle: University of Washington Press, 2010.

O'Bryan, C. Jill. *Carnal Art: Orlan's Refacing*. Minneapolis: University of Minnesota Press, 2005.

Pointon, Marcia. "Casts, Imprints, and the Deathliness of Things: Artifacts at the Edge." *The Art Bulletin*, vol. 96, no. 2 (2014): 170–95.

Radin, Joanna. *Life on Ice*. Chicago: The University of Chicago Press, 2017.

Reichle, Ingeborg. *Art in the Age of Technoscience: Genetic Engineering, Robotics and Artificial Life in Contemporary Art*. Translated by Gloria Custance. Wien: Springer, 2009.

Retsinformation: "Lov om ændring af lov om assisteret reproduktion i forbindelse med behandling, diagnostik og forskning m.v.," March 16, 2016. Accessed September 19, 2019, https://www.retsinformation.dk/Forms/R0710.aspx?id=177851.

Romain, Tiffany. "Extreme Life Extension: Investing in Cryonics for the Long, Long Term." *Medical Anthropology*, vol. 29, no. 2 (2010): 194–215.

Schweitzer, Mikhail., dir. *The Flight of Mr. McKinley*. USSR: Mosfilm, 1975.

Science Gallery (*website*). Accessed September 19, 2019, https://dublin.sciencegallery.com/visceral/afterlife-

immortalisation-kira-and-rama/index.html.

Scutti, Susan. "The Embryo Is Just a Year Younger than the Mother Who Birthed Her." *CNN*, December 21, 2017. Accessed September 19, 2019, https://edition.cnn.com/2017/12/19/health/snowbaby-oldest-embryo-bn/index.html.

Stiegler, Bernard. *Technics and Time, 2: Disorientation*. Translated by Stephen Barker. Stanford, California: Stanford University Press, 2009.

The Tissue Culture and Art Project (*artist's website*). Accessed September 19, 2019, https://tcaproject.net.

Wilson, Stephen. *Art+Science Now*. London: Thames and Hudson, 2010.

Wolfe, Cary. *What Is Posthumanism*. Minneapolis: University of Minnesota Press, 2010.

Zurr, Ionat. "Growing Semi-Living Art." PhD Dissertation, School of Architecture, Landscape and Visual Arts, University of Western Australia, 2008.

CHAPTER TWENTY-SEVEN

Music

STEFAN LORENZ SORGNER

When discussing, critical post- and transhumanism and the arts, bioart, new media arts, and science fiction are at the forefront of scholarly investigations. Music, however, is not granted the same amount of scholarly attention. The posthuman paradigm shift, which has relevance for all aspects of our life world, alters an enormous amount of facets in the world of music, too. By considering the historical embeddedness of current developments, the radical implications of the posthuman twist of our Judaeo-Christian humanistic past come out most clearly. It is important to conceptualize the move away from humanism not as an overcoming of humanism but rather as a twist. The word "overcoming" implies a dualistic separation between the old and the new cultural paradigm, which leads to the challenge that a new duality comes about. If non-dualistic thinking creates new categorical dualities, a performative self-contradiction occurs. By moving away from humanism due to its implausible dualism, you generate a new historical dualism between humanism and the emergent non-humanistic approaches. Instead of overcoming humanism, it should be stressed that traditional dualities get twisted within the posthuman paradigm shift. Humanist anthropologies rely on an immaterial soul and a material body. Overcoming humanism would imply the immaterial soul gets lost, and the material body remains. Scholars—who refer to their own approach as a new materialism—fall right into this trap. However, the posthuman turn does not imply that we lose our mind. We still have mental capacities, yet in contrast to the humanist interpretation, which identifies the mind with an immaterial ontology, posthuman approaches analyze an evolutionary coming about of mental capacities. Hence,

the traditional account of the mind-body dualism gets twisted. Humanism affirms that we have an immaterial mind and a material body, but posthuman philosophies stress that we have always been psychophysiologies in the process of permanent becoming. The notion of overcoming should be replaced by the concept of the twist.

A leading contemporary aesthetician, Wolfgang Welsch, analyzed some aspects of these changes. He refers to the correlated phenomena as the transhuman perspective, which is his way of referring to the integration of human beings into nature, as a widespread phenomenon in contemporary works of art (see Welsch 2004, 2007: 100–14). The transhuman perspective has nothing to do with transhumanism or the concept of the transhuman in transhumanism. It is his idiosyncratic way of describing the phenomena in question. Actually, the characteristics he attributes to this perspective are rather posthumanist ones, but could also be affirmed by many transhumanists. In any case, Welsch is correct in stressing that there is a strong link between Eastern thinking and this perspective. Consequently, he does not regard it as a coincidence that artists like Cage or Feldmann, who present such a perspective in their works, according to him regard themselves as particularly related to Eastern thinking. In the Eastern tradition human beings are not seen as in opposition to the world but as participants in this one world, which possesses a bigger than human measurement. Hence, it is supposed to be more common for this tradition to present, represent, and create such a perspective than it is for the Western tradition, according to Welsch (2004, 2007: 110). He also reveals the importance of the dissolution of the special status of human beings, as there could not be a close connection between human beings and nature, if human beings were radically separated from this world. In his article "Art beyond Aestheticism," he suggests some descriptions of how this perspective can be perceived within the works of art of the above-mentioned artists. When we listen to the music of John Cage and Morton Feldman, then he describes the experiences connected to this perspective as follows: "We experience ourselves like beings welcomed and participating in a world that is not on a human scale" (Welsch 2004: 67; 2007). In this article he refers to further examples. His list however could get expanded further. Before dealing with different facets of this insight, some reflections need to be made concerning the historical development of music and in particular music drama. Thereby, the aforementioned dissolution between subject and object can be compared with the coming about of this categorical separation between subject and object.

To understand the meaning and relevance of the current innovations, music will be introduced in the context of wider cultural developments. In the first part entitled "History of Music Drama," the focus will lie on the birth and the current landscape concerning music drama. By dealing with the birth of music drama, the social significance of current posthuman alterations, of which selected aspects will be presented in the second half of part one, can come out more clearly. In the second part of the chapter, which is entitled "Techno, Digital and Cyborg Music," specific aspects of posthuman music practice will be dealt with, so that some facets of the great variety of posthuman music can be highlighted. It is a field of enormous potential, and many further studies will be needed to do justice to this fascinating field of scholarly enquiry.

HISTORY OF MUSIC DRAMA

The birth process of Ancient Greek drama was a significant event in the art world during which ontological dualities emerged in it. Originally, Dionysian celebrations did not occur in a theater building. There was no stage and there were no spectators who were separated from the stage. Before the institutionalization of tragedy, there were only groups of human beings singing and dancing together without a rigid dualistic spatial separation between the actors and the audience. Various categorical dualities were introduced during the birth process of tragedy (Pickard-Cambridge 1927).

Firstly, there was the spatial separation between the audience and the actors. The audience had to remain seated within certain linear and circular fields, which were separated from but also directed toward the circle or rather stage on which the actors were supposed to fulfill their tasks.

Secondly, a distinction between the chorus and the protagonists was introduced. On the one hand, there was the chorus, and the task of the chorus was to sing and dance together. On the other hand, there were the individual actors whose task was to recite their roles. Hence, the duality between audience and actors was amplified by further introducing the duality between protagonists and chorus. Thirdly, the dualistic architecture of the theater was created, which enforces these dualistic structures. All of these dualities were absent from the festivities that took place before the invention and institutionalization of the theater, which started with the Theatre of Dionysus in Athens during the sixth century BCE (MacDonald and Walton 2011).

The institutionalization of tragedy that came along with the construction of the Theatre of Dionysus was not the sole event during which dualistic media (here, dramatic theater) came about. However, it seems plausible to claim that this event was a central stepping-stone during the historical process of the birth of dualistic media.

The same can be observed in the realm of philosophy. Dualistic thinking in the Western tradition was strongly influenced by Plato's thinking during the fifth century BCE. But we can also find dualistic conceptions before Plato, for example, in Zoroaster's thinking during the first half of the second millennium BCE. Still, Plato can be seen as one of the key figures responsible for introducing dualistic ontological categories into the Western cultural tradition.

In Plato's case, the dualism can be found between the realm of forms and the material world. Even though he introduced a dualism between human beings who possess rational souls on the one hand and animals who do not have such souls on the other hand, this separation was not yet as rigid as it became later on, because Plato also stresses that there are several types of souls—a vegetative, a sensitive and also a rational soul. Any type of soul or psyche is responsible for self-movement and hence for life. Whatever has a soul lives. Consequently, Plato has good reasons for attributing certain types of souls (but not a rational soul) to plants and animals, as both are capable of directed self-movement, which is a reason for attributing a type of soul to them. Yet Plato regards the rational soul to be solely present in human beings and argues that a rational soul is necessary to be able to enter the realm of forms and grasp the forms, to use language and communicate via language with one another.

The next central step during the development of dualistic ways of thinking occurs with the

Stoics. Stoic philosophy upholds that there is a unified *logos*, which encloses immaterial human souls. Animals were not regarded as possessing such immaterial souls according to Stoics. The main difference to Plato concerning the question of duality has to do with the idea of *humanitas*. Plato did not think that just because all human beings possess a rational soul they also ought to be treated equally well. He affirmed that there were human beings with gold, silver and others with iron in their souls (metaphorically speaking), and their social rank depends on the type of metal one has in one's soul. Stoic philosophers, on the other hand, introduce the notion of *humanitas*, which was linked to the equal evaluation of all human beings. All humans deserve the same kind of moral respect, due to their belonging to humanity. This notion was transformed by Cicero into the concept of dignity, which all human beings were supposed to have in an equal manner, because they all possess a rational soul and belong to the human species. Even though it was obvious to Cicero that human beings differ with respect to their talents and capacities, he also acknowledges that human beings ought to be treated well solely for being a member of the human species. Stoic philosophers or Cicero did not yet develop an egalitarian society in the modern sense, yet this transformation with respect to the understanding of human beings did also have some practical implications, e.g., concerning the treatment of slaves in their society, as they were gaining a higher social recognition during this period of time.

A third crucial step in the development of dualistic thinking took place with Descartes and his philosophical outlook. In contrast to the ancient thinkers within the Platonic tradition who acknowledge that there are a variety of different souls, Descartes introduced dualism on an even more rigid level by distinguishing between *res extensa* and *res cogitans*. According to Descartes, human beings belong to both types of substances while animals and all other solely natural objects belong to the realm of *res extensa* only.

This kind of rigid dualistic thinking was developed further within the Kantian approach, where we can find the same ontological distinction as in Descartes's philosophy. However, Kant focused more on the ethical relevance and implications of this dualistic understanding and developed a complex ethics and political philosophy, which still serves as the inspiration for the basis of the German foundational law. Due to this influence it follows that it is still legally forbidden to treat other persons solely as a means which presupposes a radically dualistic distinction between objects and subjects. Furthermore, this influence is the reason why according to the German foundational law only human beings possess dignity, but animals and all other solely natural entities are supposed to be treated like things. This legal distinction presupposes a highly problematic categorically dualistic ontological separation, which was already fundamental in Descartes's philosophy.

Here it might be interesting to note that all the categorically dualistic ontologies just mentioned do not directly have racist or sexist implications, even though it cannot be doubted that such associations were culturally established in connection with such ontology. Still, the philosophies just mentioned do not refer to and justify the point that white, heterosexual, rich men represent a cultural ideal of perfection. Nonetheless it is the case and it cannot be doubted that culturally the immediate connection between white, heterosexual, rich men and an immaterial rationality was established. On a philosophical level, the shift from dualistic to a non-dualistic ontology, which emerges with Darwin's and Nietzsche's reflections in the

nineteenth century, as the cultural dominant way of conceptualizing the world, was far more important than any later cultural association, which was connected to this categorically dualistic ontology. Philosophically all of the thinkers mentioned held that women possess rationality. It was this view that was challenged from the nineteenth century onward, in part by the great variety of posthuman philosophers. "Posthuman philosophers" is my shortcut for referring to philosophers of the posthuman, e.g., for philosophers who present either critical posthumanist or transhumanist reflections. The notion of the posthuman comes up in both traditions, even though a different meaning is associated with this word within these traditions. Yet both traditions doubt that a categorically dualistic ontology is an appropriate anthropology (Ranisch and Sorgner 2014).

After Kant, Nietzsche moved beyond the dualistic history of Western philosophy and the impact on and all the consequences of his approach have yet to be grasped by scholars, thinkers, and philosophers today. However, Nietzsche, together with Wagner, Darwin, and Freud, has initialized a cultural move toward a non-dualistic way of thinking. Consequently, it is possible to stress that with this cultural shift, humanism in its traditional form is coming to an end. Here, I understand humanism as a worldview that is founded upon a categorically dualistic ontology. This understanding is in tune with the etymology of the word "humanism," which comes from the Latin "humanitas." This concept was central for Stoic thinking, and it implies a categorically dualistic ontology.

Given that the aforementioned reflections concerning the development of dualistic thinking are plausible, it needs to be realized that the development of Plato's philosophy has most probably been the central cornerstone for the foundation of Western culture as a dualistic culture. Sloterdijk (1999), who identifies the beginning of humanism with the age of Stoic philosophy, and Hassan (1977), who stresses the close connection of the beginning of the enlightenment with the beginning of humanism, are correct in claiming that strong versions of dualisms can be found in the philosophies of the Stoics and of Descartes. However, it would certainly be highly implausible to disrespect the central importance of Plato's philosophy for this development.

As a consequence of the breaking together of humanism, several cultural movements have emerged that move beyond categorically dualistic ontologies today. Consequently, it seems appropriate to claim that we are moving beyond humanism into the age of the posthuman, whereby the posthuman as an open metaphor stands for a great variety of beyond humanism movements like post- (Hassan 1977), meta- (Del Val and Sorgner 2011) and transhumanism (Huxley 1951) in which the word "posthuman" comes up and which have in common that they doubt the ontological foundation of humanism. Still, it needs to be stressed that the goals, pedigrees, and methodologies of the various movements differ significantly.

NON-DUALITY, TECHNOLOGY, AND POSTHUMAN WORKS OF ART

Non-duality has already been a central feature of many postmodern works of art, as Welsch correctly noted (Welsch 2007: 110). What was missing in postmodernism was the focus on technology, which is one of the central features of posthuman works of art, and also of

posthuman music. With the erosion of the subject-object distinction in the nineteenth century, a parallel development took place in music drama.

posthuman total works of art

Richard Wagner has been a central figure in the history of music drama, and his suggestions for twisting opera into music drama are structurally analogous to several posthuman suggestions. For example, the gods of his opera "Rheingold" depend on the eating of Freia's golden apples in order to retain their divine qualities of strength and youth. There are, therefore, structural analogies between these gods and posthumans, as described by transhumanists, for which posthumans represent a further developed form of human existence. The use of a love potion in Tristan and Isolde bears many resonances to the debates surrounding contemporary love drugs within transhumanist discourses.

References to posthumanist positions in Wagner's work are also to be found. The language that occurs in his musical texts has to be mentioned and deserves further academic attention. His lyrics not only sound unusual for us today, but also do not represent the everyday language of the nineteenth century. Wagner was aware of the fact that the words convey ideological contents and that a rigid subject-object distinction is closely linked to the German language. Wagner affirmed an immanent, naturalistic, and evolutionary thinking, e.g., he suggested to educate his son Siegfried on the basis of Darwin's writings. In order to avoid the dualistic implications of German grammar, he developed his own personal, metaphorical language, which he used within his musical dramas. These examples reveal that Wagner's works contain both critical post- as well as transhumanist elements. The general social, political, and ethical orientation of his works, however, involves an orientation that bears a lot of potential for conflict with posthuman thinking and which involves numerous potentially problematic implications.

A leading contemporary German composer, Sven Helbig, refers to the notion of the Gesamtkunstwerk, a total work of art, as it was coined by Wagner and gives it a new twist. In contrast to Wagner, whose hope was that a new community comes into existence, which corresponds to his way of thinking about the world, Helbig's reasons for developing total works of art are different. He realizes the paternalistic implications of Wagner's way of thinking, yet he also intends to bridge the gap between feeling, thinking, and acting and to stress the relevance of his musical creations for our life world. We should not listen to music for the sake of music and to enjoy or cognitively realize the musical structures, but music ought to have relevance for all parts of society and ought to be accessible for everyone, too. This does not mean that he claims to have a universally valid answer, but he wishes to make his suggestions concerning philosophical insights musically accessible. Yet it is merely a suggestion, an offer, and not necessarily a universally valid insight, which is the main reason why his total work of art does not have the same morally problematic implications, which can be attributed to Wagner's creations.

Helbig's music drama "From the Noise of the World or the Revelation of Thomas Müntzer" successfully avoids the potentially totalitarian connotations of the concept Gesamtkunstwerk, as all his reflections were meant as suggestions and not necessarily as a valid ideal. It nevertheless addresses ontological, ethical, and political questions. However, it

does not remain within the mythic realm but always refers to current bioethical and religious challenges. What is the relationship between religious and political foundations? What moral assessment is appropriate for ethical questions at the beginning of life? Should utopias play a role in everyday political decisions? Within the final scene of the work "From the Noise of the World," the demons emphasize that we are doomed when we follow a utopia, a general order, and strong ideas. In this way the radical plurality of good is stressed, and so is the fact that the ethical nihilism of our time is an achievement and not a loss. These are posthuman insights. Thanks to the use of the latest technologies, innovative media, and an accessible musical language, Helbig avoids that the reception of this work is limited to a specialized audience.

Similar considerations are also to be made with regard to his concerto "Pocket Symphonies Electronica," which consists in short symphonies to which one could listen in a metro, just like a short pop song. In some performances of this musical piece of his, he reverts to orchestral recordings of his own music, plays live to the recordings as an instrumentalist and is at the same time responsible for the appropriate mixture, and thus also assumes the role of a DJ. The separation between live music and recorded music is thereby subverted as much as that between serious and popular music, or the distinction between the composer and the musician, as was also the case in the ancient theater. His instrumental music, too, is thus an inspiring plea for plurality and the softening of rigid traditional categories.

TECHNE AND ART GETTING TWISTED

Posthuman artworks represent suggestions concerning a new understanding of the world, which could be appropriate after the posthuman turn. In difference to traditional total works of art, these do not regard their own suggestions as true ones, which claim universal validity. It is this element which distinguishes them from Wagner's total work of art concept, which has highly problematic totalitarian implications. (Some) Posthuman works of art can be characterized as nontotalitarian total works of art. In order to grasp the relevance of this phenomenon, we need to take a closer look at the notion of *techne*.

The Ancient Greek notion of *techne* stood both for art as well as for technology. As a consequence of the humanist separation of mind and body, whereby the mind got connected with a nonempirical realm, whereas the body was connected to the sensual realm, art and technology got separated, too. Art became the sensual representation of the nonempirical (poiesis), whereas technology was merely a means for realizing immanent goals (praxis). With Helbig's music drama, the realms of art and technology got reunited, which corresponds to a wider cultural development, which has occurred since Darwin and Nietzsche. With this cultural reunification of art and technology, the coming about of a non-dualistic, relational, and a naturalistic, evolutionary way of thinking, i.e., several versions of ontologies of becoming, occurs, too. However, it must be noted that a proper understanding of such ontologies does not claim their own overall superiority, as such strong claims concerning truth would demand a static ontological realm. Such strong truth claims are not consistent with ontologies of becoming. Any posthuman philosophy needs to abandon a strong concept

of truth, which is based on the theory of correspondence. Truth can be pragmatic, and fictive, but Platonic notions of truth have to be abandoned within ontologies of becoming, and both critical post- as well as transhumanists affirm an ontology of becoming.

Works of bioart represent total works of art because of this reunification of art and technology. They are nontotalitarian because they do not claim to be the only way art ought to be done. Jaime del Val's metaformances (more about them later) represent the rebirth of non-dualistic media, which is a direct consequence of the birth and death process, which had occurred between 2500 BCT, and more recent developments. It is a total work of art, because it embraces and uses all facets of life, even the traditional audience gets included, which is very much in the spirit of pre-theater dramatic works. Sven Helbig produces total works of art insofar as he dissolves the categorical distinctions between human beings and machines, and between composer, performer, DJ, and improviser. These works do not demand any ultimate superiority but represent different aspects of the birth of non-dualist media.

POSTHUMAN ART AND NON-TOTALITARIAN WORKS OF ART

In the cases of Sven Helbig, Jaime del Val, and Eduardo Kac, we can see elements that are characteristic of a total work of art, a (Wagnerian) Gesamkunstwerk, as many of their works capture a totality of human experiences or use a totality of artistic means to transfer philosophical understandings and bridge the gap between the musical and the social and ethical world. These works challenge the aesthetic prohibition of total artistic structures by aesthetic theories such as Adorno's. Yet these posthuman artworks do not imply new totalitarian structures, but they increase plurality. This is the main difference between Wagner's total work of art, and posthuman aesthetics, which are characterized by being nontotalitarian total works of art, e.g., some of Eduardo Kac's works of bioart, Jaime del Val's metaformances as well as Sven Helbig's musical works. What is characteristic for all of them is that they neither stress their own superiority, nor claim a universal validity, but they merely represent a further offer, a new suggestion, or an innovative perspective.

Adorno's aesthetics demands artworks, which are dedicated to a permanently more intellectual audience. Posthuman artworks are inclusive without stopping to be innovative. Plurality gets promoted by including nontotalitarian total works of art in the spectrum of the contemporary art world. I am not claiming that all posthuman artworks are nontotalitarian total works of art, but it seems that there was a renaissance of the Gesamtkunstwerks tradition with the event of the posthuman turn, as this turn goes along with radical critique of the previously dominant Western culture, which is founded on categorically dualistic ontologies, and what these artworks do is to present alternative suggestions, new ways of perceiving, and innovative sensual experiences. Non-dualities demand to bridge the gap between the realms of music, ontology, and ethics or thinking and acting. Hence, it became necessary to move beyond Adorno's aesthetics, which demanded to permanently increase the autonomy of an artwork. Of course, Adorno's thinking was more complex than this. Musical autonomy makes the audience aware of the ethics of autonomy, so that here, too, the realms of ethics and art were connected. Yet by stressing the need of musical autonomy, he

decreased plurality and introduced the prohibition to use certain artistic means. Plurality and inclusiveness are central concepts within the great variety of posthuman approaches.

OPERA NOW

Besides Helbig, there are further leading contemporary composers whose works are connected to the posthuman turn. There is a particularly clear connection between the musical works of Philip Glass and several posthumanist trends. Firstly, the doubt concerning rigid separations of formerly categorically distinguished entities, e.g., the dissolution of the subject-object separation. *Koyaanisqatsi: Life out of Balance* is a film directed by Godfrey Reggio with film music composed by Philip Glass (see Kostelanetz 1997: 131–51). It is the first film of the *Qatsi-Trilogy*, which has been created by the same two artists, Reggio and Glass. "Qatsi" is a word from the Native American Hopi language and means "life." *Powaqqatsi: Life in Transformation* and *Naqoyqatsi: Life as War* are the titles of parts two and three of the trilogy, respectively. Each of the films represents different aspects of life, the world, and in particular, the wide spread dominance of technology today, and the score is composed to support the visual images of the films. Without the artists explicitly wishing to convey a specific meaning by means of the films, one issue becomes clear immediately, and it comes out strongest in *Koyaanisqatsi: Life out of Balance* from my perspective: the music draws us into the film and makes us aware that we are a part of the world shown in the movie. The interconnectedness between technology, nature, and human beings and the loss of any rigid and clear separation between these domains is the initial standpoint from which the relations of life manifest themselves. When watching and listening to the film, the audience is being drawn into the world and confronted with the central philosophical and ethical issues of today. Hence, watching and listening to this movie can be seen as a starting point for posthumanist reflections.

Three aspects, which are particularly significant for posthumanist philosophies, can be referred to within some of the most successful of operas by Glass, too:

1. An interest in scientific and technological issues, e.g., *Einstein on the Beach* (see Kostelanetz 1997: 152–66).
2. An affirmation of Eastern, non-dualist thinking, e.g., *Satyagraha* (Kostelanetz 1997: 176–88).
3. A rejection of rigid and absolute categories and a relatedness with a way of thinking which rejects the categorical ontologically special status of human beings, e.g., *Kepler*.

A detailed analysis of each of the three operas would reveal central philosophical issues related to posthumanism. In another article of mine, I analyzed at least some posthumanist traces within his opera *Kepler* (see Sorgner 2011). However, further studies will most certainly reveal several more specific aspects not yet mentioned here.

From the aforementioned paragraphs, it has become clear already that the world of technology and the natural sciences has entered the realm of opera during the most recent

decades. Two of the operas referred to previously even mentioned a scientist within their titles: Einstein and Kepler. However, Glass is not the only living composer who has been occupied with these issues. The aforementioned Nyman takes these issues at least as seriously as Glass. In contrast to Glass, who is most closely related to posthumanist reflections, Nyman is more intimately connected to transhumanist issues. I am not claiming here that either Glass or Nyman claims or wishes to be associated with one of these movements. I am merely pointing at structural analogies between the basic premises of these movements and themes within the musical creations of the two composers.

With respect to the music of Michael Nyman, his film music to the movie *Gattaca* stands out in particular. Here, a piece turns up which could get classified as a transhumanist one, as for it to be performed a piano player with six fingers on each hand is needed. Such a person could be referred to as posthuman. Besides this example, there are further topics to be explored concerning the musical themes and the topics dealt with within the movie. Of particular relevance is a question, which has entered the transhumanist discourses under the title "Gattaca Argument," because the plot raises the question whether genetic enhancement by selection leads to two-class society in which only posthumans or postpersons have the option of access to the socially better ranked positions and jobs whereas the lower-ranked jobs are the only option for regular-born human beings or persons. Both the transhumanist James Hughes in his excellent introduction to transhumanism entitled "Citizen Cyborg" (2004) as well as the bioethicist Lee M. Silver in his article "Genetics Goes to Hollywood" (1997) have dealt critically with the movie. The title already reveals that the genes and the ethical relevance of their impact and of their alteration are being dealt with in the movie, as the title GATTACA is constituted out of the initial letters of nucleotides (Guanine, Adenine, Thymine, Cytosine), which being put together in a sequence form the genetic information in an encoded form of the DNA molecule, which again is responsible for the development and the functions of many viruses and all known living organisms. RNA, DNA, and proteins are the three major macromolecules of all known forms of life. By intensifying the emotional challenges related to the plot, Nyman's music ideally supports the plot of the movie.

After this brief excursion to *Gattaca*, the relevance of scientific and technological issues within operas can be dealt with again, as many transhumanist topics are being considered in two of Nyman's operas: *Facing Goya* and, in some respect also, *The Man Who Mistook His Wife for a Hat*.

The opera *The Man Who Mistook His Wife for a Hat* is based upon a book with the same title by neurologist Oliver Sacks in which he describes case histories of selected patients (see Siôn 2007: 115–46). A man with visual agnosia is the basis of the description used as foundation of the one-act chamber opera composed by Michael Nyman, which premiered in 1986. The libretto was adapted from the Sacks story by Chistopher Rawlence. Thereby, a medical case history was turned into an opera.

A more explicit example of transhumanist reflections, which turn up in an opera, is the case of *Facing Goya* (see Siôn 2007: 197–212). However, the opera suggests rather an anti-transhumanist standpoint. *Facing Goya* is a four-act opera composed by Michael Nyman with a libretto by Victoria Hardie, which premiered in the year 2000. The plot is concerned with the long-lost skull of Goya and the desire to create Francisco Goya's clone. The various

singers of the opera represent perspectives concerning genetic engineering, cloning, and eugenics. An art banker and specialist in Goya's works wants to patent Goya's talent gene, raising the ethical question of gene patenting. A soprano represents someone obsessed with science who deciphers the human genome. A further soprano stresses the danger of "genoism" associated with the control and knowledge of genes. The word "genoism" was created by the writer of the film *Gattaca*, Andrew Niccol, and means an immoral ethical genetic discrimination. The tenor takes the role of an entrepreneur who affirms eugenic practices and wishes to create the first clone of a human being. The final leading role has a baritone who represents a fatalistic perspective of a thinker or a philosopher who does not uphold the special status of human beings. Hence, financial, scientific, ethical, entrepreneurial, and philosophical perspectives concerning the challenges related to eugenics are represented within the leading roles of this opera. In contrast to transhumanists who affirm the use of genetic enhancement so that the likelihood increases that a trans- or a posthuman comes about, the general vision of Nyman's opera *Facing Goya* is an anti-transhumanist one, as it was the case with the movie *Gattaca*, too.

TECHNO, DIGITAL, AND CYBORG MUSIC

So far, I mainly focused on the relevance of posthuman elements in music dramas and operas. Several central aspects of posthuman music have not yet been dealt with. The traditions of digital music, techno music, new posthuman instruments as well as Cyborg music also deserve to get mentioned in a survey on posthuman music. Historically the German band Kraftwerk is certainly a landmark for the interplay of technology, science, and music. Their relevance for the long tradition of techno music can hardly be overestimated. The techno DJ can also be seen as a posthuman musician, a Cyborg musician, who continues with the use of amplified instruments in concert halls and can be found in the use of iPhones in iPhone ensembles or together with traditional music instruments (e.g., Ólafur Arnalds). The role of the DJ as sonic cyborg prosumer could have been analyzed further, too. A prosumer is someone who simultaneously produces and consumes music. Outstanding examples for cyborg musicians are also the following two artists.

EYEBORG AND PANGENDER CYBORG

The "Eyeborg," Neil Harbisson, might be a suitable already existing example for a transhumanist composer. In cooperation with an engineer, Harbisson—who is color-blind—developed a device which enables him to hear the colors of the objects on which he focuses and uses these audial experiences for composing works of music. It might also be appropriate to talk about transhumanist music, if the latest or newly created computer-based instruments are being used to create the necessary sounds.

Particularly fascinating examples are the various metaformances of the metahumanist artist Jaime del Val (Tuncel 2011: 1–4). In contrast to posthumanist accounts, he presents a relationalist view, which implies the immediate interaction and close connection between sounds and movements. In one of his metaformances, he walks the streets of Madrid by night

as Pangender Cyborg. Thereby, it becomes clear what a dissolution of categorical dualities and an affirmation of relationalism can mean. There are cameras at various parts of his otherwise nude body. Furthermore, he wears a projector so that the new and unusual perspectives upon his body, post-anatomical representations, can be projected upon the wall in front of him. Depending upon his own movements, the projections get altered and have an effect back upon his movements. In addition, he wears loud speakers and a microphone by means of which the sounds he is making get altered and amplified. These sounds again have an effect upon his movements and the projections of his movements, which again alter how he moves and which sounds he makes. Hence, the traditional subject-object distinction gets blurred, and the same applies to the separation between the metaformance artist and the composer. There are many further philosophical aspects related to this metaformance.

BJÖRK AND THE CREATION OF NEW INSTRUMENTS

The Reactable is an excellent example of the use of new instruments for the realization of innovative sounds. It was first used in a concert in 2005, and it was developed by the Music Technology Group from the Universitat Pompeu Fabra in Barcelona (see Wilson 2010: 122–3). Björk also integrated it into her songs during her eighteen-month world tour entitled *Volta*. A further example of transhumanist music is musical pieces performed by computer-played drums or guitars, and the Japanese art unit Maywa Denki has created some spectacular examples of such instruments (see Miah 2008: 278–9). Their pieces are being referred to as "products" by the members of the group and a performance of such a piece is called "a product demonstration." This use of words implies many philosophical questions concerning the status of these works of art. Chico MacMurtrie and his group Amorphic Robot Works also cooperate to create robotic events, performances, and installations. Their piece, *Drumming and Drawing Subhuman,* from 1993 is a particularly well-known example (see Wilson 2010: 110).

A further aspect of transhumanism is the analysis that the border between humans and machines has become blurred, even though it is also this aspect which is characteristic of some central posthumanist traditions. One option concerning the future of human beings is that the posthuman will exist in the digital realm. Another option is obviously that of a genetic evolution toward the posthuman. The blurring of the boundary between human beings and machines has been dealt with from the perspective of dance and music artists. The dance artist Garry Stewart; Louis-Philippe Demers, a multi-disciplinary artist; a video artist, Gina Czarnecki; and costume designer Georg Meyer-Wiel created an extraordinary piece entitled *Devolution*, which confronts us with a world full of dance and music in which the traditional relationship between machines, robots, and human bodies is being challenged (Wilson 2010: 111).

By continuing to focus on the dissolution of categorical distinctions, which is associated with posthumanism, another work of music has to be mentioned: *Exurbia* by David Cecchetto and William Brent from 2011. It is a web-based installation of sound samples, which can be uploaded by whoever becomes part of this project. These sound samples can be used by all project participants to create further musical works. However, all participants also

have the chance of editing existing sound samples such that the alterations cannot be undone, which again affects the works by all the other artists in whose pieces the sample has been used. Thereby, the internet is being used for creating musical pieces without there being a specific composer and a finished work. There are merely musical pieces, which are permanently subject to change.

AI MUSIC AND A BEATLES SONG BASED ON DEEP LEARNING

A separate question, which had not been mentioned before, was the issue whether AIs could count as composers, artists, who create something entirely new. Several algorithms were developed, which use deep learning to create something new. One of the most striking examples is the song "Daddy's Car," which was created by scientists at SONY CSL Research Lab, who were responsible for the first-ever entire song composed by artificial intelligence on the basis of Beatles compositions. By drawing upon the great variety of Beatles songs, a new song in the style of the Beatles was realized, which is actually quite a good song, in which it is possible to clearly hear the traces of other Beatles songs. Given that the digital age is still in its embryonic stage, as the public use of the internet is not only thirty years old, it is a field of enormous potential, and each year new and striking innovations in the field of AI-based music can be expected. I can hardly wait to listen to the posthuman music, which is yet to be composed.

SOURCES CITED

Del Val, Jaime, and Stefan Lorenz Sorgner. "A Metahumanist Manifesto." *The Agonist*, vol. 4, no. 2 (2011): 1–4.

Flemming, Robert., and Kostelanetz, Richard., ed. *Writings on Glass—Essays, Interviews, Criticism*. London: University of California Press, 1997.

Hassan, Ihab. "Prometheus as Performer—Toward a Posthumanist Culture?." *The Georgia Review*, vol. 31, no. 4 (1977): 830–50.

Hughes, James. *Citizen Cyborg—Why Democratic Societies Must Respond to the Redesigned Human of the Future*. Boulder: Westview Press, 2004.

Huxley, Julian. "Knowledge, Morality, and Destiny: The William Alanson White Memorial Lectures, Third Series." *Psychiatry*, vol. 14, no. 2 (1951): 127–51.

MacDonald, Marianne., and Walton, J. Michael. eds. *The Cambridge Companion to Greek and Roman Theatre*. Cambridge: Cambridge University Press, 2011.

Miah, Andy, ed. *Human Futures—Art in the Age of Uncertainty*. Liverpool: Liverpool University Press, 2008.

Pickard-Cambridge, Arthur Wallace. *Dithyramb, Tragedy and Comedy*. Oxford: Clarendon Press, 1927.

Ranisch, Robert, and Stefan Lorenz Sorgner. "Introducing Post- and Transhumanism." In *Post- and Transhumanism: An Introduction*, edited by Robert Ranisch and Stefan Lorenz Sorgner. Frankfurt am Main: Peter Lang, 2014, pp. 7–29.

Silver, Lee. M. "Genetics Goes to Hollywood." *Nature Genetics*, vol. 17, no. 3 (1997): 260–1.

Siôn, Pwyll. ap. *The Music of Michael Nyman—Texts, Contexts and Intertexts*. Aldershot: Ashgate Publishing, 2007.

Sloterdijk, Peter. *Regeln für den Menschenpark. Ein Antwortschreiben zu Heideggers Brief über den Humanismus*. Frankfurt am Main: Suhrkamp, 1999.

Sorgner, Stefan Lorenz. "Nietzsche als Ahnherr des Posthumanismus in den Künsten: Reflexionen zum Verhältnis von Bild, Wort und Ton." In *Bilder-Sprache-Künste: Nietzsches Denkfiguren im Zusammenhang*, edited by Renate Reschke. Berlin: Akademie Verlag, 2011, pp. 45–58.

Tuncel, Yunus. "Review of Jaime del Val's 'Metaformance'." *The Agonist*, vol. 4, no. 2 (2011): 1–4.

Welsch, Wolfgang. "Art beyond Aestheticism." In *The Future of Values—21st-Century Talks*, edited by Jérôme Bindé. New

York: Berghahn Books, 2004, pp. 64–8.

Welsch, Wolfgang. "Jenseits der Ästhetisierung. Ein anderer Rahmen für die Betrachtung der Werte." In *Die Zukunft der Werte—Dialoge über das 21. Jahrhundert,* edited by Jérôme Bindé, translated by Frank Sievers and Andreas Jandl. Frankfurt am Main: Suhrkamp, 2007, pp. 100–14.

Wilson, Stephen. *Art and Science Now—How Scientific Research and Technological Innovation Are Becoming Key to 21st-Century Aesthetics*. London: Thames and Hudson, 2010.

CHAPTER TWENTY-EIGHT

Posthumanism in Film and Television

IVAN CALLUS

One of the films most readily associable with posthumanism, *The Matrix*, opens with green lines of source code on a black background. The code breaks up, cascades, and reforms, before the viewer's gaze enters, via a zero that morphs into the white orb of a flashlight held by a police officer navigating a noirish corridor, into the film's storyworld. Down the rabbit hole, indeed. Here, in this film, which liberally references literature and cultural theory from Lewis Carroll to Jean Baudrillard, is allegorized not only the plunge into the desert of the real, but also the codewriting and machinic direction determining an entirely different being-in-the-world. Neo, the film's protagonist, messianistically invoked as "the One" in a phone conversation between an unseen woman and man that the audience overhears in this opening sequence, will come to understand just how much around him is born digital. Society has become skeuomorphic, taking on (mis)recognized human architectures in what is an encompassing matricial and virtual web that constitutes what passes for reality. Here is one ready fixture of the posthumanist imaginary, dramatized in film: humanity overtaken and undone by nonhuman intelligence and by the nonhuman life it has engendered. Humanity's survival becomes attritional, its resistance mounted against awareness of the excrescence of its desires to the hegemony of machines, to which its farmable body is mere energy source.

The Matrix is not one of posthumanism's originary narratives. There are steadier claims to that in literature in, for example, Dante's *Divina Commedia*, which in the first canto of the *Paradiso* includes a transcendentalizing reference to *transumar*, or in Ovid's *Metamorphoses*, where human-to-nonhuman transformations find poignant figuration. But it

is emblematic of how film, as a medium, pictures the dramatic potential of worlds and technologies that, though not actualized, seem plausibly thinkable in consequence of present-day affordances. In providing moments evocative of the toxic virality of humanity's agency and the rigors of "traumas of code" (Hayles 2006), while remaining narratively shaped by values that might be thought of as decidedly humanist, *The Matrix* exemplifies why attentiveness to film is a fit illustrative and hermeneutic strategy in responding to some of posthumanism's foremost tropes and scenarios. To adapt Lauren Berlant, "a thing that is happening finds its genre" (Berlant 2011: 16)—and, one might add its forms and platforms too. Film, with television alongside, appears to be one of posthumanism's aptest discoveries in this respect. For while posthumanism settles readily into other forms (literature retains trenchancy in that regard, while digital games' capture of the opportunity is playable), it finds in film and television vivid reach to the hopes and fears it revisions. Quite simply, the popular imaginary tends to orient its sense of the posthuman on tracks set down familiarly by film and television.

Literature, for its part, recognizes this. Ian McEwan's most recent novel, *Machines Like Me*, is set in a world where "artificial humans were a cliché before they arrived" (2019: 1). The cliché arises because "[t]he imagination, fleeter than history, than technological advance, had already rehearsed this future in books, then films and TV dramas, as if human actors, walking with a certain glazed look, phony head movements, some stiffness in the lower back, could prepare us for life with our cousins from the future" (1–2). Note the sequence. First "books, then films and TV dramas." Note also how film and television are run together, quite as happens in this chapter, as if the two platforms were not separate but coextensive. It is a choice about which more will be said below. Meanwhile, the stiltedness with which the human is seen to perform a present-future mode of being that is kin to it but quite different in kind reinforces the suspicion that a certain kind of posthumanist narrative and *dramatis personae* (or *dramatis machinae*) is all too familiar. Films and TV series about artificial intelligences coexisting and contending with the human present one of contemporary culture's repetitive, if consistently reinvented, devices. In other words, and save for the interest in the manner and power of every next compelling reinvention of the device, posthumanism is at risk, at least in some aspects, of becoming tiresome.

All of this warrants further comment, not least because posthumanism cannot be reduced to depictions of humanity's creeping supersedence. But it may be useful to provide a brief overview first of aspects of posthumanist imaginings prevalent in filmic and televisual representation and of others that might be (trans)formative within posthumanist thought but that appear less amenable to depiction in those media. It will help too in setting up discussion of the currency of references to film and television within posthumanist theory, an issue addressed later in the chapter. This alertness to film's and television's variegations of posthumanism's conceptual and theoretical denominations is, in fact, important. As this volume demonstrates, posthumanism is about much more than originary technicity, cyborg culture, AI emergence, and biotechnological enhancement. It is prompted too by perspectives arising from animal studies; by reflection on the Anthropocene and intersections with the environmental humanities, not least involving climate change; by a nonanthropocentric ethic and epistemology, and deepened awareness of nonhuman being and the inhuman. Quite how

much of this figures in what might be thought of as posthumanism-inflected film and television is a fascinating question. As will be shown, it necessitates attention to issues of genre and to productions not typically thought of as posthumanist but which can be shown to have some alignments in that regard. There is not the space in this chapter to be even minimally comprehensive about all this, so the aim must be to offer pointers to posthumanism's variegated presence in film and television and some areas for further exploration.

POSTHUMANIST REPRESENTATION IN FILM AND TELEVISION: SCOPE, PLATFORMS, GENRES

The year 1999, when *The Matrix* was issued, coincides with the publication of N. Katherine Hayles's seminal *How We Became Posthuman* (this chapter is being written, then, on the twentieth anniversary of both of these works). There is rather less in the book on film's and television's contribution to the trajectory describing posthuman becoming than might be expected. In contrast, novels—literature—feature more than incidentally. There is sustained reference to work by Philip K. Dick, William Gibson, Neal Stephenson, Bernard Wolfe, and Richard Powers, for instance. This helps to establish science fiction (SF)—and, indeed, speculative fiction—as one default mode for evocation of the posthuman. SF, in effect, becomes prospective realism, not least before technology's stretching of verisimilitude. Film's and television's repertoires in this unravelling and reweaving of the fabric of the real are, needless to say, themselves extensive. The degree to which they feature in posthumanist thought is therefore an interesting point for consideration, with Hayles's book offering a good cue. But first, some notable aspects of posthumanist representation on screen are reviewed below.

The unreal-yet-not-implausible it-*could*-happen conceit drives anything from Fritz Lang's *Metropolis* to Denis Villeneuve's *Blade Runner 2049*. Sometimes this occurs in the shape of adaptation and reimagination of literature and SF. *Metropolis* sprung from the 1925 novel of the same name by Thea von Harbou, while *Blade Runner 2049* is a sequel of Ridley Scott's film, based on Philip K. Dick's *Do Androids Dream of Electric Sheep?* It is hardly parenthetical to remark that certain authors and/or texts have acquired serial centrality in filmic or televisual adaptation of posthumanist motifs, Dick's work not least (*Total Recall* and *Minority Report* exemplify this). *Frankenstein* is a key example of how one text, one work, becomes a foundational allegory in posthumanist representation. That well-known moment in Chapter 5 when the "dull yellow eye" of "the creature" opened and "a convulsive motion agitated its limbs" once "the instruments of life" were made to "infuse a spark of being" into a "lifeless thing" made it thinkable that human, or human-like, being could stem from human artificing (Shelley [1818] 2008: 57). The consequences, to be sure, are devastating. "[T]he creature at the heart of the tale is both (and neither) alive nor dead, born nor made, natural nor artificial;" as a result, "he confuses many of the boundaries by which normative humanity has been delineated" (Graham 2002: 62). Contemporary fiction has revisited Mary Shelley's novel, for instance in Peter Ackroyd's *The Case Book of Victor Frankenstein* or Jeanette Winterson's *Frankisstein,* and cinema's traditions have found this

tale of science's overreaching—suggestive of a Faustian dynamic and the inevitability of tragedy overtaking humanity's wish to renegotiate and/or reengineer the conditions of existence—to be enduringly cautionary in what might be thought of as normative *posthumanism*. This has been the case ever since J. Searle Dawley's 1910 film, which despite its more irenic resolution is unsettling enough in its depiction, in other departures from the novel, of the creature's vat-born and mirror-menaced existence. Yet there has arguably not been a noteworthy filmic or televisual adaptation of *Frankenstein* for some time. The resonances of even classic posthumanist fictions, it seems, can wax and wane differently in reworkings across media, affecting the serial centrality referred to above.

Possibly the potentialities discernible through three keywords in the posthumanist lexicon —*embodiment, enhancement, emergence*—find more on-trend representation in stories with a quite different lineage in the understanding of the posthuman. Posthumanism has in fact already been around long enough to notice its generations and, like feminism, its "waves." That would be a separate discussion, as more relevant here is how the references of choice within posthumanist work on film and television are prompted to change as new work commands attention.

The rise of the superhero narrative is interesting in this regard. It draws attention to the platform diversity in the media ecology of crypto-posthumanist representation. A seemingly irrepressible example is *The Avengers* movies.[1] Set in the Marvel Cinematic Universe (now there's a phrase) and based on Marvel Comics characters like Iron Man, Spiderman, Ant-Man, Black Widow, Doctor Strange, and Thor (the scope for inclusiveness of prosthesized and enhanced humanity, as well as the inhuman and the nonhuman, is irreproachable), the franchise cannot be said to be pitching the most verisimilar order of the posthuman. It consolidates and reworks in the broader imaginary (a *very* broad imaginary, since the Marvel movies' receipts are record-breakingly high-grossing) motifs that are familiar enough in previous mythologies and in classics of posthumanist narration. Featured there would be the precarity of the human, metamorphosed humanity, conflicts between human and nonhuman, self-immolation in redemption of generalized humanity, and more. Given the platform dynamics, stories deriving from the comics find ongoing development in movies, short film, television, games, and books. In this pan-media ecology, attentiveness to the unique genius of a form (literariness, the particularity of the cinematic, the specificities of television) still has its place. Clearly, however, some storyworlds are more than ordinarily restive about platform confinement.

Marvel's Cinematic Universe, with its quite complete platform ubiquity, provides striking indication of this. Apart from the twenty-three movies out at the time of writing, with at least another ten in (post-)production or planned, there are storyworld extensions and continuities across broadcast television and streaming services. And this without bringing into play releases on Blu-Ray or DVD, including the "bonus material" thereon and the "One-Shots." Recall, here, the banner sentence that punctuates Raymond Williams's foundational study of television and is, in fact, critiqued by him: "Television has altered our world" (Williams [1974] 2003: *passim*). It is overtaken by the truism that television is itself much altered, as is cinema's, by online services and by contemporary viewing habits. Additionally, viewers are used to binge-watching successive seasons of a drama series in the much-vaunted "golden

age of *television*," just as cinema's penchant for sequelization and remakes is routinized enough (as with the posthumanism-relevant *Terminator* movies and *The Planet of the Apes* films, the latter based on Pierre Boule's novel). The trend elsewhere for "prequels, coquels, and sequels" (Parey 2019) is heightened to a different degree altogether with the Marvel Universe, which trumps in this respect even the *Star Trek* franchise.

Such complementarities across platforms uncover one reason why concurrent reference to film and television in this chapter is not incongruous. Certainly not with the Marvel Universe's storyworlds, where the narratives are fluidly inter-referencing: a veritable rhizomatic and cross-platform *comédie posthumaine* (or *transhumaine*), to rephrase Balzac. It is significant too that this should be the case with a "universe," indeed a contemporary mythology, informed as distinctly as it is by motifs involving enhancement, mutation, apocalyptism, and more, all with distinct amenability to posthumanist reading and interpretation.

It therefore becomes relevant to ask about the changing nature of works for closer study within posthumanist critique. Some *topoi* with deeper lineage continue to reward revisioning. Prometheus remains a good example. Its place in posthumanist critique is upheld in the first volume of Bernard Stiegler's *Technics and Time*, which rereads Plato's and Hesiod's creation narratives and their account of Promethean agency to recall the role in anthropogony of the anti-hero's brother, Epimetheus, "the forgetful one, the figure of essential witlessness that makes up all experience," who overlooked humanity in his assigned responsibility of distributing a positive attribute to each animal, thus prompting the punishment-worthy bestowal by Prometheus of fire and art (Stiegler [1994] 1998: 186). Ridley Scott's film, *Prometheus*, displaces Promethean motivations onto human (and humanoid) questionings on originarity, turning on indeterminism between narratives of creation and apocalypse (one tagline is, "They went looking for our beginning. What they found could be our end."). Underlying desires and anxieties in these ancient myths clearly remain timeless. But it is true too that the future, fraught with promise and uncertainties that seem imminently present and ripe for (im)plausible anticipative representation, is apt to be depicted in ways that grow more closely affinitive with an imaginary that itself evolves to figure, sometimes presciently, sometimes overstatedly, the narrative possibilities and dramatic potential afforded by technological advance, or environmental crisis, or confrontation with the nonhuman, or the precarity of the human. Film and television are key in indicating, shaping, and responding to such shifts. They set coordinates for the imaginary's preeminent settlements within posthumanist mythologies' mappings of the present and future.

This all sets a challenge to critical reference. Quite simply, awareness of which filmographic as well as bibliographic stock is up, down, or stable—and in which and to whose index—becomes a consideration. The question is whether there is correspondence between the filmographies and the bibliographies. In other words, is the conceptualizing and theorizing of the posthuman in step with what exercises the broader imaginary? Neither is required to be in lockstep with the other, of course. This is not the opening of *Metropolis*. There is no call for deadening synchronicity across creative and critical labor. If anything, critique can co-create that imaginary, or *pre-script* it (as demonstrated by the allusive texture of *The Matrix*), while theorizations of the posthuman may exhibit some levels of

disaffiliation from film's and television's technophiliac representations of mutation, enhancement, and more-than-residual humanist instincts (see note 6 above and the section below). In any case, the division between imagination and critique is less than neat. It could not be when a film like Spike Jonze's *Her* narrativizes reflection on affect's affordances if understandings between human and AI were to become more than virtual-assistive. Similarly, a TV series like *Black Mirror* shows that essayistic takes on technology's psychosocial impacts are articulable in televisual storytelling, the critical edge sharpened rather than blunted by that conveyancing. Posthumanist critique of what is observable already in the immanent-imminent stages of "technogenesis" and "anthropogenesis," with "technics, far from being merely in time, properly constitut[ing] time" (Stiegler [1994] 1998: 27), is as discoverable, then, in fiction-on-screen as in theoretical formulations, further asserting film's and television's variegated salience to posthumanism and its representations.

Meanwhile, *Black Mirror* itself exemplifies that tranche of posthumanism-affinitive television that is nonderivative. Examples of posthumanist narratives born filmic or televisual, unbound by storyworlds in literature or popular culture, abound. *Westworld*, another example of a drama series that has garnered both popular and critical acclaim, may be based on a 1973 film of the same name scripted and directed by Michael Crichton, but it moves well beyond it and extends the burgeoning cultural weight of writing for television. *Westworld*'s significance lies in its reimagining of the storyline that has artificial humans acquiring, and struggling with, consciousness, heightening (amid *many* action sequences) ethico-philosophical questions that portend upon mindedness and the tensions that thereby arise between creator and created, demiurge and plaything. Here is television writing that—to refer back to this chapter's earlier point on reinvention and tiresomeness—freshens, even re-poeticizes, posthumanist desire (an episode like "Kiksuya," the eighth in Season 2, is one example that might be cited). Viewers of such series have expectations unrehearsed by adapted storylines. The storyworlds are still discoverable, unfolding: the sense of the writing's originality and the imagination's extensions is accordingly strong. It all contributes to the profile of the figure of the creator-writer whose work across film and television engenders compelling and culturally influentially storyworlds, exemplified by Gene Roddenberry (*Star Trek*), Joss Whedon (*The Avengers*, etc.), Charlie Brooker (*Black Mirror*), Alex Garland (*Ex Machina*) or, with *Westworld*, Christopher Nolan (*Interstellar*, *Batman Begins*) and Lisa Joy.

Consider the contrast with films like *Never Let Me Go* and *The Road*, based on novels by Kazuo Ishiguro and Cormac McCarthy respectively that have the profile of contemporary classics within contemporary fiction. They depict unsettling biotechnological and post-apocalyptic futurity. The former turns on cloned humans whose education is only a prelude to their "completion" (the euphemism signaling the end of their utility as part of a years-long and ostensibly benign organ-farming process), the latter on an unspecified disaster that precipitates one man and his son's attempt to survive in an ash-covered world in which some of the few other survivors are now cannibalistic. The films' audiences extend beyond the novels' readerships, though the latter would certainly be interested to see how the vividness of each dystopia translates to the screen. That old chestnut of fidelity in adaptation rolls into view. There will always be a certain kind of reader intent on looking, for instance, at how the

crucial, human-absenting, epilogic final lines in McCarthy's novel find their equivalent in film. But the overriding point is that posthumanism is one paradigm that is equally intermediatic, offsetting concerns around adaptive fidelity. Ubiquity across platforms and the writing thereto, indicative of posthumanism's ubiquity *tout court*, is a fitter consideration. And debates around fidelity in any case need to be recast when a drama series based on a novel appoints the latter's author as consultant to its story's extra-literary continuation, as occurred for instance, with Margaret Atwood serving in that role in *The Handmaid's Tale*, which like *Children of Men*—itself adapted from a novel, by P. D. James—turns on an infertility pandemic in a dystopian future.

This brings one crucial misgiving into view. With all the concerns and evocations already mentioned in this chapter, questions will arise on the risk of overextending *posthumanism* as a term, marking out a paradigm that is not so much capacious as voracious in subsuming the temper, concerns, affordances, and productions of contemporary culture. It is precisely this point that cues the issue of genre and mode. All the works reviewed so far have involved forms of cinematic or televisual posthumanist *fiction*. There would be more to say about distinct genres in this line. Up for discussion would be zombie narratives, for instance, from Victor Halperin's *White Zombie* and George Romero's *Night of the Living Dead* to *The Walking Dead*, and shading into contagion narrative, as in *World War Z*; the "Last Man" narrative, of which *The Road* is an example, as are Stanley Kramer's *On the Beach* and Chris Marker's *La Jetée*; the alien or monster invasion narrative, from the first *Invasion of the Body Snatchers* film (much referenced in posthumanist theory) to innumerable examples since. The list could go on, with overlaps across these genres and with a common factor in post-apocalyptism and/or the posthumanity condition. Set to different degrees of posthumanist bearings, these works problematize attempts to assert purism on what can and cannot be subsumed within the generality of posthumanist representation; they sublimate through their hyperbolizing dramatizations deeper consciousness of real-enough dangers.

While misgivings over overextension are understandable, it would be a mistake to overlook other kinds of production. Consider this point. As this chapter is being finalized, there are massive fires in the Amazon rainforest. An eloquent account by Franklin Foer in *The Atlantic* speaks of how

> the destruction of the Amazon is arguably far more dangerous than the weapons of mass destruction that have triggered a robust response. The consequences of the unfolding disaster—which will extinguish species and hasten a worst-case climate crisis—extend for eternity. To lose a fifth of the Amazon to deforestation would trigger a process known as "dieback," releasing what *The Intercept* calls a "doomsday bomb of stored carbon." (Foer 2019)

There is no need to stress the continuities with those areas of posthumanist discourse overlapping with the environmental humanities. However it is worth underlining that relaying as-it's-happening becomings of posthumanist-enough scenarios are some quite unassuming and understudied genres (at least in posthumanist contexts): the news bulletin, rolling updates on twenty-four-hour news channels, correspondents' two-minute voiced-over

commentaries of footage of ravagings like that in the Amazon. It is no coincidence that in so many films and TV series, representations of crisis or disaster are punctuated with clips from real or fictive news footage. There are examples of this in various productions referred to across this chapter.

The idea that posthumanism is a paradigm whose implicit tenses are the conditional and the subjunctive (Callus 2016)—"it *could* occur: if this *were to* happen, this too *might*"—is thereby weakened. Real-time news coverage about all too real times grows ever more shadowed by concerns on issues with distinct posthumanist overtones, not least in the midst of political and economic decision-making that is slow to think more ecologically and less anthropocentrically. In the space available, the mention of four examples of posthumanism creep (let's call it that) approached in this mode must suffice (and let it be kept in mind that a work does not need to have the word *posthumanist* feature even once to have affinities in that regard, though the question of overextension of the term again arises there). Firstly, documentary, with Silverback Films' 2019 *Our Planet,* narrated by David Attenborough, as the example: for many viewers, it is going to be the most vivid representation they encounter of humanity's effects on other species and entire ecosystems. Already, *Blue Planet II*'s final episode the previous year, with its contribution to diffusing awareness of the hazards of microplastics on marine life and beyond, was influential. Secondly, environmental films: *An Inconvenient Truth* is among the better known, but shorts have their own trenchancy, as shown by Jonas Cuarón's seven-minute *Aningaaq,* accompanying the Blu-Ray release of *Gravity,* directed by his father Alfonso Cuarón. *Aningaaq* interestingly counterpoints human survival in outer space in the longer film with documentary focus on the rigors of the existence of the title character, a fisherman, in Greenland; the feature film also incorporates an intradiegetic radio conversation between the fictional protagonist, Dr. Ryan Stone (Sandra Bullock), and the latter. Thirdly: drama series again, but this time instanced in the HBO miniseries *Chernobyl,* which uses the format in factional documentation of the immediate and longer-term effects of the explosion of the nuclear reactor near Pripyat, Ukraine, in April 1986. The fourth example brings back technodeterminism: the mini-genre of the update-feature from "new tech" conventions, revealing the latest assistant-loaded or directly assistive devices—from phones to speakers to robots—to integrate into daily routines. It's all enough to script, in the portentous tones of the trailer voiceover, "The posthuman—coming soon to a home and an environment near you." How seriously one takes what's trailed, then, what the posthuman is (*not*), and to what extent posthumanism is grown into a catch-all term, is what must be asked. It brings up the matter of posthumanist theory, which tends to be serious enough.

FILM AND TELEVISION IN POSTHUMANIST THEORY

In view of all the above, the spareness of reference to film and television in *How We Became Posthuman,* which already in 1999 had ample range for citation, or indeed in Rosi Braidotti's recent *Posthuman Knowledge,* can seem curious. It suggests that film and television are not consistently core to posthumanist conceptualization. In that vein, it can be noted that *Blade Runner* is the only film referenced in another seminal posthumanist text, Donna Haraway's

essay "The Cyborg Manifesto," while Hayles's *My Mother Was a Computer* asserts literary primacy in its subtitle: *Digital Subjects and Literary Texts.*

However and as is well known, film and television do figure routinely in other posthumanist work: in Elaine Graham's *Representations of the post/human,* for instance, which in examining "some of the most definitive and authoritative representations of human identity in a digital and biotechnological age" refers among others to *Metropolis* (an image of the robot Maria is on the cover), David Cronenburg's *eXistenZ,* and various offerings in the *Star Trek* franchise (Graham 2002: 1); or in Rosi Braidotti's *The Posthuman,* which references Marcel Herbier's 1924 film, *L'Inhumaine,* in its exploration of "the highly sexualized and deeply gendered relationship of the twentieth century to its industrial technology and machinery" (Braidotti 2013: 106). In cases like these, the references rather illustrate than determine the overriding argument. It is different with, say, R. L. Rutsky's *High Technē*. Rutsky's book contains a sustained commentary on *Metropolis* that revisits classic film theory by Siegried Kracauer and André Bazin among others—and, indeed, Benjaminian ideas on the auratic—with a posthumanist lens to show how in the "dream of a living, spiritualized cinematic machine, the cinema's technological status must be aestheticized, spiritualized, in order to reflect the projections of a self that wishes to see itself as a fully present, living whole" (Rutsky 1999: 44–5). Cinema is thereby seen as integral to aesthetic modernism, conflicted, in Baudelaire's terms, between "the transitory, the fugitive, the contingent" and "the eternal and the immutable," and informed by the dialectic of "the bachelor machine, of the Frankenstein complex" (1999: 47).

In view of the gender politics thereby revealed as integral to certain posthumanist imaginings, it is significant that a key anthology from the period, *Posthumanism* edited by Neil Badmington, includes as a cinema-focused chapter Judith Halberstam's reading of Jonathan Demme's *The Silence of the Lambs* (off an article which had first appeared in *Camera Obscura* in 1991). It is a telling choice, dispelling overidentification of posthumanist themes with speculative fiction. Halberstam draws attention to how in the film *Buffalo Bill,* the serial killer who removes the skin of his female victims and sews it for wearability, "remakes [gender] as a mask, a suit, a costume." For him, "gender is always posthuman, always a sewing job which stitches identity into a body bag," such that "identity … is not the transcendent signifier of humanity, it is its most efficient technology" (Halberstam [1991] 2000: 67, 68). Even here, then, technology returns—though the greater import lies in how posthumanist bearings are discernible in a film that might not otherwise have been regarded as especially amenable to them.

The same applies to Cary Wolfe's *What Is Posthumanism?* Lars von Trier's *Dancer in the Dark,* a "melodrama" about "a woman who is slowly going blind" and who "sacrifices her own life so that her ten-year-old son … may receive an operation that will save his sight from the ravages of the same congenital disease," is the focus of a chapter-long reading of a film that is not self-evidently posthumanism-invested (Wolfe 2010: 170). Wolfe deploys ideas from Stanley Cavell and Jacques Derrida on "*presentness*" and on being "spectralized by the shot" to suggest that "[fi]lm is thus what the world looks like when we're not there" (176–7). This is reinforced with references to film theory, including Laura Oswald on cinema-graphia —"'traces of non-presence' such as the splice, the cut, or the frame" (190)—to underline the

film's enactment of what Cavell calls "a philosophy of immigrancy, of the human as stranger" (173), such that it "shatters the mirror in which the subject is held as unity by defining the image as a trace for another image" (190). Sound, voice, woman (the protagonist is a singer) are studied in an interrelating reading that, alongside *and* counter to other work by theorists and commentators on cinema, positions the film as "necessitating a fundamentally different critical logic that forces us beyond the simple dialectical reversal and elevation of the terms banished by humanism to subservient status (the Real, the Thing, the feminine, and so on)" (202). In this reading the "full articulation of the feminine" is profiled, in "its 'invaginated' relationship with prostheticity that obeys a fundamentally different, posthumanist logic" (202).

What is witnessed here is the critical resourcing of *the-film-to-think-with*. A cinematic (or televisual) work, read closely, analyzes posthumanism back, in effect critiquing some of its default moves and logic. The work is read not illustratively, but as prescient staging, or allegorization, of theoretical and conceptual points at hand. Formative in this is "the idea of a critical post-*humanism*, i.e. a humanism intent on working through its own repressed, … for a more open and less metaphysical definition of humans and their laws" (Herbrechter 2013: 129). It is a strategy recalling set-piece readings within poststructuralism, like Derrida reading *Hamlet* in *Specters of Marx* in order to conceptualize spectropoetics, hauntology, and time-out-of-joint problematics, themselves not unrelated to posthumanist tropology. Later critique yields further examples, not necessarily off the most obvious posthumanism-minded films. The eighth chapter of David Wills's *Inanimation*, for instance, discusses Jean-Luc Godard's *Weekend* and its prefiguring of Gilles Deleuze's ideas on cinema's capacity for the crystal image, "the outer-most, variable and reshapable envelope, at the edges of the world, beyond even the movements of the world" (Deleuze 1985: 108; quoted in Wills's modified translation, 2016: 232). It looks at the implications there for relating "the philosopher's cinematic analyses to the question of life, specifically a life of intensity not reducible to the inanimate," referencing also Claire Colebrook's work on Deleuze, cinema, technology, and a life of the image (Wills 2016: 232). To a different plane, Elena Past's *Italian Ecocinema beyond the Human* is interesting not only for its confirmation of affinities between ecocriticism and posthumanism, but also for focusing on production choices and practices in its readings of works that, again, are not necessarily staples of posthumanist reference. Among the films read closely is Michelangelo Antonioni's *Deserto rosso* and Roberto Frammartino's *Le quattro volte* (*The Four Times*), the latter intriguingly instantiating what a cinematic nonanthropocentrism might configure.

This is not the space to inventorize further posthumanist theory's propensity to resource film and television or comment on the nature of its choices in doing so. Broad trends have in any case been sufficiently indicated for refinement—or counters—to have their pegs in other scholarship in this line.[2] There is however one film, very *sui generis*, that demands mention. Directed by David Barison and Daniel Ross, *The Ister* features interviews with, among others, philosophers Bernard Stiegler, Jean-Luc Nancy, and Philippe Lacoue-Labarthe, as well as with the German film director Hans-Jürgen Syberberg. The structuring link is Heidegger's *Hölderlin's Hymn "The Ister"*, the book-form record of a lecture course delivered in 1942 on one of Hölderlin's hymns, a poem on the Danube, for which the ancient

Greek name was *Istros* (the Ister). Interspersing the interviews with shots of a journey along the river from east to west, from Romania to Germany to the source of the Danube, this is not so much film-to-think-with as straight-to-film critical posthumanism. It is perhaps *the* example of the trajectory of nonnormative posthumanism in noncommercial film or television: singular, unparaphrasable, and shaped over its three hours by various aperçus on the themes, which exercise this volume. Most obviously pertinent is the first part, in which Stiegler accessibly echoes various perspectives from *Technics and Time*. He observes that "technics develop faster than culture" and that "hominization" parallels, *is*, "the technicisation of the living," culminating, once "permanent innovation" determines becoming, in a "great difficulty for thought": namely, "Man is fundamentally a technical being, and yet technics is always unsettling man."[3] The other parts have their own possibly more implicit posthumanist resonances and are interesting for the interface between late-poststructuralist thought and the sense of the posthuman, not least in tensions between human exceptionalism and a more nonanthropocentric ethic. *The Ister,* then, provides further confirmation that posthumanism in film and television, as elsewhere, is not reducible to fiction's ways with humanity's supersedence.

FILM, TELEVISION, AND THE POSTHUMANIST VIGNETTE

With such a wealth of evidence for posthumanism's presencing in film and television, privileging any one work, or episode, for closer engagement is going to be invidious, even as some recommend themselves easily enough: the transformation of Maria in *Metropolis,* for instance, or the soaring to Dantesque reverse-precipitousness in *The Matrix* when Neo comes upon the banking of human upon human as power source. Scenes like these emblematize, *fix,* the posthumanist imaginary.

This chapter has selected two such scenes, both from recent TV series, which have their own quiet power. Fiction again then—but this reflects the space available, as well as the examples' inherent effectiveness. The first is taken from the 2019 BBC One TV series *Years and Years,* scripted by Russell T. Davies. The opening episode contains a heart-to-heart conversation between an asocial teenager, given to wearing filter-visors that project cartoon-animal faces above her own, and her parents, who are anxious to be supportive after she reveals, "I think I'm trans." Their solicitousness turns to bafflement when she says, "I'm not transsexual. I'm transhuman." She explains, "I'm not comfortable with my body … . I don't want to be flesh … . I'm going to escape this thing. And become digital … . I want to live forever. As information. Because that's what transhumans are, mum. Not male. Or female. But better. Where I'm going, there's no life or death, there's only data. I will be data." There is a lot that is parodied here, in a scene that plays off, while debunking, the allure of the transhuman. Indeed, it is a scene likely to install itself in debates surrounding tensions between transhumanism and posthumanism, though such readings would be well-advised to take account of the nuancing aspects of the series as a whole.

The second scene is taken from the Channel 4 series *Humans,* a remake of the Swedish

series, *Äkta människor* (*Real Humans*). The fifth episode of the 2018 third season involves a consciousness-endowed artificial human confronting a woman who, in the midst of bitter human-nonhuman contestations, has been helping others of his kind. The limits of empathy for the nonhuman, however, are exposed in a cruel test he sets her. Abducting an old man, he gives her the choice of hostage to save. Who should he release: the disheveled older man, unprepossessing but human; or a nonhuman boy, spruce and winsome and with whom she had already built deep rapport, artificial though he is? Hesitant, stricken, she harrowedly chooses the old man. Taut and tense, the scene stages the raw human(ist) automatism that affirms human limitation above disposable, humanlike, efficient, affect-ing autopoeticity. Scenes like this can be thought of as (post)humanist vignettes: posthumanist parables, even. Film and television are not only rich in them but *entertain* viewers' alertness to the girding concerns. The success of a series like *Black Mirror,* indeed, owes much of its effectiveness to this attribute.

One shared characteristic of *Humans* and *Years and Years* should also be mentioned. The interiors, the streetscapes, even much of the computer hardware are recognizably the present's. It is as if our world were abruptly afforded artificial life and everything else adapted. It may be a choice dictated by production budgets, but it underlines how posthumanist representations have become normalized. Film and television have contributed strongly to this, reinventing posthumanism even as it acquires the quotidian, lived-in look.

CONCLUSION

There would be much more to say on posthumanism in film and television: for instance, on non-Anglophone traditions in this line and on the relevance of independent film, or the overlap between posthumanism—which, in the end, is always about death and time—and spectropoetical imagining, in examples taking in the curious autothanatographical vantage points discernible in productions from Dreyer's *Vampyr* to the more recent *Les Revenants* (*The Returned*). The chapter will however have demonstrated some overriding considerations: among them, posthumanism's varied repertoires in film and television, which traverse genres and platforms; the dystopian overtones in portrayals of humanity's uneasy coexistence with autopoietic technology; the imaging of understandings of the posthuman not overdetermined by technologism. What is thereby attested is the depth and eclecticism of posthumanism's genealogies and canonicities within film and television, as well as the critical ambivalences around those repertoires. It all prompts the final thought, emerging from a simple-enough point. Precisely because film and television are now so integral to, and informed by, the posthumanist imaginary, it has become indispensable for anybody researching the field to be not only well read but also—to adopt a term used by Dame Carolyn McCall, ITV's Chief Executive—well watched.[4] How this affects the picture of the occasional disconnect between the posthumanist sensibility informing film and television and its screening in posthumanist critical discourse becomes, in consequence, a very viewable question.

is crucial to register that posthumanist theory can be ambivalent about the posthumanist credentials of the Marvel Cinematic Universe and other superhero/superhuman films. See, for instance, R. L. Rutsky (2007), particularly pages 105–7, and Rutsky (2016). This chapter is sympathetic to that view, but cognizant that the franchise connects with a broader posthumanist imaginary that might be disinclined to discern the distinctions across humanism, transhumanism, and posthumanism. See Stefan Herbrechter (2013), especially pages 118–34, for important reflections on the implicit collusions with humanism besetting this disinclination.

or a good guide, see *The Palgrave Handbook of Posthumanism in Film and Television* (Hauskeller et al. 2015).

uotations refer to the English subtitles of the DVD of the film.

he term was used by Dame Carolyn McCall in the Deloitte/Enders Analysis "Media and Telecoms 2019 and Beyond" conference in March 2019 and was amply reported on in the press.

SOURCES CITED

Ackroyd, Peter. *The Casebook of Victor Frankenstein*. London: Chatto and Windus, 2008.

Antonioni, Michelangelo, dir. *Deserto rosso*. Cineriz, 1964.

Attenborough, David. *Planet Earth*. Created by Silverback Films. BBC One, 2006.

Attenborough, David. *Our Planet*. Created by Silverback Films. Netflix, 2019.

Attenborough, David, narrator. *Blue Planet II*. BBC Natural History Unit. BBC One, 2017–18.

Atwood, Margaret. *The Handmaid's Tale*. Boston: Houghton Mifflin, 1986.

Badmington, Neil, ed. *Posthumanism*. Houndmills: Macmillan, 2000.

Barison, David, and Daniel Ross, dir. *The Ister*. First Run/Icarus Films, 2004.

Berlant, Laurent. *Cruel Optimism*. Durham, NC: Duke University Press, 2011.

Boulle, Pierre. *Planet of the Apes*. Translated by Xan Fielding. New York: Vanguard Press, 1963.

Braidotti, Rosi. *The Posthuman*. Cambridge: Polity Press, 2013.

Braidotti, Rosi. *Posthuman Knowledge*. Cambridge: Polity Press, 2019.

Brooker, Charlie, creator. *Black Mirror*. Five Seasons. Channel 4, 2011–14; Netflix 2016–present.

Callus, Ivan. "Drop the 'Proto-': Posthumanism and Prefiguration." *Word and Text*, vol. 6 (2016): 165–71.

Cameron, David, dir. *The Terminator*. Orion Pictures, 1984.

Colebrook, Claire. *Deleuze: A Guide for the Perplexed*. London: Continuum, 2006.

Colebrook, Claire. *Deleuze and the Meaning of Life*. New York: Continuum, 2010.

Croneberg, David, dir. *eXistenZ*. Dimension Films, 1999.

Cuaron, Jonas, dir. *Children of Men*. Universal Studios, 2006.

Cuarón, Jonas, dir. *Aningaaq*. Warner Bros, 2013.

Cuarón, Jonas, dir. *Gravity*. Warner Bros, 2013.

Darabont, Frank, and Angela Kang, creators. *The Walking Dead*. Ten Seasons. AMC, 2010–present.

Davies, Russell T., creator. *Years and Years*. BBC One. May–June 2019.

Dawley, Searle J., dir. *Frankenstein*. Edison Manufacturing Company, 1910.

Deleuze, Gilles. *L'Image-temps: Cinema 2*. Paris: Minuit, 1985.

Demme, Jonathan, dir. *Silence of the Lambs*. Orion Pictures, 1991.

Derrida, Jacques. *Specters of Marx: The State of the Debt, The Work of Mourning and the New International*. Translated by Peggy Kamuf. London: Routledge, [1993] 1994.

Dick, Philip. *Do Androids Dream of Electric Sheep?*. New York: Doubleday, 1968.

Dick, Philip. "We Can Remember It for You Wholesale." In *We Can Remember It for You Wholesale*. London: Millennium, [1966] 2000, pp. 157–74.

Dreyer, Carl Theodor, dir. *Vampyr*. Vereinigte Star-Film, 1932.

Foer, Franklin. "The Amazon Fires Are More Dangerous Than WMDs." *The Atlantic*, August 25, 2019. https://www.theatlantic.com/ideas/archive/2019/08/amazon-fires-show-limits-sovereignty/596779/.

Forster, Mark, dir. *World War Z*. Paramount Pictures, 2013.

Frammartino, Michelangelo, dir. *Le Quattro Volte*. [*The Four Times*]. Cinecittà Luce, 2010.

Garland, Alex, dir. *Ex Machina*. Universal Pictures, 2014.

Gobert, Fabrice, creator. *Les Revenants* [*The Returned*]. Two Seasons. Canal+, 2012–15.

Godard, Jean-Luc, dir. *Weekend*. Athos Films, 1967.

Graham, Elaine L. *Representations of the Post/human: Monsters, Aliens and Others in Popular Culture*. Manchester: Manchester University Press, 2002.

Guggenheim, David, dir. *An Inconvenient Truth*. Created by Al Gore. Paramount Vantage, 2006.

Halberstam, Judith. "Skinflick: Posthuman Gender in Jonathan Demme's *The Silence of the Lambs*." In *Posthumanism*, edited by Neil Badmington. Houndmills: Macmillan, [1991] 2000, pp. 56–68.

Halperin, Victor, dir. *White Zombie*. United Artists, 1932.

Haraway, Donna J. "A Cyborg Manifesto: Science, Technology, and Socialist Feminism in the Late Twentieth Century." In *Simians, Cyborgs and Women*. New York: Routledge, 1991, pp. 149–81.

Harbou, Thea von. *Metropolis*. Berlin: August Scherl, [1925] 1926.

Hauskeller, Michael, Thomas D. Philbeck, and Curtis D. Carbonell, eds. *The Palgrave Handbook of Posthumanism in Film and Television*. Houndmills: Palgrave Macmillan, 2015.

Hayles, N. Katherine. *How We Became Posthuman: Virtual Bodies in Cybernetics, Literature, and Informatics*. Chicago: University of Chicago Press, 1999.

Hayles, N. Katherine. *My Mother Was a Computer: Digital Subjects and Literary Texts*. Chicago: University of Chicago Press, 2005.

Hayles, N. Katherine. "Traumas of Code." *Critical Inquiry*, vol. 33, no. 1 (2006): 136–57.

Heidegger, Martin. *Hölderlin's Hymn "The Ister."* Translated by William McNeill and Julia Davis. Bloomington: Indiana University Press, [1984] 1996.

Herbier, Marcel, dir. *L'Inhumaine* [*The Inhuman Woman*]. [1924] Boite à Images, 1986.

Herbrechter, Stefan. *Posthumanism: A Critical Analysis*. London: Bloomsbury, 2013.

Hillcoat, John, dir. *The Road*. Dimension Films, 2011.

Ishiguro, Kazuo. *Never Let Me Go*. London: Faber and Faber, 2005.

James, P. D. *The Children of Men*. London: Faber and Faber, 1992.

Johnson, Joe, dir. *Captain America: The First Avenger*. Paramount Pictures, 2011.

Kramer, Stanley, dir. *On the Beach*. United Artists, 1959.

Lang, Fritz, dir. *Metropolis*. Parufamet, 1927.

Lundström, Lars, creator. *Äkta människor* [*Real Humans*]. Two Seasons. Sveriges Television 2012–14.

Marker, Chris, dir. *La Jetée*. Argos Films, 1972.

Mazin, Craig. *Chernobyl*. HBO/Sky UK, May 2019.

McCarthy, Cormac. *The Road*. New York: Alfred A. Knopf, 2006.

McEwan, Ian. *Machines Like Me: And People Like You*. London: Jonathan Cape, 2019.

Miller, Bruce, creator. *The Handmaid's Tale*. Hulu, 2017–present.

Nayar, Pramod. *Posthumanism*. Cambridge: Polity, 2014.

Nolan, Christopher, dir. *Batman Begins*. Warner Bros, 2005.

Nolan, Christopher. *Interstellar*. Paramount Pictures, 2014.

Nolan, Jonathan, and Lisa Joy, creators. *Westworld*. Two seasons. HBO, 2016–18.

Parey, Armelle, ed. *Prequels, Coquels and Sequels in Contemporary Anglophone Fiction*. Oxford: Routledge, 2019.

Past, Elaine. *Italian Ecocinema beyond the Human*. Bloomington: Indiana University Press, 2019.

Roddenberry, Gene, creator. *Star Trek*. Three seasons. NBC, 1968–69.

Romanek, Mark, dir. *Never Let Me Go*. Twentieth-Century Fox, 2010.

Romero, George A., dir. *Night of the Living Dead*. Walter Reade Organization, 1968.

Rutsky, R. L. *High Techne: Art and Technology from the Machine Aesthetic to the Posthuman*. Minneapolis: University of Minnesota Press, 1999.

Rutsky, R. L. "Mutation, History, and Fantasy in the Posthuman." *Subject Matters*, vol. 3, no. 2 (2007): 99–112.

Rutsky, R. L. "Technologies." In *The Cambridge Companion to Literature and the Posthuman*, edited by Bruce Clarke and Manuela Rossini. Cambridge: Cambridge University Press, 2016, pp. 182–95.

Schaffner, Franklin J., dir. *Planet of the Apes*. Twentieth-Century Fox, 1968.

Scott, Ridley, dir. *Blade Runner*. Warner Bros, 1982.

Scott, Ridley, dir. *Prometheus*. Twentieth-Century Fox, 2012.

Shelley, Mary. *Frankenstein, or, the Modern Prometheus*. Edited by M. K. Joseph. Oxford: Oxford University Press, [1818] 2008.

Siegel, Don, dir. *Invasion of the Body Snatchers*. Allied Artists, 1956.

Spielberg, Steven, dir. *Minority Report*. Twentieth-Century Fox/Dreamworks Pictures, 2002.

Stiegler, Bernard. *Technics and Time, 1: The Fault of Epimetheus*. Translated by Richard Beardsworth and George Collins. Stanford: Stanford University Press, [1994] 1998.

Trier, Lars von, dir. *Dancer in the Dark*. Zentropa Entertainments, 2000.

Verhoeven, Paul, dir. *Total Recall*. Columbia Pictures, 1990.

Villeneuve, Denis, dir. *Blade Runner 2049*. Warner Bros and Sony Pictures, 2017.

Vincent, Sam, and Jonathan Brackley, creators. *Humans*. Three seasons. Channel 4, 2015–18.

Wachowski, Lana, and Lilly Wachowski, dir. (as The Wachowski Brothers). *The Matrix*. Warner Bros, 1999.

Whedon, Joss. *Buffy the Vampire Slayer*. Seven Seasons. The WB and NP, 1997–2003.

Whedon, Joss, dir. *Avengers*. Walt Disney Studios Motion Pictures, 2012.

Williams, Raymond. *Television: Technology and Cultural Form*. Oxford: Routledge, [1974] 2003.

Wills, David. *Inanimation: Theories of Inorganic Life*. Minneapolis: University of Minnesota Press, 2016.

Winterson, Jeanette. *Frankisstein: A Love Story*. London: Jonathan Cape, 2019.

Wolfe, Cary. *What Is Posthumanism?*. Minneapolis: University of Minnesota Press, 2010.

CHAPTER TWENTY-NINE

Digital Comics and Unstable Interfaces

EDWARD KING

Comics culture developed in close entanglement with posthuman thought. This is most strikingly the case in the superhero genre and its deep influence on the evolutions of comics texts throughout the twentieth century. The dialogue between Golden Age superhero narratives and eugenics has been well documented. The ideal of what Scott Jeffery (2016: 78) describes as the "perfect body" that motivated the character design of DC's Superman and Captain America developed in step with the fascist movements of the 1930s and their core belief in the perfectability of the human species. The "cosmic bodies" of Silver Age heroes such as Marvel's *X-men* and the *Hulk*, meanwhile, drew from the close historical connection between technological and magical thinking that Erik Davis describes as "techgnosis" and, in turn, strongly influenced the displacement of anthropocentrism at the center of counter-cultural thought of the 1960s and 1970s. The thematic preoccupation with posthumanism, however, is not restricted to science fiction comics. Lisa Diedrich, for instance, traces the emergence of the genre of graphic medicine, a conjuncture between graphic narratives and clinical medicine that helps those thinking through the consequences of illness "reimagine the boundaries of 'health,' 'illness,' 'life,' and 'death' and to rethink the status of the human in its entanglements with the nonhuman in everyday life" (2017: 97). Both illness and the institutional contexts of its treatment are presented as assemblages of human and nonhuman agents whether technical or chemical.

Central to this recurring thematic preoccupation with technologically modified bodies and socio-technical assemblages is a close interconnection between posthuman thought and the

form of comics. The consolidation during the latter half of the nineteenth century of comic book conventions for the depiction of human bodies took place in the context of intensifying industrialization. As Scott Bukatman argues in his analysis of structural developments in comic strips of New York newspapers at the time, "the body in motion was increasingly depicted as deformed by the machineries of industrialism" (2012: 36). Enduring techniques for the depiction of bodily movement (including motion lines and blurred outlines) "conjured a body reacting violently to the power of technological might" (Bukatman 2012: 37). (It was this same technological might that was later harnessed and mastered in the fantasy of the superhero body.) The development of the signature grid structure, which drew from contemporary chronophotographic strategies for the visualization of movement associated with Jules Marey and Eadweard Muybridge, submitted the human body to the visual logic of what Bukatman calls the "instrumental rationality of industrial development" (2012: 37). As Ernesto Priego and Peter Wilkins argue, the comics grid is "an aesthetic analogy of the Gestell" and consequently comics are read "in the context of technological enframing" (2018: n.p.). Subjected to the grid, the human is reduced to standing reserve: something that can be controlled, manipulated, or mobilized for financial gain. The foundations of comic book form in the framing of the human by industrial technologies have made it a key site for the articulation of the increasingly complex entanglements between human subjects and technological systems and the unexpected and ever-emerging assemblages these produce.

In *Posthumanism and the Graphic Novel in Latin America*, which I co-authored with Joanna Page, we traced the emergence of a form that not only thematizes emerging posthuman subject positions but also actively produces them through the readerly performances they demand (King and Page 2017). The embodied engagements with the materiality of the text and what Thierry Groensteen (2007: 108) describes as the "plurivectorial" reading pathways demanded by the image-text combinations and panel-page structures mirror contemporary accounts of relational ontologies such as those pursued by posthumanist theorists. The relational constitution of human and nonhuman entities described within posthumanist graphic narratives in Latin America such as the work of Edgar Clement in Mexico and Rafael Coutinho in Brazil and elsewhere is echoed and informed by the textual constitution of meaning as a dynamic interaction between panel and page; word and image; book, reader, and environment. The editors of *The Palgrave Handbook of Posthumanism in Film and Television* argue that works of popular culture such as science fiction cinema "mirror and disseminate visions of our possible futures" marked by the posthumanist "shift in popular consciousness" (Hauskeller et al. 2015: 3). I argue, by contrast, that comic books perform a much more formative role than the mere reflection and popularization of scientific and philosophical discourses. The specific affordances of the form and the networked modes of reading and meaning-making in which they are embedded make comics ideal vehicles for what Rosi Bradiotti describes as a "critical posthumanism." For Braidotti, critical posthumanism is a practice that combines a critique of humanism (drawing from anti-humanist thought within poststructuralism) with "forward-looking experiments with new forms of subjectivity" (2013: 45).

The mobilization of the affordances of comics form within a critical posthumanist practice is never more evident than in experiments with digital comics, when the comic book

conventions cherished by purists are stretched to their limits. A recurring critique of digital comics that combine the space-based structural properties of comics (grid structures, motion lines) with time-based media such as animation and an audio track is that they are not actually comics. As Bukatman puts it, "[s]ince sound and movement are both time-based phenomena, they seem to contradict comics' conception of space as representation of time—the conceptual fundament of the medium" (2011). The introduction of temporal media wrests control of the flow of time ceded to the reader by the creators of the comics. Rather than the reader having power over temporal transitions through control over movement from panel to panel and page to page, in the animated sequences inserted into some digital comics, time unfolds beyond the reader's volition. The experience of reading these comics, therefore, can be an awkward compromise. As Josip Batnic argues, "[l]oading the comic with elaborate and impressive effects" can undermine the status of the comic as a "meaningful and unified whole" (2016: n.p.). In this chapter, I argue that the potential of comics as a vehicle for critical posthumanism is realized most fully in these moments of disunification, when both the form of comics and the reader's sense of control fragments into the intermedial flux of the digital interface.

DIGITAL COMICS

Critical posthumanism can be found in the very earliest experiments with digital comics. *Argon Zark!*, a comic developed by web designer Charley Parker, the first installations of which were published in 1995, playfully explores the transformative potential of digital interfaces. Narrative events are triggered by the eponymous designer Zark's development of a Personal Transport Protocol (PTP) which enables him to travel the web not virtually but physically. As he partially explains it, "PTP simply translated our molecular structure into a superdense infostream and bla bla." The comic follows Zark as he accidentally activates hyperlinks embedded in his physical environment and is sent hurtling back and forth across the internet. Despite the satirical tone and nerdy jokes, the narrative encourages the reader to think critically about the modes of reading facilitated by the digital interface. While as a web designer Parker's job is to produce interfaces that are as unobtrusive for the user as possible, his comic draws attention to the strangeness and unexpected impacts of digital interfaces on our experience of time and space. The last installments of *Argon Zark!* (which petered out in 2008) employ more and more flash animation as the project drifted away from the conventions of print comics (a print version of the first chapter was dismissively described as a "Dead Tree Souvenir Edition") toward the hybrid strategies of what have been labeled "motion comics."[1] The combination of space-based and time-based media underscores the transformative effect that is the focus of the narrative. An ongoing source of comedy in the comic is provided by Zark's robot sidekick with faulty voice recognition software. The robot echoes whatever its creator says in a distorted form. A program designed to facilitate the interaction between computers and their human users is anything but smooth, in a way that mirrors the awkwardness of the digital comics platform itself. Rather than a design flaw, this "friction" (to use a term often used in relation to digital interface design) becomes a tool of its critical posthumanism.

This potential has been further developed by artists engaging more explicitly with the discourses of technological posthumanism. The Brazilian multimedia artist and comics author Edgar Franco coined the term "HQtrônicas" (HQ is short for Histórias em Quadirnhos, a Portuguese term for comics common in Brazil) to describe the audio-visual languages emerging at the intersection of comics and the affordances of networked electronic media, including interactivity and animation (2017: 28–42). Digital comics produced by Franco during the early 2000s form part of his wider multi-media universe "Aurora Pós-humana" (Posthuman Dawn), which also includes print comics, electronic music, and live performance. "Ariadne e o Labarinto Pós-humano" (produced in 2001) combines a narrative set in a posthuman far-future with a didactic approach to posthumanist theory, including links to web resources on a range of movements including extropianism and transhumanism. The reader is placed in the position of a member of the human "resistance" whose extropian boyfriend wants to download his consciousness onto a computer chip. In the comic's final stages, the reader has to pick between two alternate endings by either remaining faithful to her partner's disembodied consciousness or setting up with a physical clone. Works by artists such as Parker and Franco engage with digital comics not just as a set of new tools but as a form that is bound up with the profound epistemic shifts entailed by digital culture while offering a discursive space for their critique.

While themes of human-technological hybrids and distributed cognition have been fairly common in the world of digital comics, it is the work of Australian comics artist and digital interactive designer Stu Campbell who has harnessed the affordances of digital comics most effectively to a critical posthumanist agenda. A closer analysis of his work draws into focus the specific contribution to explorative posthumanism of both the emerging forms of digital comics and the print traditions from which they draw. Campbell is best known for his twenty-four-episode webcomic *Nawlz*, which was first launched in 2008 and reformatted for touch-screen interfaces in 2011. The narrative takes place in a run-down metropolis and narrates the misadventures of drug-addict technophile and "cyber-graffiti" artist Harley Chambers. The near-future society developed through the two issues of *Nawlz* is characterized by a complex intertwining of the material environment and networked information. This has been mainly driven by the popularity of an augmented reality device, known as the "Sensori 17 freqon chip," that is inserted into its users' visual cortex allowing them to access a layer of information overlaying the physical infrastructure of the city. Freqon users can access both the "Reals" created by corporations, advertisers, and artists or project their own Reals onto the city for others to interact with. Because of its "enhanced translation of dreams and subconscious imagery" (Campbell 2008: n.p.) the freqon chip has become particularly popular with the creative industries, spawning a new field of mass consumer culture known as Digital Identity Entertainment.

Complicating this socio-technical assemblage even more is the pervasive recreational practice known as seeding, which involves implanting media through the freqon chips as false memories while taking "binder" drugs to stimulate and intensify those memories. "The outcome," we are told, "is the fusion of the memory with your perception of reality" (Campbell 2009: n.p.). Although more focused on world-building and the development of stunning audio-visual digital effects, the comic's narrative traces Harley's growing realization

that his own private Real on which he is developing a vision he remembers from his childhood (a kind of private graffiti he projects onto the city around him) is being manipulated by a mysterious external entity. The dramatic tension focuses on questions of control. Does Harley control his own Real? If not, how does he construct a sense of self commensurate with the realization of his intricate interrelatedness with the information networks distributed across the city? *Nawlz* shares with Braidotti an interest in the possibilities of posthuman "subjectivities." I place the term, which Braidotti herself uses, in scare quotes since the subjectivities staged in Campbell's comic are modes in which dominant conceptions of humanist subjecthood, and its constitutive opposition to a natural or technological object world, are placed under erasure. This is a form of subjectivity in which there is no stable opposition between subject and object, self and other. Braidotti describes posthuman subjectivity as "a relational subject constituted in and by multiplicity, that is to say a subject that works across differences and is also internally differentiated, but still grounded and accountable" (2013: 49). This tension between constitutive openness to multiplicity and an enduring sense of groundedness and accountability is central to the narrative tension in *Nawlz*.

Rather than the superhero or graphic medicine traditions of comic book posthumanism, Campbell's work draws its main inspiration from the cyberpunk genre. Key aspects of its world-building are drawn from canonical literary and cinematic cyberpunk works. The technological implantation of false memories, for instance, is reminiscent of Ridley Scott's 1982 film *Blade Runner* and the Philip K. Dick universe that it was partly based upon, while the intertwining of the physical body with data networks builds on a science fiction tradition consolidated by William Gibson's paradigmatic 1984 novel *Neuromancer*. *Nawlz* unites these two tropes in its focus on how the experience of selfhood is changing through its increasingly complex interrelations with invasive information technologies. The comic also echoes cyberpunk's political ambiguity in its treatment of digital technologies. *Nawlz* hesitates between presenting its networked information technologies either as a mechanism of tightening control, binding individuals to the logic of the market in increasingly intimate ways, or as a means through which to construct experimental socio-technical assemblages that might constitute a blockage to power. In this sense, the comic foreshadows Arthur Kroker's description of the undecidability of technological posthumanism. For Kroker:

> The technological posthuman is that historical moment when the power of technology turns back on itself, effectively undermining traditional concepts such as subjectivity, privacy, and bounded consciousness in order to render all things truly uncertain and unknowable. (2014: 15)

The technophilic drug addicts that populate *Nawlz* inhabit this unstable terrain in which "the will to technology turns back on itself, volatilizing society [and] crashing boundaries" (Kroker 2014: 24).

UNSTABLE INTERFACES

At an aesthetic and structural level, *Nawlz* builds on a print tradition that has reworked cyberpunk tropes through the hybrid syntax of comics. Paul Pope's *Heavy Liquid,* first serialized between 1999 and 2000, narrates the social impact of a new drug that expands the user's senses making her or him more connected with the human and material environment. In a way that exemplifies cyberpunk's pervasive use of organic metaphors of viral infection for the description of information flow, the "heavy liquid" drug blurs the boundaries between the organic and the technological, being both a biochemical agent and a medium of networked connection. Brian Wood and Becky Cloonan's *Channel Zero,* which was first serialized in 1997 before being published as two standalone works in 2000 and 2002, is *Nawlz*'s closest point of reference in print both in its thematization of power and control in the information age and its punk aesthetic. Like *Nawlz, Channel Zero* is constructed through a dense layering of verbal and visual information, mirroring the infoglut described within the narrative, while the do-it-yourself cyberpunk ethos of the hacker protagonist is reproduced through the form of the book. In a way that echoes the protagonist Jennie 2.5 hacking into the state television channel to broadcast her own message of dissent, the reader of *Channel Zero* is encouraged to have an active and irreverent attitude to the medium of the print book. A number of pages are presented as posters designed to be cut out, complete with dotted lines marking where the engaged reader should use the scissors. The blurring of subject and object described at the level of the narrative is realized through an intended reading experience in which the physical object of the book is reshaped in line with the purposes of the reader.

This strategy of using the multimodality of comic book form to denaturalize human-technological interfaces is central to Campbell's use of digital design elements. In a way that echoes *Channel Zero*'s cut-out pages, *Nawlz* demands an active mode of readership as a way of thinking critically about the transformative potential of the interface. The format developed by Campbell uses a promiscuously broad range of digital comics strategies. Key aspects of print comics syntax, such as the use of speech bubbles and panel segments to evoke the passage of time, are combined with animated sequences. The degree of control the reader has over these animated segments varies across the comic. "Roll-over images" that come to life through contact with the curser are interspersed with sections of looping parallax animation in which an animated image is layered over a static background creating the impression of depth-of-field.[2] Rather than imitate the printed page, *Nawlz* invokes the potential of what Scott McCloud described as the "infinite canvas" in which the computer monitor is converted into a movable "window" onto an infinitely vast surface of inscription (2000: 200–42). As the reader clicks a series of arrows, the monitor window shifts in a number of directions. However, while not using the printed page as a structural referent, the nonlinearity of the digital "canvas" echoes the "plurivectorial" nature of reading print comics described by Groensteen. The monitor seems to shuttle back and forth at the click of a mouse just as the reader's eye is pulled across the printed page, both with and against the flow of the narrative.[3]

The main impression given by Campbell's blending of print comics syntax with digital interface design is that of layering. The combination of different media is presented as a formal corollary of the schizophrenic breakdown that the protagonist Harley experiences at the level of the narrative. In her analysis of contemporary autobiographic comics, Nancy

Pedri argues that the layering of different media, including photographs with hand-drawn and computer-generated images, is used as a way of presenting the self as an epiphenomenon of assemblages of forces, discourses, and technologies. For Pedri, the inclusion of photographic images introduces a "complex layering of perspectives" into graphic memoirs (2017: 20). These multiple perspectives are presented as co-constitutive of the self that is under examination. The use of hand-drawn versions of photographs in works such as *Mendel's Daughter* (2006) by Martin Lemelman and *Mallko y papá* (2014) by Argentine illustrator Gusti presents "understanding[s] of the self and experience as embodied, shared, relational" (34). Furthermore, because they are constituted by "crossing, overlapping, complementary, and competing perspectives," these understandings are "always in the making" (20). The constitution of meaning across a range of different media in *Nawlz* has a similar effect. Although the focus of the narrative is the fragmentation of Harley's fragile psyche as he comes to terms with his tenuous control over the memories he thought of as constituting the private core of his self, the storyline is not focalized uniquely through his perspective. Rather, the reader is forced to assemble a narrative of events from fragments of different media existing within the diegetic world of the comic, including the Reals emitted by Harley and his friends and a real-time augmented reality "magazine."

In Alexander Galloway's study of interfaces as "processes" that "bring about transformations in material states" (2012: vii) he sets up an opposition between artistic works that conceal their interface with the viewer or reader through an impression of self-contained unity, and works that draw attention to the "original trauma of the interface itself" and so "revel in the disorientation of shattered coherence" (39). He takes as an example of the latter Richard Williams's parody of Norman Rockwell's 1950 "Triple Self-Portrait" for *Mad Magazine* in which the signature mascot, Alfred E. Neuman, gazes back directly at the viewer undermining the internal visual logic of the original. The tension between Rockwell's celebrated painting and its satire, Galloway argues, is that between "coherence and incoherence, of centers creating an autonomous logic versus edges creating a logic of flows, transformations, movement, processes, and lines of flight" (2012: 39). Its interface is "unstable … unproductive, inoperative, unworkable" (39). In its disjointed disaggregation of comic book structures within a digital platform, *Nawlz* is an unstable interface that constantly draws the reader out of the unity of the work. Rather than a failure of the comic (as per the critique of motion comics outlined above) this instability is a key element in its effectiveness as a work of critical posthumanism. The instability of the interface at the level of the reading experience is repeatedly echoed by the posthuman assemblages constructed at the level of the narrative. Issue 6 of Season 01, for instance, recounts a dream that Harley has when he falls asleep without turning his casting chip off (leaving his consciousness open to intervention). Floating above the city, "stretching his interface," Harley sees the city as a "nervous system" intricately interconnected with his own. Suddenly sitting on a street-side electrical box, Harley is confronted by the vision of an octopus floating in a restaurant window. The virtual cephalopod abruptly addresses Harley, revealing a knowledge of his inner anxieties and asking him what he "thinks of this interface." As the octopus addresses Harley, an animated sequence kicks in showing Harley drawn toward the window against his will and the animal extending a tentacle through the glass. A further animated image showing Harley's spine

painfully bursting through his jacket becomes animated when the reader hovers the cursor over a flashing cross. At the moment when Harley is starting to realize the degree to which his consciousness is being manipulated by external forces, control over the temporal progression is momentarily taken out of the reader's hands.

Furthermore, the interfaces described in the sequence—the urban nervous system; the hologrammatic octopus—blur the distinction between the technological and the organic in a way that mirrors the reader's embodied interaction with the work. Katherine Hayles's analysis of the digital textuality of electronic hyper-text literature illuminates the embodied nature of the interface that *Nawlz* sets up with the reader. In her discussion of Shelley Jackson's *Patchwork Girl* (1995), a postmodern gothic reinvention of Mary Shelley's Frankenstein myth that imagines if Frankenstein had created a girlfriend for his monster, Hayles analyzes the connections between the thematic focus on monstrous female embodiment as the repressed Other of Enlightenment reason and the specific corporeal modes of reading demanded by the electronic platform. Jackson exploits the fact that "electronic hypertexts are written and read in distributed cognitive environments" and that the reader is "constructed as a cyborg, spliced into an integrated circuit with one or more intelligent machines" (Hayles 2000: 13). The monstrous body of the entity described within the narrative is mirrored by the monstrous body of the reader, "distributed" as she or he is between embodied habits of reading derived from print culture, the digital infrastructure devised by Jackson through commercially available software (including Storyspace and MacPaint), and a broad spectrum of intertexts ranging from Mary Shelley herself to Donna Haraway. By appropriating and re-writing a canonical eighteenth-century novel within this digital textual ecology, Jackson is staging a return of the material and distributed dimensions of literary writing that were repressed in the conception of copyright law during this period as the emanation of individual masculine genius that "soared above their material instantiations in books" (17). Jackson uses the specificities of her electronic medium—what Hayles terms the "flickering connectivities" that mediate between the author, reader, and the multi-layered coding chains enabling the interface—to turn her text into the repressed unconscious of literary discourse. The patchwork girl of the title, a stitched assemblage of different bodies, stands in as a metaphor for the boundary-breaching textual performance required of the reader.

The parallels with *Nawlz* are instructive. Like *Patchwork Girl*, the narrative in *Nawlz* draws on the gothic in its construction of the creeping control of external forces over Harley's "Real" as a return of the repressed. The aesthetic developed by Campbell also draws heavily on the gothic. Digital avatars haunt the titular mist-shrouded city of *Nawlz* like specters. But both texts also use the gothic mode to carry out similar forms of critique. *Patchwork Girl*'s digital gothic stages a return of that which is repressed in dominant articulations of literature (enshrined in the copyright laws of the eighteenth century), including image culture, the materiality of both text and reader, as well as the networked nature of its textuality. *Nawlz*, meanwhile, exposes constitutive formal elements of comics that are disavowed in its gentrification through the consolidation of the graphic novel form: namely, the feedback loops between the work and the networks of texts and fan communities from which they arise, and the socio-technological assemblages that are performed in the

process of reading. Campbell's digital comic draws attention to the "transversality" of comics cultures. Braidotti argues that a "transversality of relations" is the key to the constitution of technological posthuman subjectivity (2013: 95). A posthuman subject "traces transversal connections among material and symbolic, concrete and discursive lines or forces" (95). The instability of the interface developed in *Nawlz* induces a mode of readership that is alert to connections between discourse (exploratory posthumanism) and the digital materiality of the platform.

CONCLUSION

A close reading of *Nawlz* reveals the effectiveness of comics as a tool of critical posthumanism in a technological mode. This just scratches the surface of the use of comics in the exploration of the emerging socio-technical assemblages of the digital age. Further examples include Greg Borenstein's "algorithmic comic," the "Generated Detective," that uses a program to create a webcomic from images and fragments of text "generated from public domain detective, romance, and horror novels and Creative Commons licenced photographs" (Borenstein 2014: n.p.); and Nova Jiang's "Ideogenetic Machine," an augmented reality art work that instantly converts images of those interacting with the installation into a comic that is projected onto a canvas. In a way that echoes *Nawlz*, the modes of posthuman subjectivity evoked by both works are "undecidable" in the manner identified by Kroker. Both serve to naturalize the increasingly invasive integration of computer systems into social reality, while simultaneously providing a space to explore these processes in a critical way. What *Nawlz*'s use of cyberpunk tropes contributes is a focus on power. In their introduction to a volume on "interface critique," Florian Hadler and Joachim Haupt argue the digital interface should be thought of as "an apparatus that governs the user through … experience design, user guidance and usability" (2016: 9). In Campbell's hands, the digital comic becomes a way of examining human-machine interfaces at a moment when these interfaces are being rendered increasingly invisible through their naturalization by dominant corporate software producers.

While the use of comic book syntax within a digital platform is a particularly powerful mode of critically framing emerging posthuman assemblages driven by the increasing integration of humans and computer systems, the digital comics examined here draw attention to the critical posthumanist potential shared with more traditional print comics. Throughout my analysis I have drawn attention to the digital textual strategies (such as the layering of different media, and plurivectorial modes of reading encouraged by the structure) that are developed from print comics. Campbell implicitly makes a claim for the specificity of the digital comic by labeling *Nawlz* an "interactive comic." However, all of the dynamics of limited interaction present in *Nawlz* (including the choice of whether or not to activate certain animated features) are present in a slightly different form in the comic's print predecessors. Comics have long accompanied posthuman themes with the use of textual technologies designed to "reach out" to the reader. *Superman Beyond* (2011) came with 3-D glasses that allowed the front-cover image of the superhero to literally lean out of the book. As Jeffery points out, this was part of a long tradition of superheroes breaking the fourth wall

of the comic book page (2016: 100). However, the key quality that is critically foregrounded by posthumanist digital comics that is also central to their print corollaries is the networked constitution of meaning. In his analysis of Mike Mignola's *Hellboy* comics, Bukatman argues that the "present moment of respectability" enjoyed by comics and the "polyphonous hybrid" textualities they employ (a status marked by the growing scholarly attention and the rise of the graphic novel form) are indicative of the "epistemic shift" surrounding "the changing status of the book in digital culture" (2016: 19). Comics, he explains, demand a mode of "networked reading" now dominant in digital cultures.

> Not only do panels and pages connect in both sequential and nonlinear correspondences and continuities, but readers of superhero comics are heavily invested in character histories, narrative continuities, and the virtues and vicissitudes of the various "universes" in which those characters and stories commingle. (Bukatman 2016: 22)

The "transversality" that is key to a critical posthumanist subjectivity is a central and constitutive facet of comics cultures. The instability of its formal interfaces as it migrates back and forth across print and digital technologies makes it a valuable textual tool for critical experimentation with socio-technical assemblages.

---

or an overview of debates surrounding "motion comics" and opposing approaches to digital comics that leave more temporal control in the hands of the reader, see Daniel Merlin Goodbrey, "The Impact of Digital Mediation and Hybridisation on the Form of Comics," Thesis submitted to the University of Hertfordshire in partial fulfillment of the requirements of the degree of DDes (2017). Available here: http://e-merl.com/thesis/DMGthesis2017web.pdf.

ı a video "tutorial" uploaded to Vimeo, Campbell explains the series of techniques he uses to achieve this effect. He starts by drawing the images on a roll of brown paper and then scans them into Photoshop before applying colors and other visual effects. The animated and non-animated images are exported as separate layers into Illustrator before being combined.

hilippe Marion (1993) argues that the experience of reading comic books is characterized by a tension between the "oeil optique" and the "oeil haptique." While the former follows the linear construction of the narrative, the latter is drawn to the details and textures of the page, and pulls against the smooth narrative flow.

SOURCES CITED

Batnic, Josip. "Digital Comics: Harder, Better, Faster, Stronger." *Network Cultures*, November 21, 2016, http://networkcultures.org/longform/2016/11/21/digital-comics-harder-better-faster-stronger/.

Borenstein, Greg. "Generated Detective: An Algorithmic Comic." *Greg Borenstein*, November 2014, https://gregborenstein.com/comics/generated_detective/.

Braidotti, Rosi. *The Posthuman*. Cambridge: Polity Press, 2013.

Bukatman, Scott. "Online Comics and the Reframing of the Moving Image." In *The New Media Book*, edited by Dan Harries. London: BFI Publishing, 2011, pp. 133–43.

Bukatman, Scott. *The Poetics of Slumberland: Animated Spirits and the Animating Spirit*. Berkley, Los Angeles, and London: The University of California Press, 2012.

Bukatman, Scott. *Hellboy's World: Comics and Monsters on the Margins*. Oakland, California: University of California Press, 2016.

Campbell, Stu. "Nawlz." *Interactive Comic—NAWLS*, 2008, https://www.nawlz.com/.

Campbell, Stu. "Nawlz.com: Interactive Comic—Tutorial." *Vimeo*, July 20, 2009, https://vimeo.com/5689844.

Davis, Erik. *Techgnosis: Myth, Magic and Mysticism in the Age of Information*. New York: Serpents Tail, 1998.

Diedrich, Lisa. "Comics and Graphic Narratives." In *The Cambridge Companion to Literature and the Posthuman*, edited by Bruce Clarke and Manuela Rossini. Cambridge: Cambridge University Press, 2017, pp. 96–108.

Franco, Edgar. *Qudrinhos expandidos: Das HQtrônicas aos plug-ins de neocortex*. João Pessoa: Marca de Fantasia, 2017.

Galloway, Alexander R. *The Interface Effect*. Cambridge: Polity Press, 2012.

Gibson, William. *Neuromancer*. London: HarperCollins, [1984] 1995.

Goodbrey, Daniel Merlin. "The Impact of Digital Mediation and Hybridisation on the Form of Comics." Thesis submitted to the University of Hertfordshire in partial fulfillment of the requirements of the degree of DDes (2017), http://e-merl.com/thesis/DMGthesis2017web.pdf.

Groensteen, Thierry. *The System of Comics*. Jackson: University of Mississippi, 2007.

Gusti. *Mallko y papá*. Buenos Aires: Océano Travesía, 2014.

Hadler, Florian, and Joachim Haupt. "Towards a Critique of Interfaces." In *Interface Critique*, edited by Florian Hadler and Joachim Haupt. Vol. 139 of *Kaleidogramme*. Berlin: Kulturverlag Kadmos, 2016, pp. 7–13.

Hauskeller, Michael. et al. "Posthumanism in Film and Television." In *The Palgrave Handbook of Posthumanism in Film and Television*, edited by Michael Hauskeller et al. New York: Palgrave, 2015, pp. 1–7.

Hayles, N. Katherine. "Flickering Connectivities in Shelley Jackson's *Patchwork Girl*: The Importance of Media-Specific Analysis." *Postmodern Culture*, vol. 10, no. 2 (2000), https://muse.jhu.edu/article/27720/summary.

Jeffery, Scott. *The Posthuman Body in Superhero Comics: Human, Superhuman, Transhuman, Post/Human*. New York: Palgrave Macmillan, 2016.

Jiang, Nova. "Ideogenetic Machine." *Vimeo*, October 10, 2011, https://vimeo.com/30341877.

King, Edward, and Joanna Page. *Posthumanism and the Graphic Novel in Latin America*. London: UCL Press, 2017.

Kroker, Arthur. *Exits to the Posthuman Future*. Cambridge: Polity, 2014.

Lemelman, Martin. *Mendel's Daughter*. London: Ramdom House, 2016.

Marion, Philippe. *Traces en cases: Travail graphique, figuration narrative et participation du lecteur*. Louvain-la-Neuve: Academia, Université Catholique de Louvain, 1993.

McCloud, Scott. *Reinventing Comics: How Imagination and Technology Are Revolutionizing an Art Form*. New York: HarperCollins, 2000.

Morrison, Grant, Doug Mahnke, and Christian Alamy. *Superman beyond 3d: Final Crisis*. New York: DC Comics, 2008.

Parker, Charley. *Argon Zark!* (n. d.), https://www.zark.com/.

Pedri, Nancy. "Photography and the Layering of Perspective in Graphic Memoir." *ImageText*, vol. 9, no. 2 (2017): 1–34.

Pope, Paul. *Heavy Liquid*. New York: DC Comics, 2008.

Priego, Ernesto, and Peter Wilkins. "The Question Concerning Comics as Technology: Gestell and Grid." *The Comics Grid: Journal of Comics Scholarship*, vol. 8 (2018), https://www.comicsgrid.com/articles/10.16995/cg.133/.

Scott, Ridley, dir. *Blade Runner*. USA: Warner Bros, 1982.

Wood, Brian, and Becky Cloonan. *Channel Zero: The Complete Edition*. Milwaukie: Dark Comics, 2012.

CHAPTER THIRTY

Anime's Situated Posthumanism: Representation, Mediality, Performance

JAQUELINE BERNDT

Anime, a popular media form from Japan, has been closely tied to posthuman critical discourse in Europe and North America. Designating primarily genre fiction appearing in cel animation, the name itself—an abbreviation of the English loanword *animēshon*—took roots in vernacular Japanese in the 1970s (cf. Berndt 2018). Roughly two decades later it began to enter the global lexicon. But contrary to the popular global definition—"Animation Made in Japan"—in Japanese discourse, anime is specified with regard to medium as cel, or cel-look, animation, serialized narratives produced on tight budgets and consequently rendered to the greatest possible extend in so-called limited rather than full animation;[1] with regard to media, that is, institutions and practices of production, distribution, and consumption, as closely tied to television and manga (i.e., magazine-based printed comics). With manga, the traditional supplier of stories to be adapted, anime shares the commercial orientation, the format of serial narratives, the high degree of conventionality, and usually also the fandom. As a matter of fact, not all "anime" are TV series or related franchise movies, but categorizing these as anime in the same breath as animated feature films made for theatrical release by renowned director-auteurs (such as Hayao Miyazaki and Mamoru Oshii) may become problematic beyond the narrow confines of medium specificity. Turning to anime, and manga, in search of contributions to, for example, posthumanism calls for a consideration of media affordances which change according to time, place, and audiences.

This chapter foregrounds the study of anime which is, arguably, much more connected to posthuman (as posthumanist and post-anthropocentric) discourse[2] than manga, from media affordance down to global circulation. The animated movie *Ghost in the Shell* (*K'kaku kidōtai,* dir. Mamoru Oshii 1995; hereafter, GiTS) serves as the main point of reference due to its extraordinary critical impact. It is not juxtaposed with the eponymous manga it adapted (by Masamune Shirow 1989–90) and neither the ensuing franchise (including Oshii's sequel *Innocence,* 2004, and the two TV anime series *Ghost in the Shell: STAND ALONE COMPLEX* and *S.A.C. 2nd GIG* by Kenji Kamiyama, 2002–03 and 2004–05 respectively). As most accounts of anime's posthumanism highlight plot, dialog, and character configurations, this chapter privileges anime-specific mediality, and precisely because its focus is on the media form of anime rather than the thematic genre of science fiction English-language discourse is given preference over the Japanese one, where literature has played the central role (cf. Fujita 2012). The chapter shows what type of anime is at stake in relation to posthumanism, and how not only exceptional animated movies like GiTS but also ordinary TV anime series (like *Inuyashiki: Last Hero* and *Coppelion*) may afford posthumanist thought, namely by making viewers feel "disjunctive synthesis" (Lamarre 2015: 8).

REPRESENTING THE POSTHUMAN

Since its introduction to non-Japanese adult audiences around 1990 anime has been associated with posthuman representation. Already in the 1960s the animated TV series *Astro Boy* (*Tetsuwan Atomu,* dir. Osamu Tezuka 1963–66) crossed borders, but it did not have the transnational critical impact of later feature-length animated movies for theatrical release like GiTS, or *AKIRA* (dir. Katsuhiro Ōtomo 1988). Prior to the age of online streaming services and Quality TV, the media-institutional role of cinema proved vital to attracting attention by academics and public intellectuals abroad. Not surprisingly, the manga[3] these movies initially rested on enjoyed a much lesser fame outside of Japan. In addition to cinema, anime's globalization was facilitated by three factors: its initial embedding in the domain of science fiction (hereafter, SF); critical interest in representation or thematic content, especially the cyborg as a posthuman type of character; and the discourse of techno-Orientalism, "a practice of ascribing, erasing, and/or disavowing relationships between technology and Asian peoples and subjects" (Niu 2008: 74, 91: n7). In the early 1990s, the reception of anime and its posthumanism was linked to techno-Orientalism, which articulated both fear and desire toward Japan as a new economic and technological power at the time (cf. Ueno 2001). Facilitated by cyberpunk narratives such as *Blade Runner* (dir. Ridley Scott 1982) and William Gibson's Neuromancer (1984), techno-Orientalism included a likening of Japanese people to robots lacking individuality and "animatedness" (cf. Ngai 2005).

Outside Japan, the circulation of anime, and manga, was boosted by a perceived affinity with the thematic genre of SF; to rephrase, they spread as part of a specific "subcultural cluster" (Kacsuk 2016: 289). SF also became the major gateway for anime to enter Anglophone academia (cf. Orbaugh 2002, 2005, 2009). Inside Japan, SF series increased the cultural status of anime domestically around 1980, although this did not equally apply to the media of manga which has been framed to a much higher degree by demographic genres, that

is, age and gender-specific categories. In part these genres provided the space for female manga authors to publish SF narratives already in the 1970s and 1980s, but whenever non-Japanese posthuman discourse considered Japanese popular media, there has been an inclination to privilege anime and, relatedly, male directors.

As is widely known, GiTS, the movie, tells the story of Major Motoko Kusanagi, a cyborg at Japan's Public Security Section 9, who experiences an identity crisis that makes her question the authenticity of her memories. Throughout the movie she chases a mysterious hacker, the so-called Puppet Master, and eventually she merges with that artificial intelligence to propagate. Japanologist Sharalyn Orbaugh, one of the most prolific academics writing on GiTS, read the movie as "a narrative that is all about the nature of sex/gender identity and self-identity in general in a future world where sexual reproduction has given way to mechanical replication" (2005: 67). Relatedly, she highlighted cultural differences, for example, in her retrospection on the "Cyborg's Heyday 1985–1995" where she maintains:

> One of the most salient aspects of all the posthuman films of Oshii Mamoru[4] is that the cyborgs they depict are not always terrifying, hypermasculine, evil characters. On the contrary, many of his cyborg protagonists are feminine in shape, and Oshii is interested in exploring what cyborg subjectivity is like "from the inside," so that viewers get a much more nuanced, complex sense of what it might *feel* like to be posthuman. (2015: 196; emphasis added)

Over the course of the last two decades, and in line with the shifting accentuation in posthuman theory, GiTS has been scrutinized in regard to how much it actually promotes a non-binarist relation between mind and matter, or ghost—the Major's organic brain and sense of self (although "for Motoko, the self is neither in her body nor in her brain"; [Kadobayashi 2015: 34])—and shell, her prosthetic body. Media theoretician Thomas Lamarre has responded to the general, not Japan-specific "impasse of the cyborg problematic"—the posthuman being as not networked enough and its intelligence not sufficiently embodied—with a focus on affective relationality:

> The ghost is matter of embodied experience and intuition of the world rather than disembodied subjectivity. It entails, in effect, *feeling* rather than perceiving. Where the perceiver seems to reside in the shell (or in the head) and to stand outside the world, the ghost feels the world and the self at the same time, prior to the perceiver being conscious of either. (Lamarre 2015: 7)

With respect to the GiTS animations Lamarre elaborated on the example of scan lines, that is, the emulation of video footage in anime as a marker of the cyborg's view and as such "an experiential analog to the ghost" (7); with respect to the GiTS manga he foregrounded the material composition of graphic storytelling, or "how each panel 'feels' and 'affects' the other panels on its page as well as pages preceding or following it" (2018: loc. 6706). In this context, Lamarre introduced the term "disjunctive synthesis" (2015: 8), denoting "a fusion of different dimensions without loss of difference" (2018: loc. 6683) that applies, in his reading,

to both the GiTS narrative's discourse of the posthuman and the twofold audiovisuality, or "cyborg mediality," that gives rise to it.

SITUATED MEDIALITY

Differences in perspective are not only due to a location outside or inside Japan, but likewise, and even more so, the degree of familiarity with the media environment that has hosted anime in the first place. Consequently, an external perspective can be found as much in traditional film criticism as in anthropological research by Japan experts. One of its recurring characteristics is a generalized notion of the media in question, generalized insofar as formalist medium specificity is given preference over historically and culturally situated media practices including conditions of production, distribution, and modes of consumption. A representative example in this regard is the monograph *Robo Sapiens Japanicus: Robots, Gender, Family and the Nation* (2018) by Jennifer Robertson. Taking its departure from the popularity of humanoid, socially assistive and therapeutic companion robots such as ASIMO and Pepper, which are neither fully functionable as caretakers of the elderly nor commercially viable, Robertson investigates "real-world human-robot relations in Japan" (1) with a special analytical emphasis on "the type of national cultural, social institutional, and family structures within which humans and robots are *imagined* to coexist" (26; emphasis added). Her fieldwork reveals that "the inclusion of robots in a network of animate entities is an attitude shared by many Japanese roboticists today" (13), and she traces this orientation back to both indigenous animism and the favorable images of robots that "have been forged by science fiction films, anime, and manga" (8).

Neither of these popular media is homogenous though, as, for example, differences between the affections of Japanese roboticists and the preferences of non-Japanese critics evince. While many of the latter are attracted by bounded narratives which facilitate philosophical readings (cf. Swale 2015; Bolton 2018), the actual developers of humanoid robots and their domestic users have been cherishing a collective memory that rests on TV anime such as *Astro Boy*, or *Doraemon* (1973, 1979–2005). Evidence is provided by the SF fantasy anime series *Inuyashiki: Last Hero* (dir. Keiichi Satō and Shūhei Yabuta 2017).[5] Set in contemporary Tokyo, it features Mr. Inuyashiki, a prematurely aged mousey salaryman, whom extraterrestrials accidentally kill and then revive as a cyborg. Contrary to his antagonist, an increasingly violent high school student, Mr. Inuyashiki uses his newly acquired powers to help people. In the third out of eleven episodes, he overhears remote cries, but he cannot get his machinic body to soar into the air—until he starts to cantillate the *Astro Boy* theme song. Thus, the elderly man, whose only companion is a stray dog he picked up briefly after his transformation, is empowered diegetically by intertextual reference to an old anime series, or by anime as such which, even if it employs CGI as is the case here, has become an aging media compared to the time of the first GiTS movie, at least insofar as posthuman tropes are concerned.

Inuyashiki: Last Hero is reminiscent of GiTS in several regards—its opening titles, which feature mask-like human faces attached to machinic bodies; a naked woman in fetal position floating in free space; the foregrounding of mediated experience by means of a variety of

screens (from smartphone displays and computer monitors to public LCD walls); and also the overall seriousness in tone. The everyday-life settings are realistic, the social issues too: bullying at school, shit-storms online, and neglect in dysfunctional families. But the fact that there is nothing to laugh about distinguishes *Inuyashiki: Last Hero* from the bulk of mainstream anime which, as a global niche media, is marked, among other things, by comedic changes in register far beyond mere on-the-side gags. One device is the so-called *chibi,* an exaggerated ("super deformed") midget character, or midget version of one and the same character, that makes affective states visible. Playfully jeopardizing diegetic coherence and promoting characters' fluid identity, chibi have been increasingly used since the 1990s, and in the more openly structured TV series format at that, as distinct from authorial movies like the ones by Hayao Miyazaki or Mamoru Oshii. Although not strictly chibi, GiTS's cute and funny *tachikoma*—smaller spider-like robots endowed with artificial intelligence, who synchronize every night (and are consequently all performed by one and the same voice actor)—did not make it from Shirow's manga into Oshii's 1995 movie; they appear in the later TV anime series though. Media philosopher Takeshi Kadobayashi conceives the tachikoma as an allegorization of "the parergonic condition of the 'ghost' concept in the GiTS series. The tachikoma exhibit liveliness although they do not possess a ghost, or rather precisely because they do not have to be anxious in that regard" (2015: 48). Kadobayashi likens them to the earlier anime robots Astro Boy and Doraemon, for whom it was also insignificant whether they had a ghost at all, and he maintains further that they do not become as earnest and uncanny as the Puppet Master when they "begin to host something like a ghost" (2015: 47) in the first TV series.

But even without chibi-fication or a similar kind of comicality, *Inuyashiki: Last Hero* appears sufficiently animetic, and not only because of the fantasy elements, the central characters' levitation, and their ultimate duel in space. The series exhibits the typical "synthetic disparity" (Ritzer 2013: 143) between sequences of spectacular action and daily dinner table conversation or monologic contemplation, as well as "the coexistence of different graphic worlds" (Csicsery-Ronay Jr 2015: 41). The latter manifests in the alternation between limited and full animation or, in a broader sense, still and moving images, which occasionally fuse by "the incorporation of an intensity of movement into the still image itself" (Steinberg 2012: 28). The still image itself furthermore tends to entwine pictorial flatness and depth, especially in the form of two-dimensional, apparently hand drawn character designs, and computer-generated three-dimensional cityscapes (the contrast of which is much sharper in the manga due to the extensive use of photographic images for backgrounds there). Anything but confined to the visual dimension, im/mobility, and dis/continuity go right to the heart of anime's media affordance for posthumanism. While animation in general may appear "as a nexus of contradictions" in regard to the segmentation of movements as well as body and voice in its production (Ngai 2005: 125), commercial TV anime has turned technical and economic constraints into a recognizable style, its (by now deliberate) imperfection corresponding with character types that escape the modern anthropocentric standard. Symptomatic in this regard is the adaptation of Akira Kurosawa's renowned movie *Seven Samurai* (1954) into a twenty-six-episode anime series, *Samurai 7* (dir. Toshifumi Takizawa 2004). The anime's retro-futuristic setting turns the bandits who

threaten the villagers into giant cyborgs, or more specifically, mobile armors without souls. But an intermediary being is also featured: Kikuchiyo, the cyborg who has retained his soul. In Kurosawa's film, he was a social hybrid and therefore able to mediate between the classes of farmers and samurai; in the anime, he conjoins technologically outdated human warriors and advanced killing machines. Symptomatically, his closest companion is a newly added girl character, little Komachi.

Childlike and cute characters who invite empathy, last but not least by means of big eyes, abound in mainstream anime: from Astro Boy, the robot who cannot grow, to those animaloid creatures and spirit beings that populate the globally most widespread franchises today (suffice to think of *Pokémon, Yōkai Watch*, or *Kemono Friends*). Anime characters like Mr. Inuyashiki, who is not cute but who escapes perfection as much as Astro Boy in both narrative setting and animation, seem to deliver what roboticist Masahiro Mori had in mind for humanoid robots in 1970 when he called attention to the "uncanny valley," a point where human-likeness in a nonhuman entity starts to look eerie or even creepy (Karl F. MacDorman points out that the use of the word *uncanny* leads back to the first translation in 1978 and insinuates a psychoanalytical connection that Mori himself had not intended [2019: 226–7]). Mori's advice "to create a *safe* level of affinity by deliberately pursuing a nonhuman design" (2012: 4; emphasis added) has obviously been heeded by anime. Two things suggest this: first, the abundance of posthuman characters who, in all their ambiguity, are approachable and ultimately unthreatening, or "safe"; and second, the fact that "[t]he overwhelming majority of Japanese-based [anime] productions maintain an attachment to 2D or hand-drawn character design within a backdrop and texturing that is aided by 3D design and digital imaging" (Swale 2015: 39). Not the photorealism of computer-animated films like *Final Fantasy: The Spirits Within* (dir. Hironobu Sakaguchi 2001) but deliberate stylization is one of anime's characteristics just like the occasional restraint toward animating anything and everything, invoking motion through sound or rapid editing of still images instead. Yet, in order to illustrate the power of stylization, Mori referenced the traditional puppet theater, *bunraku*, and not anime, although anime had already given rise to numerous nonhuman characters. The commitment to im/perfection—as a way to invite audience participation from empathy and immersion down to fan creation—did presumably not yet appear as deliberate a choice as under today's technological conditions.

Mori's idea of the uncanny valley has increasingly attracted global attention since 2005, mainly in regard to computer animation and video games. In the humanities, it has been cherished as hinting to an uncertainty or "in-betweenness that may momentarily make us question our knowledge or beliefs about the foundations or definitions of reality, organic life, humanness and agency," according to film scholar Lisa Bode (2018: 66). Focusing on non-Japanese commentary, her overview seems to confirm Robertson's assertion that "the uncanny valley hypothesis is largely a preoccupation of Anglophone scholars" (2018: 157). As a Japan expert trained in Cultural Studies Robertson criticizes Mori's hypothesis, among other things, for the generalization of the user, maintaining rightly that the uncanniness of puppets and robots alters depending on age, gender, ethnicity, education, and familiarity. In extension, she calls for socio-critical specification with respect to the widespread assumption that Japanese robotophilia escapes Western binarisms. According to her, modern Japan shows

an inclination to replace the man-machine binarism by the man-woman binarism and human exceptionalism by "Japanese exceptionalism" (2018: 142–3), for example, when people in need prefer robots over minorities, foreigners, and refugees. But the critical stance toward generalization is not applied to the media texts which Robertson introduces at length to support her argument of conservative "retro-robotics." One of her central examples is a ten-page informational manga in short-story format commissioned by the Japanese government in 2007.[6] Not available in stores, it signals to potential readers difference from typical entertaining graphic fiction; it even lacks the very manga look that is expected to invite empathy and immersion, close-ups of characters' faces to begin with. Regarding such a publication as "exemplary of the widespread use in Japan of gekiga (graphic propaganda)" (2018: 22) is only possible if one abstains from considering the meaning of *gekiga*[7] shared by the majority of manga authors, editors, and readers. The formalist reference to a "typical graphic structure" (Robertson 2018: 74)—panel types as categorized by cognitive linguist Neil Cohn—does not accommodate manga specificity either as it overlooks the situatedness that needs to be considered when assessing the possible socio-political impact of Japan's highly compartmentalized popular media. After all, the allegedly universal "graphic structure" of manga differs significantly according to time and (gendered) genre.

PERFORMANCE

As distinct from the GiTS manga, the 1995 movie ends on the protagonist's rebirth as a girl who speaks eventually with the Major's low voice as if the ghost remained while the shell was replaced after the merger with the Puppet Master. Compared to the Major's nakedness in other scenes (more boldly pictured in the manga though), her girlhood has not attracted much attention. In the main it has been taken as indicative of the necessity of embodiment and—as no other body was available on the black market quickly enough—the eluding of control by the state, the owner of most shells. But the girl body also points to connectivity and performativity (cf. Berndt 2019). Heather Warren-Crow demonstrates in *Girlhood and the Plastic Image* (2014) what the girl and the digital image have in common, namely, a fluctuating in-betweenness, closely related to malleability and environmental openness. As such even the Major, who does not appear girly at all, exhibits properties of a girl: at the beginning of the GiTS movie, she takes off her coat to dive into the city/cyberscape, her "naked" body turning visually transparent and finally disappearing as a result of merger with the environment. Otherwise, she plugs into the Web by means of a cable attached to her neck's data port, and precisely this networkedness makes her both vulnerable to penetration and powerful.

When the Major raises her voice for the first time, her mouth stays immobile. This disjunction has led Japanologist Christopher Bolton to associate Japan's bunraku theater, where puppets are being watched frontally on stage while their speech and song resound from the right side of the audience. In *Empire of Signs* (1970), Roland Barthes approached the bunraku configuration with regard to a different kind of subjectivity, one that is performed as concurrently dispersed and unified (Barthes [1970] 1982: 48–57). At first glance, the bunraku stage seems to foreground a lack of agency though: the actual actors are

being performed by puppeteers and a chanter just as the characters they perform are being played by social conditions they can hardly defy or exit only by means of double suicide, for example. The Major's final merger with the Puppet Master can arguably pass as an equivalent of the bunraku characters' withdrawal. But when Bolton uses the section title *Uncanny Parallels* for the revised comparison of bunraku and GiTS in his monograph *Interpreting Anime*, this is not to reconfirm Japanese tradition or a dubious origin; rather, it serves to highlight the twofoldedness of being performed and performing, which appears to be echoed by the assertion that "animation conceals and then foregrounds the performance" (Bolton 2018: 117). Performance artist and researcher Yuji Sone reads both bunraku puppets and actual humanoid robots as performers in his monograph *Japanese Robot Culture*, and he maintains that their affective power and capability to initiate a transformative experience in the viewer lean on "the recognition of the theatricality of the staging … a dynamic and culturally specific mise en scène" (2017: 18).

One central thread running through Bolton's monograph on animated movies is the oscillation they actuate between affective immersion and critical distance. This is investigated against the backdrop of a primary interest in the concept of the individual human subject and this subject's identity crisis under posthuman conditions. Accordingly, Bolton regards the disparity of the puppets' artificiality and realism—their appearing lively while not being alive—as uncanny. But as mentioned above, Mori did not allude to the Western tradition of the doppelgänger, and anthropologists have shown that the perceived uncanniness is not necessarily shared by contemporary Japanese roboticists either (cf. Richardson 2016). Notably, the discussion of the Major in light of bunraku puppeteering leads back to ideas first developed in the early 2000s (cf. Bolton 2002). Since then critical interest in anime has seen a significant move away from representation to mediality and mediation, and more specifically, from the representation of mediated experience to medial experience. This has affected the view of GiTS:

> The challenge of shifting attention to the media problematic is that it is no longer possible to look at the identity crisis in terms of a problem with an answer or a contest with a victor. Taking a discursive side … resolves nothing. Oshii instead situates us within a media experience of the problematic. (Lamarre 2015: 17)

In other words, worthy of consideration is not only how specific anime works situate their audience paratextually, but also how they make viewers experience, or feel, the issue at hand, in this case, posthumanism as disjunctive synthesis. The TV anime *Coppelion* (dir. Shingō Suzuki 2013, thirteen episodes) is a good example in this regard, especially as it resembles GiTS in various ways. Thus, the images underlying the series' end credits reference the movie's famous opening: just like the latter presented the Major's genesis—as a machinic body assuming flesh and skin and then surfacing from fluid—the TV anime turns a doll into a girl and has her pulled out of the fluid by a companion's hand. In terms of narrative, *Coppelion* begins where the 1995 GiTS left off: instead of the mature female cyborg, genetically engineered high school girls are at the center, so-called Coppelions whom the anime features "as radiation-resistant post-human technologies, as disposable nuclear

workers, and as magical girls endowed with superhuman/supernatural powers" (Monnet 2017: 255). Twenty years after a fatal nuclear accident which transformed Tokyo into a ghost town, so highly contaminated that humans cannot naturally live there anymore, a Coppelion unit is dropped in the now walled city to locate and rescue survivors. Like in the Major's case, the superhuman capabilities of eighteen-year-old Ibara and her companions are not visible at first glance, but can be inferred only from the fact that they do not wear hazmaz suits, in contradistinction to the human characters around them. Apart from that intradiegetically visible evidence, the viewer has to rely on verbal hints in dialog and narration, or on inserted still images of dolls which signal the Coppelions' status as marionettes in the hands of the state, another similarity with the Major. The state is represented by adult "puppeteering" men. And as if confirming Robertson's gender-related argument, even the so-called Ghosts, soldiers of the initial rescue forces who had been left behind, try to use the girls—although for revenge, that is, a devastating detonation of the ruined nuclear power plant, which is too heavily polluted for humans to enter.

But not all Coppelions are female, and not all take an anti-human attitude. In particular Ibara commits to both human and nonhuman survivors, including the poisoned city of Tokyo, which is about to be abandoned completely to become a global nuclear waste dump. In her attempts to go beyond anthropocentric binaries, she represents a posthumanist position par excellence. From an ecocritical perspective, however, the *Coppelion* anime may easily appear as not living up to its subversive promise, an expectation raised by the fact that the manga it is based on was outspoken with regard to the risks of nuclear power[8] to a degree that it has been found to "convey a criticism of nuclear power" (Li 2017: 41). Consequently, the anime adaptation, which had already been announced by March 2011, was postponed after the Fukushima disasters. This makes *Coppelion* indicative of the high contextuality of mainstream anime's (and other popular media's) representations: what was produced with the primary aim of commercial entertainment, or assumed to pass under that umbrella, may raise political concern under certain circumstances—and be revised accordingly, as happened to the *Coppelion* anime within the two and a half years until it was finally broadcast.

Comparative literature scholar Livia Monnet sees the anime in a more general way as staying complicit with nuclear capitalism insofar as the nuclear uncanny "is deflected into, and blunted by, melodrama; by the animetic-mangaesque effects of magical (nuclear) irrealism, comical self-referentiality, and self-parody; by postapocalyptic pathos; and finally by an ethos of self-sacrifice" (Monnet 2017: 254). Self-sacrifice concludes also *Inuyashiki: Last Hero*. Having served as a narrative device to terminate the underwhelmingly successful manga serial it was adapted from, it also attests to the observation that anime is "effective for expressing confusion but not as good for portraying solutions or resolution" (Bolton 2018: 50), a statement initially pertaining to the *AKIRA* movie. Monnet's article demonstrates how the search for resolution—in the sense of an unambiguous "critique of Japan's and of global nuclear capitalism"—inevitably fails, the critical discourse of a number of characters being "considerably weakened by *Coppelion*'s compliance with the dominant imaginary of market-oriented anime and SF ecologies" (2017: 256). Eventually the article concedes that "*Coppelion* may be said to tentatively articulate an emergent, new type of subjectivity" called "ahuman (nuclear) condividuality," and in relation to that, an ethico-aesthetic paradigm

called "chaosmos of (nuclear) condivision" (257).

It is interesting to note that the radical inclusion, which these newly developed concepts promote, does not extend to the "animetic-mangaesque effects" and the "self-parody" of commercial anime. Magically occurring levitation serves as one example for playing down the risks of nuclear power and the reality of life in a toxic environment. Indeed, the Coppelions fly, but when they do, for example in battle, their movements are not continuous; occasionally, they freeze and halt in free air. Besides, bold outlines mark them as flat characters off from the three-dimensionally rendered cityspace in which they act. Abrupt juxtaposition rather than "plasmatically" continuous metamorphosis is also the main way in which anime employs the chibi device. Admittedly, the *Coppelion* characters do not undergo such transformation, but in view of the exaggerated depiction of their affective states they approximate the "combination of serious engagement with a playful style," which Ursula K. Heise maintains to be a general characteristic of animation from its inception (2014: 301).

Affective and aesthetic charging is one central aspect for anthropologists Casper Bruun Jensen and Anders Blok in their attempt to "energize the previously discarded concept of animism" (2013: 87). What they call "Shinto cosmograms" in order to free Shintō, Japan's indigenous religion, "from the burden of simply and exclusively signalling an ominous politics" (88), is "characterized by qualities of immanent connectedness, affective and aesthetic charging, imaginative renewal of more-than-human homes and polymorphous enchantment" (107). Hayao Miyazaki's animated movies serve as a case in point. But as this chapter has shown, TV anime holds its own potential with regards to experiencing the posthuman condition. Reaching beyond the bounded art work of an author, it allows for a whole range of disjunctive syntheses, including oscillations between representational issues and aesthetic matter, media convergence and media specificity. In Japanese publications on the posthuman, however, mediality in general and that of anime in particular have carried less weight than philosophical issues (cf. Hyōsho 2008). In comparison to North America, literary critic Naoya Fujita (2012) sees the Japanese discourse, tied as it is to SF literature, characterized by an absence of euphoric transhumanism as an attempt to overcome death; an emphasis on communication networks and interrelationality (like in GiTS); and a culture of animating fictitious characters that rests in part on traditions of animism. An investigation of such particularities and also posthumanist notions ante litteram is, without doubt, worthwhile. In contrast, this chapter has taken the perspective of anime studies to invite speculation on the possibility of an animetic posthumanism which, by its very nature, would go beyond the exclusion of comicality, entertainment, parody, commerce, and fancultural participation.

---

imited animation minimizes the number of drawings per second of film, creates partial movements, and evokes the impression of movement by other than cinematic means, resulting in "dynamically immobile" images (Steinberg 2012).

f. for an overview Ferrando 2013; and Braidotti, who interrelates the "critique of the Western Humanist ideal of 'Man' as the allegedly universal measure of all things" with the "rejection of species hierarchy and human exceptionalism" and the promotion of a "notion of vitalist materialism that encompasses non-human agents, ranging from plants and animals to technological artefacts" (2018: 339).

ı line with Japanese and Japanological custom, this chapter leaves the plural form of nouns unmarked by "-s." The romanization of Japanese words follows the modified Hepburn System, with macrons indicating extended vowels. The translations from Japanese publications are mine.

s distinct from the Western name order employed in this chapter, Orbaugh follows the Japanese convention, surname preceding first name without separation by comma.

ased on the manga by Hiroya Oku, first serialized in the bi-weekly magazine *Evening* 2014–17.

atsuhiko Eguchi (script) and Ryūji Fujii (illustrations) *Innovation 25*.

type of graphic narrative for mature readers that formed the basis for *seinen* [youth] manga, today preferred by elderly male Japanese politicians. Non-Japanese comics critics occasionally assume it to be the only socio-critical manga genre, that is, an equivalent to alternative comics.

Ianga by Tomonori Inoue, in *Young Magazine* (first weekly, later monthly), 2008–16, 26 vols.

SOURCES CITED

Barthes, Roland. *Empire of Signs*. Translated by Richard Howard. New York: Hill and Wang, [1970] 1982.

Berndt, Jaqueline. "Anime in Academia: Representative Object, Media Form, and Japanese Studies." *Arts*, vol. 7, no. 4 (2018): n.p, https://www.mdpi.com/2076-0752/7/4/56.

Berndt, Jaqueline. "Introduction: Shōjo Mediations." In *Shōjo Across Media: Exploring "Girl" Practices in Contemporary Japan*, edited by Jaqueline Berndt, Kazumi Nagaike and Fusami Ogi. New York: Palgrave Macmillan, 2019, pp. 1–21.

Bode, Lisa. "The Uncanny Valley." In *The Animation Studies Reader*, edited by Nichola Dobson, Annabelle Honess Roe, Amy Ratelle and Caroline Ruddell. New York: Bloomsbury Academic, 2018, pp. 59–68.

Bolton, Christopher. "From Wooden Cyborgs to Celluloid Souls: Mechanical Bodies in Anime and Japanese Puppet Theater." *Positions*, vol. 10, no. 3 (2002): 729–71.

Bolton, Christopher. *Interpreting Anime*. Minneapolis: University of Minnesota Press, 2018.

Braidotti, Rosi. "Posthuman Critical Theory." In *Posthuman Glossary*, edited by Rosi Braidotti and Maria Hlavajova. London: Bloomsbury, 2018, pp. 339–42.

Cohn, Neil. *The Visual Language of Comics: Introduction to the Structure and Cognition of Sequential Images*. London: Bloomsbury, 2013.

Csicsery-Ronay Jr, Istvan. "What Is Estranged in Science Fiction Animation?" In *Simultaneous Worlds: Global Science Fiction Cinema*, edited by Jennifer Feeley and Sarah Ann Wells. Minneapolis: University of Minnesota Press, 2015, pp. 29–46.

Ferrando, Francesca. "Posthumanism, Transhumanism, Antihumanism, Metahumanism, and New Materialism: Differences and Relations." *Existenz*, vol. 8, no. 2 (2013): 26–32.

Fujita, Naoya. "Joron: Nihonteki posutohyūman no jidai" [Preface: The Japanese Posthuman Era]." In *Posutohyūmanitīzu: Itō Keikaku igo no SF* [Posthumanities: SF Since Itō Keikaku], edited by Genkaiken [Studies of the Limit]. Tokyo: Nan'undō, 2012, pp. 3–15.

Heise, Ursula K. "Plasmatic Nature: Environmentalism and Animated Film." *Public Culture*, vol. 26, no. 2 (2014): 301–18.

Hyōshō. Tokushū: posutohyūman" [*Representation*. Special Issue: Posthuman]. Edited by *Hyōshō bunkaron gakkai* [Association for Studies of Culture and Representation]. Tokyo: Getsuyōsha, 2008.

Jensen, Casper Bruun, and Anders Blok. "Techno-animism in Japan: Shinto Cosmograms, Actor-Network Theory, and the Enabling Powers of Non-human Agencies." *Theory Culture & Society*, vol. 30, no. 2 (2013): 84–115.

Kacsuk, Zoltan. "Subcultural Clusters and Blurry Boundaries: Considering *Art Worlds* and *Fields of Cultural Production* through the Prism of Localized Manga Production in Hungary." In *Cultures of Comics Work*, edited by Casey Brienza and Paddy Johnston. London: Palgrave Macmillan, 2016, pp. 283–96.

Kadobayashi, Takeshi. "Gōsuto no shibari o hodoku: Kōkaku kidōtai, posutohyūmanizumu, parerugon" [Untying the 'Ghost': *Ghost in the Shell*, posthumanism, parergon]." In *Eiga to tekunorojī* [Film and Technology], edited by Yukihiro Tsukada. Kyoto: Minerva shobō, 2015, pp. 31–57.

Lamarre, Thomas. "Scan Lines: How Cyborgs Feel." In *Simultaneous Worlds: Global Science Fiction Cinema*, edited by Jennifer Feeley and Sarah Ann Wells. Minneapolis: University of Minnesota Press, 2015, pp. 3–28.

Lamarre, Thomas. "Cyborg Empiricism: The Ghost Is Not in the Shell." In *Introducing Japanese Popular Culture*, edited by Alisa Freedman and Toby Slade. New York: Routledge, 2018, pp. 300–10. Kindle edition.

Li, Carl K. "How Does the Radiation Make You Feel? The Emotional Criticism of Nuclear Power in the Science Fiction Manga *Coppelion*." *Journal of Graphic Novels and Comics*, vol. 8, no. 1 (2017): 33–45.

MacDorman, Karl F. "Masahiro Mori und das unheimliche Tal: Eine Retrospektive." In *Uncanny Interfaces*, edited by Konstantin Daniel Haensch, Lara Nelke and Matthias Planitzer. Hamburg: Textem Verlag, 2019, pp. 220–34.

Monnet, Livia. "A Chaosmos of Condivision: Radiation Aesthetics in the TV Anime Series *Coppelion* (2013)." In *Ecocriticism in Japan*, edited by Hisaaki Wake, Keijiro Suga and Yuki Masami. London: Lexington Books, 2017, pp. 239–65.

Mori, Masahiro. "Bukimi no tani." *Energy*, vol. 7, no. 4 (1970): 33–5.

Mori, Masahiro. "The Uncanny Valley: The Original Essay by Masahiro Mori." Translated by Karl F. MacDorman and Norri Kageki. *IEEE Spectrum* (2012): n.p. (6pp.). https://spectrum.ieee.org/automaton/robotics/humanoids/the-uncanny-valley.

Ngai, Sianne. "Animatedness." In *Ugly Feelings*. Cambridge, MA: Harvard University Press, 2005, pp. 89–125.

Niu, Greta Aiyu. "Techno-Orientalism, Nanotechnology, Posthumans, and Post-Posthumans in Neal Stephenson's and Linda Nagata's Science Fiction." *MELUS*, vol. 33, no. 4 (2008): 73–96.

Orbaugh, Sharalyn. "Sex and the Single Cyborg: Japanese Popular Culture Experiments in Subjectivity." *Science Fiction Studies*, vol. 29, no. 3 (2002): 436–52.

Orbaugh, Sharalyn. "The Genealogy of the Cyborg in Japanese Popular Culture." In *World Weavers: Globalization, Science Fiction, and the Cybernetic Revolution*, edited by Kin Yuen Wong, Gary Westfahl and Amy Kit-Sze Chan. Hong Kong: Hong Kong University Press, 2005, pp. 55–72.

Orbaugh, Sharalyn. "Emotional Infectivity: Cyborg Affect and the Limits of the Human." *Mechademia*, vol. 3 (2008): 150–72.

Orbaugh, Sharalyn. "Chapter 12: Manga and Anime." In *The Routledge Companion to Science Fiction*, edited by Mark Bould, Andrew M. Butler, Mark Bould and Adam Roberts. London/New: York: Routledge, 2009, pp. 112–22.

Orbaugh, Sharalyn. "Who Does the Feeling When There's No Body There? Critical Feminism Meets Cyborg Affect in Oshii Mamoru's *Innocence*." In *Simultaneous Worlds: Global Science Fiction Cinema*, edited by Jennifer Feeley and Sarah Ann Wells. Minneapolis: University of Minnesota Press, 2015, pp. 191–209.

Oshii, Mamoru, dir. *Kōkaku kidōtai*. Japan and UK: Kodansha and Bandai Visual Company, 1995.

Richardson, Kathleen. "Technological Animism: The Uncanny Personhood of Humanoid Machines." *Social Analysis*, vol. 60, no. 1 (2016): 110–28.

Ritzer, Ivo. "Transmedialität, Transgenerizität, Transkulturalität: Zur axiomatischen Hybridität von *anime*." *montage AV*, February 22 (2013: 132–50. DOI: http://dx.doi.org/10.25969/mediarep/441.

Robertson, Jennifer. *Robo Sapiens Japanicus: Robots, Gender, Family, and the Japanese Nation*. Oakland: University of California Press, 2018.

Sone, Yuji. *Japanese Robot Culture: Performance, Imagination, and Modernity*. New York: Palgrave, 2017.

Steinberg, Marc. *Anime's Media Mix: Franchising Toys and Characters in Japan*. Minneapolis: University of Minnesota Press, 2012.

Swale, Alistair D. *Anime Aesthetics*. New York: Palgrave Macmillian, 2015.

Ueno, Toshiya. "Japanimation and Techno-Orientalism." In *The Uncanny: Experiments in Cyborg Culture*, edited by Bruce Genville. Vancouver: Arsenal Pulp Press, 2001, pp. 223–31.

Warren-Crow, Heather. *Girlhood and the Plastic Image*. Hanover, New Hampshire: Dartmouth College Press, 2014.

CHAPTER THIRTY-ONE

Ready Player Two: The Digital Avatar as Extension of Self

KELLY I. ALIANO

Ernest Cline's 2011 novel *Ready Player One* offers a dystopic look at the potential outcomes of our mediatized, virtualized twenty-first-century lives. For protagonist Wade Watts, the OASIS, an online gaming platform that has transformed into a true "second life" for its participants in the virtual realm, "was like having an escape hatch into a better reality. The OASIS kept me sane. It was my playground and my preschool, a magical place where anything was possible" (Cline 2011: 18). For the people who populate the novel's fictional world, this virtual universe feels more real to them than their existences in the physical world. If we really critique our contemporary world, there is so much of what Wade narrates —of what Cline envisioned in crafting this novel—that does not feel that far off from our actual historical moment. People spend ample amounts of their time on social media curating their identities via Facebook statuses, Tweets, and the perfect Instagram or SnapChat photos.

While this may feel like brand new terrain, *Ready Player One* reminds us that there is a throughline from our gaming, or play, practices to this recent fascination with the performance of self that occurs online. Indeed, many MMORPG-style games have been asking players to craft and hone characters for years and avid players may see those performed identities as being as real as the self they perform in real life. As Daniel Tack notes in "Studying Player Commitment to MMORPGs" for *Forbes*, "In *World of Warcraft*, players become attached to their avatars because of the time and emotional effort that they

invest in their characters, and their avatars reflect the player's identity and embody the player in the virtual world" (Tack 2012). For these gamers, there is a connection between their sense of self and the character they have created in-game. The field of video game studies, then, offers us a possible scholarly in-road to making sense of these digital performance practices.

Therefore, it has become essential that scholars find a way to theorize about the important cultural product and potential cultural producer that is video games. Within the field of video game studies, it has been argued that theater and performance scholars have unique expertise to add to the discussion, as we are already engaged in debate about the performed/performative self and the transformative experience of play(ing). I take this discussion further, arguing, along with Jane McGonigal, that our virtual experiences can be a positive addition to our sense of identity, by offering us varied experiences beyond our day-to-day norms. In Jane McGonigal's estimation, it is vital that people play games in order to use these experiences toward their own future development of a sense of self outside of the realm of the virtual, interactive play. She states:

> If you are a gamer, it's time to get over any regret you might feel about spending so much time playing video games. You have *not* been wasting your time. You have been building up a wealth of virtual experience that … can teach you about your true self: what your core strengths are, what really motivates you, and what makes you happiest. As you'll see, you have also developed world-changing ways of thinking, organizing, and acting …. There are plenty of opportunities for you to use them for real-world good. (McGonigal 2011: 12)

McGonigal sees gaming as a practice that can expand our bank of life experiences and, potentially, allow us to become better than we would have been otherwise. This is largely due to the fact that gaming is interactive: we must *play* within the confines of the game narrative in order to achieve individual goals.

I envision this role of the spectator as an empowered and potentially empowering one. It allows the gamer to participate in the world of the narrative in an active way, while still ultimately maintaining the rules of the game, be they narrative (as in many AAA titles) or mechanics. In my opinion, viewing gaming as this sort of "empowered spectatorship" allows us to build on what we know about the role of audience in performance and enhance it with our understanding of what it means to play, from the perspective of both imaginative play—such as that of children—and playing more formally, as in drama.

VIDEO GAMING AND PLAY

For example, in the case of first-person shooters, the gamer is needed for the story behind the fourth wall to play out. In addition, the world of the said story is seen only through the eyes of the main character/gamer. In this manner, the "spectator" of a video game is different from the spectator in any other mediatized form, and even from spectators of many traditional live forms (except for the myriad forms of performance that call for varying degrees of audience participation). Their perspective is limited by the mechanics of game play but their

experience of the world is an active one. As Jesper Juul notes in the opening to *Half-Real*, "To play a video game is therefore to interact with real rules while imagining a fictional world, and a video game is a set of rules as well as a fictional world" (2005: 1). The gamer must *participate* in the mediatized form of video games, both through providing the right codes to manipulate game play and by completing the right tasks in the correct order, so as to advance the narrative storyline of the game.

While the OASIS may *feel* real to Wade and his fellow "gunters," in truth it operates much as any other game might. As Juul describes, "The rules of the game provide the player with challenges that the player cannot trivially overcome. It is a basic paradox of games that while the rules themselves are generally definite, unambiguous, and easy to use, the enjoyment of a game depends on these easy-to-use rules presenting challenges that *cannot* be easily overcome" (2005: 5). This description could as easily be about Halliday's challenge of *The Hunt* as it is about the more traditional video games we all regularly play. For those devoted to Halliday's series of trials, attempting to win the contest became more than just a game: it transformed into a way of life, an identity in its own right. As Wade explains, "During the first year of the Hunt, being a gunter was highly fashionable, and nearly every OASIS user claimed to be one" (Cline 2011: 8). A brand of cultural identification was born of participating in this game and its outcome had real-world implications: control over the game world of the OASIS itself.

The difference between our contemporary gaming practices and that described in the novel, then, perhaps, lies in the stakes of the gaming practice. The Hunt had a prize applicable in real life. In addition, the participants did not see their in-game actions as pure play; rather, their OASIS lives were often more real to them than anything they might have done outside of the virtual landscape. This is most pronounced in the characters' sense of self; the novel's characters see their game identities as somehow more real than their physical ones. The three main characters spend much of the novel only knowing one another via their usernames and only interacting within the OASIS.

Most gaming is not meant as a substitute for real life. As Juul reminds, "Most video games are ruled *and* make-believe" (2005: 13). This latter fictional quality of gaming has been elided for the characters of *Ready Player One* in a similar fashion to the direction we may see social media practices taking us in our real world. For players of Halliday's Hunt, for example, the game is more real than any other aspect of their lives. For Wade and his friends, gaming has taken on a role in their lives beyond just being an escape. The OASIS offered that escapism, but it was also a way to recreate yourself. Wade tells us that he "designed [his] avatar's face and body to look, more or less, like my own" and that "you could give your OASIS avatar any name you liked, as long as it was unique" (Cline 2011: 28). This was a space in which play could become a space in which to (re)create the self.

POSTHUMANISM AND "PLAY"

This may have once felt like a foreign and perhaps even frightening concept. Yet, in the age of social media and the smartphone, we have taken this interaction with the digital to a whole new level. Not only do we engage in complex constructions of identity when we play a video

game, we often spend a great deal of our day-to-day lives doing the same: cropping our photos to create the perfect Instagram post to sell our followers on our "perfectly imperfect" lives; deciding who to follow/retweet/quote tweet and refute on Twitter and which hashtags will best perform our political identities; using our leisure hours to play MMoRPGs that demand intensive character construction in-game and perhaps even more intensive performance away-from-keyboard, with conventions and forums and cosplay filling our corporeal performative lives. In many ways, our contemporary moment takes the pervasive "posthuman" fears of the twentieth century to the next level: one from which it has become increasingly difficult to separate our digital selves from our physical ones.

Much of our twenty-first-century existences, then, feel very much in line with the fictions of the mid-twentieth century, particularly those of the science fiction genre. For much of the last century, science fiction was the genre in which writers and artists could imagine new worlds riddled with unheard-of technological possibilities. This imaginative form expanded the boundaries of the real: although most great science fiction inventions have some basis in real-world scientific innovation, these creations and devices stretch the boundaries of what actually is possible in the current technological field. Regarding science fiction creations, Darko Suvin suggests:

> Science fiction has always been created through the author's fascination with unknown possibilities; inextinguishable curiosity has supplied the foundation of the genre. But unlike fantasy, in SF the amazing aspects of the story had to lie within the bounds of what was *possible* according to the standards of knowledge current in the author's world …. It is thus imaginary *people* grappling with a different way of life—i.e., in a different environment—that provide the central situation for SF. (1970: xi)

By envisioning what could be, and by looking toward a future that has not yet happened but could, these science fiction works suggest something about the fictional social structures under which their characters live.

In particular, the robot or android form—which became almost a science fiction cliché as the genre developed—offered this reflection of our human experience through the lens of science fiction. Of this phenomenon, one that he perfected in his own classic works within the genre, Isaac Asimov comments, "The value of the robot/android story in science fiction is that, in dealing with a manmade version of humanity, the science fiction writer is immediately lured into considering the nature of man in its deepest aspects" (1977: 172). Asimov is suggesting that in creating the human-like, an artist is forced to reevaluate his understanding of the human. The live, therefore, is thrown into relief through the technological creation. We can see this extending to our contemporary fascination with the digital realm. Our virtual selves are somehow meant to throw into relief our corporeal lives and, perhaps, vice versa.

Indeed, science fiction opened up countless imaginative technological possibilities; it was then up to actual science to pick up these ideas and experiment with some of them. Before we could contemplate the degree to which the self could be curated digitally, we first needed to accept that the technological could be seen as behaving in a manner similar to—or even

indistinguishable from—the human. One of the earliest studies of this posthuman possibility came in 1950 with Alan M. Turing's work "Computing Machinery and Intelligence," in which he sets out the question "Can machines think?" (Turing 1950: 433). Preceding by decades the era of the personal computer and interactive digital media, Turing argues that energy should be put toward creating and using machines that can learn and thereby adapt to the instructions they are given. Turing contends:

> We may hope that machines will eventually compete with men in all purely intellectual fields. But which are the best ones to start with? Even this is a difficult decision. Many people think that a very abstract activity, like the playing of chess, would be best. It can also be maintained that it is best to provide the machine with the best sense organs that money can buy, and then teach it to understand and speak English. This process could follow the normal teaching of a child. Things would be pointed out and named, etc. Again, I do not know what the right answer is, but I think both approaches should be tried. (1950: 460)

Turing's suggestion that machines could be taught like "a child" already opens the door to the possibility of a posthuman world. If we could train our machines to do exactly what we want them to do and to improve with repeated instruction, we could theoretically engender machines that would, over time, equal and even surpass humans. If this were possible, then who could say that a digitally constructed self is not as real as a physical one?

N. Katherine Hayles sees Turing's experiments, which involved sitting a user down at an interface through which he interacted with unseen beings and was asked to establish which was male, which was female, and which was machine, as a clear example of a posthuman experience. Hayles relates:

> The important intervention comes … when the test puts you into a cybernetic circuit that splices your will, desire, and perception into a distributed cognitive system in which represented bodies are joined with enacted bodies through mutating and flexible machine interfaces. As you gaze at the flickering signifiers scrolling down the computer screens, no matter what identifications you assign to the embodied entities that you cannot see, you have already become posthuman. (1999: xiv)

By engaging in an activity such as Turing's experiment, an individual is already having a distinctly posthuman experience.

What, then, does it mean to be "posthuman"? Hayles provides a list of qualifications for the posthuman:

> First, the posthuman view privileges informational pattern over material instantiation, so that embodiment in a biological substrate is seen as an accident of history rather than an inevitability of life. Second, the posthuman view considers consciousness … as an epiphenomenon, as an evolutionary upstart trying to claim that it is the whole show when in actuality it is only a minor sideshow. Third, the posthuman view thinks of the body as the original prosthesis we all learn to manipulate, so that extending or replacing

the body with other prostheses becomes a continuation of a process that began before we were born. Fourth, and most important, by these and other means, the posthuman view configures human being so that it can be seamlessly articulated with intelligent machines. In the posthuman, there are no essential differences or absolute demarcations between bodily existence and computer simulation, cybernetic mechanism and biological organism, robot teleology and human goals. (1999: 2–3)

In short, Hayles is suggesting that the posthuman does not value the live over the machine. On the contrary, the living form can be seen as a kind of machine, in which consciousness is no longer a distinguishing marker of uniqueness but rather a fluke accident.

Perhaps most interesting for my discussion of online gaming practices and the performance of self is Hayles's contention that "becoming posthuman both evokes terror and excites pleasure" (Hayles 1999: 283). This latter notion of pleasure is tied up in the usefulness of mechanized beings and in the way in which their introduction into society can open up new ways of thinking. Hayles suggests, "The posthuman evokes the exhilarating prospect of getting out of some of the old boxes and opening up new ways of thinking about what being human means" (1999: 285). The posthuman can usher in an exciting new era of thinking, both in the realm of the technological and in understandings of the human.

Hayles also highlights how terrifying a prospect this "posthuman" construct could be. The posthuman proposes that neither the human is special nor is its survival necessarily essential, as there are mechanical counterparts to it that easily could supplant humanity and even completely replace it. Hayles notes, "The terror is relatively easy to understand. 'Post,' with its dual connotation of superseding the human and coming after it, hints that the days of 'the human' may be numbered" (1999: 283). We can connect this to the digital selves of the OASIS which have, in many ways, superseded the corporeal existences of the characters of Cline's novel. The characters have become more their in-game selves than their real-world ones: the technological has triumphed over the human. If we build a corollary between the novel and our real-world social media practices, should we feel terror at the prospect of our virtual selves somehow superseding our human existences? Or is this a pleasure, freeing us from the anxieties of real-life interactions?

This is, of course, a trope that was regularly explored in earlier science fiction, at least insofar as robots and machines were the posthuman advancement. *2001: A Space Odyssey*'s Hal 9000 reminds us first of how computers will make our lives easier and more efficient and then, more profoundly, of how horrifying it could be if our computers were sentient. They could be moved by the worst of human emotions—cruelty, jealousy, fear—to do the worst actions imaginable.

We also find more positive renderings of our advanced relationships with computers. On the opposite side of this debate from *2001*, for example, is Robert A. Heinlein's vision of the sentient computer in *The Moon Is a Harsh Mistress* (1966). In this novel, the talking, thinking computer becomes a friend, one almost valued as highly as human being (although the emphasis here is, of course, on the *almost*). The science fiction motif of the sentient machine reminds us that, whether we are indulging the fear of robots and sentient and computers or embracing them as conveniences or even companions, we cannot deny that we

have fully integrated the technological into our existences.

PROSTHETIC MEMORY AND PLAY

To connect this back to the subject of gaming, then, it is important to remember McGonigal's argument that gaming will allow us to increase our bank of experiences and thereby become better people. McGonigal envisions:

> a future in which games continue to satisfy our hunger to be challenged and rewarded, to be creative and successful, to be social and be part of something larger than ourselves. But I also see a future in which the games we play *stoke* our appetite for engagement, pushing and enabling us to make stronger connections—and bigger contributions—to the world around us. (2011: 10)

This suggests that gaming will offer us a kind of prosthetic memory: uploading our virtual experiences into our life experiences and valuing them equally: a posthuman construction of memory building for sure.

Again, this is a concept that has been well-traversed in science fiction: the "feeling," "remembering" robot or cyborg is a common trope. Each one of these fictional characters was constructed to question the idea that it is through memory that people claim their sense of humanity and identity. Cyborg or robot characters who claim to remember may not, in fact, actually remember. Rather, their memories could be seen as being prosthetic. In her article, "Prosthetic Memory: *Total Recall* and *Blade Runner*," Alison Landsberg describes prosthetic memory as "memories which do not come from a person's lived experience in any strict sense. These are implanted memories, and the unsettled boundaries between real and simulated ones are frequently accompanied by another disruption: of the human body, its flesh, its subjective autonomy, its difference from both the animal and the technological" (Landsberg 2004: 239). Instead of having experienced the events that they are able to recount, these partially to fully mechanized entities may have had these experiences uploaded into their memory databases.

Without being sure that they possess authentic memories, these characters cannot be sure that they are in any way actually human at all. As Landsberg correctly states, "If memory is the precondition for identity or individuality—if what we claim as our memories defines who we are—then the idea of a prosthetic memory problematizes any concept of memory that posits it as essential, stable or organically grounded. In addition, it makes impossible the wish that a person owns her/his memories as inalienable property" (2004: 239). Prosthetic memory throws into relief the reality that memory is an unreliable source: it can change or morph over time or, perhaps, even be manipulated. If this is the case, then we cannot trust even the most seemingly authentic memories as proof of our selfhood, humanity, or identity.

Indeed, if we accept Landsberg's supposition about the instability of memory, then we can begin to see ways in which even so-called "human" memory could be uploaded or implanted. One way in which an individual can "experience" something without having "lived" that experience is through an interactive virtual media, such as video games. An individual is able

to play within a universe, as a person other than herself, and thereby gain certain experiences within that world. Yet, ultimately, any memory of those experiences is entirely born of the fictional.

For example, in the 2012 game *Halo: Reach* this complex notion of virtual memory is pushed to its furthest limits; the game prescribes for its player a futile mission. Noble Six, the gamer's avatar, is charged with preventing the fall of a planet called Reach. Yet, for the savvy Halo player (or the observant advertisement watcher), the knowledge here is that, definitively, Reach will fall. That event is already a part of the mythology of the world of the *Halo* stories (in fact, a novel already existed outlining these events). In addition, the adverts further emphasize this point. An online commercial commands the potential gamer: "Remember when there was a tomorrow. Remember where it all began. Remember Reach." The player's action in this game will be to remember the events that are being encountered. In playing, the gamer is creating an active memorial to these past events. The experience of the game, then, acts as the recall and even the reliving of this painful memory, all the way to its bitter and fatal end. This memory that is being enacted becomes part of the gamer's life experiences, now that gamer has constructed that memory through the act of gameplay.

This suggests that the events of in-game action could affect the gamer's formation of a sense of self and this has also led to some of the most profound criticism of gaming, especially first-person shooters like the *Halo* franchise: that such games cause young people to become violent or indulge in dangerous incarnations of hypermasculinity. In Derek Burrill's *Die Tryin'*, for example, he "inspect[s] and theorize[s] how videogames [*sic*] function as a performative space in which forms of subjectivity, particularly masculine-coded subjectivities, are produced, reproduced, and maintained" (Burrill 2008: 2). From his perspective, video games have been part of a larger process of reifying certain negative stereotypes associated with masculinity. From this angle, these in-game behaviors have pervaded our culture, as ways of both glorifying and desensitizing people, especially youth, toward violence. The creation of self may indeed be influenced by our gaming practices and, if it is, this may have some scary implications. If we expand this, then, to the performance of self in the virtual plain, what sorts of selves are we manifesting through our virtual practices and how are we performing those selves in order to manipulate our world(s)?

POSTHUMAN PROSTHETIC PLAY OF SELF

Certainly, this gaming practice also connects to another theme of our posthuman, digital gaming discussion: that of creating one's own identity in-game, which can have implications for how we view ourselves in real life. To continue with our earlier example, *Halo: Reach* allowed the gamer to customize his/her own in-game avatar. While your choice of character type was limited to that of a Spartan, within that framework, the gamer could personalize all of the other physical qualities. In many ways, this feels like a precursor or corollary to the kinds of "customizing" practices we all indulge in curating our social media presences. We present ourselves "just so," appropriate for the version of ourselves that we want others to see and of the narrative that we want to tell. *Ready Player One*, then, offers us the possible apotheosis of where this creation of digital bodies may take us in the coming decades. This

fictional account offers a clear argument for the degree to which the online self may overtake the corporeal one, in terms of personal identification.

Indeed, *Ready Player One*'s construct of the OASIS, as both virtual playground and new world order, is perhaps the apotheosis of this self-creation process in the digital realm. At the same time, though, it offers an interestingly complex memory prosthesis for these self-builders to construct from: its creator, James Halliday, uploaded his own fantasy-reality, one that the players within the landscape then "download" into their own personas, by adopting his interests and making his preoccupations their own. The players, like protagonist Wade Watts, create their selves via identifying not with their own nostalgia or cultural past, but with that of Halliday. The formation of the digital self is as much an homage to someone else as it is a reflection of one's truest identity. Who these individuals are is filtered through the framework that Halliday offers to them. They are creating themselves via a memory bank that is not, and could not be, their own, allowing them to tap into a false nostalgia that they do not—and cannot—actually possess.

Clearly, the vision of the 1980s that Halliday attempts to sell the gamers on is an idealized one. As Mike Sell wonderfully puts it:

> [The Hunt] transmogrifies the decade's video and roleplaying games, music, television, and movies into a nerd-friendly high-stakes Arthurian quest. But the Hunt makes no mention of the "other 1980s," the 1980s of AIDS, accelerating climate change, rising income inequality, the radical deregulation of global markets, the militarization of the police, the rise of transnational corporations, the intensification of the war on drugs, or mass incarceration. In case you didn't hear, the 80s sucked. (Sell 2018).

This filtered version of the world—idealized through the eyes of a child, to a large degree—creates an impossible standard for its players to live up to. It is a fiction of a fictional account, a recreation of a world built on a world that never actually was.

This experience is doubly—triply—meta in that reading the novel operates as its own game of sorts, one full of references meant to be accessible to the right kind of readers, those "in-the-know" about the popular culture tropes most relevant to its target audience. Megan Amber Condis argues that "Cline's text makes the 'gamer' identity legible by linking it to some of the cultural codes that define 'heteronormative white masculinity'" in her article "Play the Game of Literature: *Ready Player One*, the Ludic Novel and the Geeky 'Canon' of White Masculinity" (2018: 4). From Condis's perspective, this game within a game of reading the novel mirrors the identification that needed to happen for the participants in the Hunt. Condis writes:

> This systematic requirement of identification with a white male perspective to participate in gamer culture is echoed in Cline's decision to narrate his novel in the first person through the eyes of Wade. Cline asks his readers to enter into his narrative (play his narrative game) via an act of identification with Wade Watts …. We are encouraged to play the novel like a game, entering into Wade's role in the same way that one might enter into the role of Mario. (2018: 13)

Condis reminds us that there are negatives to this identification—the elision of other identities besides white, heteronormative male—seeing the novel as "an important window into how the construction of the gamer identity came to be a performance of white masculinity even as it reproduces the conditions of that social construction" (Condis 2018: 16). As exciting as the posthuman prospect may be—it allows us to recreate ourselves online for example—it is also terrifying—it will force conformity and reify prejudice and discrimination.

CONCLUSION

No matter your feelings toward Cline's novel, what is perhaps most remarkable about what it offers us is that it is a vision that does not feel so far removed from our contemporary experience of the world. Indeed, video gaming and social media have become integral parts of many contemporary lives in the developed world, in some cases to such a degree that our digital self(s) is as real to us as our corporeal one. Perhaps we have, through video gaming and social media, once and for all, become posthuman, as Hayles argues we had in the late 1990s. Even writer Tom Bissell, in theorizing about video games and gaming practices, admits that video games are a part of his life experience. In speaking of playing *Oblivion*, he notes, "*Oblivion* is less a game than a world that best rewards full citizenship, and for a while I lived there and claimed it" (Bissell 2010: 5). We no longer just play games; we live in them. Through our virtual experiences, especially those that allow for performative interaction, we have expanded our posthuman positionality. We can find ways to adapt ourselves to our (virtual) environments and to preserve an archive of our identity. We have become a version of ourselves that is both real and digital, and both human and posthuman simultaneously.

SOURCES CITED

Asimov, Isaac. "Robots and Androids." In *The Visual Encyclopedia of Science Fiction*, edited by Brian Ash. New York: Harmon Books, 1977, pp. 172–80.

Bissell, Tom. *Extra Lives: Why Video Games Matter*. New York: Pantheon Books, 2010.

Burrill, Derek. *Die Tryin': Videogames, Masculinity, and Culture*. New York: Peter Lang Publishers, 2008.

Cline, Ernest. *Ready Player One*. New York: Broadway Books, 2011.

Condis, Megan Amber. "Playing the Game of Literature: Ready Player One, the Ludic Novel, and the Geeky 'Canon' of White Masculinity." *Journal of Modern Literature*, vol. 39, no. 2 (2016): 1–19. Accessed November 1, 2018, https://muse.jhu.edu/.

Hayles, N. Katherine. *How We Became Posthuman*. Chicago, IL: University of Chicago Press, 1999.

Juul, Jesper. *Half-Real: Video Games between Real Rules and Fictional Worlds*. Cambridge, MA: MIT Press, 2005.

Landsberg, Alison. "Prosthetic Memory: *Total Recall* and *Blade Runner*." In *Liquid Metal: The Science Fiction Film Reader*, edited by Sean Redmond. New York: Wallflower Press, 2004, pp. 239–48.

McGonigal, Jane. *Reality Is Broken: Why Games Make Us Better and How They Can Change the World*. New York: Penguin Press, 2011.

Sell, Mike. "A Defense (Sort of) of Ready Player One (Part 2 of 2)," *This Professor Plays* (blog), February 9, 2018, http://iblog.iup.edu/thisprofessorplays/2018/02/09/a-defense-sort-of-of-ready-player-one-part-2-of-2/.

Suvin, Darko. "Preface." In *Other Worlds, Other Seas*. New York: Random House, 1970.

Tack, Daniel. "Studying Player Commitment in MMORPGs." In *Forbes*, November 30, 2012, https://www.forbes.com/sites/danieltack/2012/11/30/studying-player-commitment-to-mmorpgs/#3b59189695da.

Turing, Alan M. "Computing Machinery and Intelligence." *Mind,* vol. 54 (1950): 433–60.

CHAPTER THIRTY-TWO

Precarious Lives in the Age of Biocapitalism

PRAMOD K. NAYAR

The late twentieth-century literature and popular culture have been concerned about various dimensions of the Human and the idea of the person. A sample of such texts would include cult texts and critically renowned works around these themes. In the dystopian film *Repo Men* (2010), starring Jude Law and Forest Whitaker, humans with diseased organs can buy replacement organs at exorbitant EMIs from firms. These organs are repossessed, like cars or houses, if the buyer reneges or even falls back on the payments. As Remy (Jude Law), one of the "repo men" (those who assigned with the task of "repossessing") says at one point when he discovers that he himself has a heart implant, "this new heart is accumulating interest with every beat." In Kazuo Ishiguro's critically acclaimed *Never Let Me Go* (2005), clones are manufactured and reared to adulthood, when they begin donating their organs to enable humanity to survive. In the Swedish author Ninni Holmquist's *The Unit* ([2006] 2017), women who are fifty and men sixty-nine years of age respectively, and childless, are deemed "dispensable," serving as living cadavers to donate organs. The parents in Jodi Picoult's *My Sister's Keeper* (2004) have created Anna as a bone-marrow match for her leukemia-afflicted elder sister, Kate. Margaret Atwood conceives a future society where fertile women are treated as reproductive units in *The Handmaid's Tale* (1986). We could subsume these under the broad category of "popular posthumanism," dealing with and interested in the borders of the human and the machine, the arrival of lifeforms through non-standard reproductive mechanisms, and the ethics around blurred bodies, organs and "persons."

Posthumanist thought has drawn upon a diverse range of philosophies and thinkers as well

as having a sustained interest in the role of capitalism and biopower. Critical posthumanism, which focuses on the materiality of the body, is also alert to biological citizenship in which the material body is produced in and imbricated with technoscience and capitalist processes of exploitation of biopower. By rejecting the view of the autonomous subject and instead proposing a subject that is essentially intersubjective and intercorporeal, posthumanism refashions the very idea of the human. This critical posthumanism may be fruitfully utilized to study the enormously influential and often insidious expansion of biocapitalism.

The first theme in these texts of biocapitalism is the precarious nature of species identity *and* borders, which are often mediated by corporations and research organizations (exemplified in Atwood's HelthWyser and AnooYoo in the *MaddAddam* Trilogy). Technologies of cloning, organ traffic/transplantation, tissue engineering, and other such *human* biological sciences are grounds for a cultural anxiety around species borders.

Projects such as the Human Genome Project and the Human Genome Diversity Project (NatGeo, IBM, and others) and their search for origins, relations, and "genetic citizenship" (Heath et al. 2004) also serve as a clear and present danger to the human species' sense of belonging and kinship. Such projects, as Kim Tallbear (2007, 2013) and others argue, cast genetic relations as primordial and "true," although kinship, belonging, and the sense of community are, for Native Americans and several older populations, built not on bloodlines but cultural memories and shared practices—on their social ontologies but not their biological "roots." When large corporations, some of which have connections to the military, step into the arena of the life sciences and especially sciences that have a role to play in reorganizing the future line of humans, then biocapitalism has effectively determined the fate of the species.

With the frightening rise of what Andrea Fumagalli describes as "cognitive biocapitalism" (2011) originating in the late twentieth century, there is a concerted attempt to generate knowledge through informatization (communications and information technologies), and hence it is devoted to the "cognitive." This is then used to serve a system that, as always, makes use of the "bare vital faculties of human beings" (8). While the first, the cognitive, rapidly intensifies into what may be thought of as "biosurveillance," where organs, tissues, offspring, thoughts, and memories are all databased by the state or corporations, the second, capitalism, is the power held over life, and its constituents, from tissues to memories again, by corporate houses working with state laws and bioscience. It translates for our purposes into the "convergence of the life sciences with systems and regimes of capital … the ways in which the life sciences are increasingly incorporated into market regimes" (Sunder Rajan 2012: 2). Melinda Cooper elaborates: "what neoliberalism wants to capitalize is not simply the public sphere and its institutions, but more pertinently the life of the nation, social and biological reproduction as a national reserve and foundational value of the welfare state" (2008: 9).

In what follows I examine what I take to be a key component of posthumanist thinking, biocapitalism, as found in literary and popular cultural texts. It examines two aspects of biocapitalism, precarious corporeality and the judicialization of life.

PRECARIOUS CORPOREALITY

In Margaret Atwood's *The Handmaid's Tale*, the woman's anatomy is literally her destiny. Subject to monthly ordeals of attempted impregnation (termed "Ceremony") and gynecological examinations, Offred and the rest of the handmaids serve as bodies controlled by a social order. Early in the novel, when Offred arrives at the house of the Commander to which she is deputed—her third, as she admits—the Commander's wife reminds her that this is a "business transaction" (15). She also warns Offred: "As for my husband, she said, he's just that. My husband. I want that to be perfectly clear. Till death do us part. It's final" (16). The Commander's wife claiming rights to the husband, via the citation of the (Christian) marriage vows, is contrasted by the words "business transaction" in Offred's case. In both cases, there is ownership but the terms of this ownership are different. Offred serves the completion of this picture of the normative heterosexual family: wife, husband, and (hopefully) progeny. But "business transaction" signals the terms on which Offred is part of the family's history and picture and yet not *in* it. Offred would record:

> And there will be family albums, too, with all the children in them; no Handmaids though. From the point of view of future history, this kind, we'll be invisible. But the children will be in them all right, something for the Wives to look at, downstairs, nibbling at the buffet and waiting for the Birth. (214)

This is Atwood's vision of the bioeconomy of the future, one that is predicated upon, expectedly, on the woman's body and its reproductive functions.

Central to a critique of biocapitalism in Atwood and others is their theme of possession and labor, of which the above excerpt is a good example.

The lives of Offred (*Handmaid's Tale*), Kathy, Tommy (*Never Let Me Go*), and Dorrit (*The Unit)* are reduced to the organs and their functions as determined by the social order and authorities. In one sense, then, their bodies are alienated from their selves because there is no agential control over the futures of these bodies. They are "biological citizens" (Petryna 2002) but never full citizens because they function, as do their bodies, as property rather than as agents in control of their corporeal property.

Ruth says in *Never Let Me Go*: "I was pretty much ready when I became a donor. It felt right. After all, it's what we're *supposed* to be doing, isn't it?" (223, emphasis in original). The phrasing is important here. Kathy is pointing to cultural training which prepares and conditions the clones to perform the duties and tasks they are *supposed* to do. Having accepted that their bodies belong to the state, the clones no longer feel that donating their organs until they die is anything but "right." This is live capital: the official/state investment in cloning technologies, the nurture and safety of the clones in places like Hailsham, seeks eventual returns in the form of their bodies and organs.

Examining slave bodies, Sheila Jasanoff makes a case for "dual ontologies—as goods and as persons" (2012: 164). Offred, Kathy, and others are "manipulated biological entities" (164). The clones and handmaids are persons in so far as they have desires, anxieties, consciousness, and sentiments. Yet their principal role in these dystopian visions is of goods,

"an integral and ontologically stable component of the economic and cultural system" (164). The humans in the future will be kept alive, the human species order itself kept alive, precisely through the *stable* nature of the Offreds and the Kathys. John Schwetman puts it this way:

> *Never Let Me Go* presents a perverse caricature of birthright aristocracy by focusing on main characters lacking power by virtue of their birth, or, more accurately, of these "objects in test tubes" never having been born at all … [their] clone status is a literary variation on social class and its function. (2017: 430–01. Also Rollins [2015] on labor and the gift economy in the novel)

The clones thus serve as slave bodies simply by virtue of their birth. If clones are created as reservoirs and service bodies for humans, the "windups" or cyborgs (called "New Persons" or "New People") in Paolo Bacagalupi's *The Windup Girl* have only one rule and role: "New people serve and do not question" (n.p.).

This argument enables us to see how biocapitalism operates: it transforms human bodies, no matter where these originate, in the uterus or the petri dish, into patentable, possessable objects. In this process, the naturally or artificially occurring bodies (clones, Offreds, "windups") are *equated*, being patentable. They are *pure* uterus, cadavers, and organ storehouses, purified from the natural state they may be found in, or grow into.

Sheila Jasanoff, while examining the famous *Diamond versus Chakraborty* case in the United States, notes this blurring of the nature/culture and natural/invented binary, and describes the process as follows:

> Purification, in effect, was a process of denaturing, of taking something out of its natural context. In pure and isolated form, genes are no longer nature's instruments, subject to the vagaries of natural law, but are amenable instead to human intentions and purposes. They are ripe for entering the cultural worlds of sociality and commerce. (2012: 167)[1]

This is precisely the precarity of the human form, when the integrity, for long deemed intrinsic and natural to it, becomes purified, reduced to socially valuable functions.

In biocapitalism of the kind envisioned by Atwood, Ishiguro, Holmquist, and other popular texts (*Dirty Pretty Things, Repo Men*), certain bodies are at once present and absent. Present, because they are integral to the social order, especially in terms of the *reproduction* of the social order, and absent because they will be unacknowledged in the very histories they help make. The "normal" humans kept alive thanks to "donations" by the living cadavers in *Never Let Me Go* and *The Unit* would produce "normal" histories in which these cadavers, whose bodies would provide the soft organs enabling human life, but whose identities will never be revealed to the receivers, would not be recorded. The integrity of some humans is in precarity in these texts precisely because of this absent/present tension, but also due to other forms of ownership and labor these bodies are reduced to. That is, precarity here is the loss of control and agency over internal organs, functions such as reproduction and sex, thereby partially erasing what it means to be a human.

In *Handmaid's Tale* the hitherto private space of sex and reproduction has been shifted into the public realm and state policy. Furthermore, the state's control automatically implies the loss of control of the reproduction, fetus, and the child by the mother. In *The Unit* Dorrit is cautioned that she should not develop any kind of attachment to the fetus—described as "fresh human capital" in the novel (n.p.)—she is carrying, because it will not be "her" child as such (the children born are immediately sent up for adoption by the state). In these cases, critics are right to point out, that the woman is a modern-day slave, with no control over her labor. Linda Myrsiades writes:

> The woman is regarded as a reproductive slave forced by the state and not entitled to full human status … The good mother/handmaid performs surrogate, carrying on society's genes as the vessel through She is alienated from her own "labor" insofar as her own child is really designed for a state intent upon restocking its labor pool and ensuring its viability as a form of government. (1999: 228)

Another effect of biocapitalism is the alienation of the humans from their own organs. There is no sense of self possible because the bodies of Offred or Kathy or Dorrit are (meant to be) emptied out: designated as carriers whose cargo, so to speak, is never their own. Here is Offred's account of her body-consciousness:

> I sink down into my body as into a swamp, fenland, where only I know the footing. Treacherous ground, my own territory. I become the earth I set my ear against, for rumors of the future. Each twinge, each murmur of slight pain, ripples of sloughed-off matter, swellings and diminishings of tissue, the droolings of the flesh, these are signs, these are the things I need to know about. Each month I watch for blood, fearfully, for when it comes it means failure. I have failed once again to fulfil the expectations of others, which may have become my own.
>
> I used to think of my body as an instrument, of pleasure, or a means of transportation, or an implement for the accomplishment of my will. I could use it to run, push buttons of one sort or another, make things happen. There were limits, but my body was nevertheless lithe, single, solid, one with me.
>
> Now the flesh arranges itself differently I'm a cloud, congealed around a central object, the shape of a pear, which is hard and more real than I am and glows red within its translucent wrapping. Inside it is a space, huge as the sky at night and dark and curved like that, though black-red rather than black. Pinpoints of light swell, sparkle, burst and shrivel within it, countless as stars. Every month there is a moon, gigantic, round, heavy, an omen. It transits, pauses, continues on and passes out of sight, and I see despair coming towards me like famine. To feel that empty, again, again. I listen to my heart, wave upon wave, salty and red, continuing on and on, marking time. (1986: 69–70)

One notes the change in Offred's perception and description of herself. From the body as an "instrument of pleasure," "transportation," and "an implement for the accomplishment of my

will," she now sees it completely different: a vessel. Her life is structured around the moon's cycles, and therefore her menstrual cycle, an index of her fertility but also, tragically, a sign that she is not yet pregnant. There is no coherent sense of her body as an agent of her will: she is only her reproductive organs. The sight of blood is a sign of her failure, she believes. This shift is necessitated by a shift in the socio-cultural contexts: the social order has now outlawed sex except for procreation and the bodies of fertile women like Offred are to be dedicated to the service of the state.

It is only when Offred's (or any handmaid's) inner space—the womb—becomes filled with the property of the state—the fetus—that she can claim a rightful space in Gilead's social order (Myrsiades 1999: 230). The dispensables and the clones in *The Unit* and *Never Let Me Go* respectively acquire a degree of social space, acceptance, and identity only when they start donating their organs or bear children for the state. The self and life of the handmaid are endangered only when her inner space remains empty, that is, barren because it is against the basic principles of their biological citizenship. The topos of the woman's body are to be violently—because it is not voluntary or agential—violated, impregnated for it to acquire a space in the social order. Indeed, the social order is aware of the sources of the organs, that the humans are kept alive because the clones die. Ishiguro writes: "however uncomfortable people were about your existence, their overwhelming concern was that their own children, their spouses, their parents, their friends, did not die from cancer, motor neurone disease, heart disease" (2005: 258). In short, the precarity of human lives can only be alleviated by rendering the clones' lives precarious in the future where all power is likely to be manifest as biopolitical power, with the regulation of bodies, individuals, and entire populations. In the process, some of the humans risk losing their integrity and agency over their bodies.

In Pamela Cooper's reading of *The Bell Jar* and *Handmaid's Tale*: "the story of the women's quest for self is a brutal narrative of uterine imperatives, of the body filled up or emptied out" (1997: 102). Cooper further argues that the "reproductive organs question the very issue of wholeness" (103). The "uterine imperative" that Cooper underscores is as applicable to Dorrit and Kathy-Tommy because their bodies are meant to be emptied out. What is termed "donation" in *Never Let Me Go* and *The Unit* is essentially the rendering of the body into a set of organs which together do not constitute a sense of self for the "human." This loss of integrity of the human is at the center of the biocapitalist theme in these texts.[2]

In an interesting variation Karen Yamashita in *Through the Arc of the Rainforest* makes J. B. Tweep, the American entrepreneur, a mutant: he has three arms. Leading the quest for the Matacão (in the Brazilian forests), "with three arms, he is the living embodiment of the multiply and tirelessly reaching US corporations with interests overseas" (Bahng 2008: 126). Far from being vulnerable as a result of his mutant body, Tweep is the enterprising, and ruthless, capitalist. Yamashita also draws the connection between the rise and expansion of biocapitalism and rising social inequalities. Describing the effects of the Matacao, she documents the effects on the poor and peasant lives in its neighborhood. Mané Pena, a symbol of this class of natives, lived by "fishing, tapping rubber and collecting Brazil nuts." Then government officials clear the land of rubber trees and acquire the area for development, in the process discovering and exposing the Matacão. First, Pena's family move to "low-cost, riverside condominiums built on the edges of the Matacão." Then, these

buildings are replaced with luxurious developments and US fast-food chains for the expanding tourist traffic (see De Loughry 2017).

THE JUDICIALIZATION OF LIFE ITSELF

The clones in *Never Let Me Go*, like the dispensables in *The Unit*, are given the best of health care services. They are periodically examined for potential sickness, served the best food and their regimen is the best possible one for physical health. However, there is also no escaping this regime. In *The Unit*, for instance, when Dorrit learns that her partner has just made his final donation and is lying dead in the Operating Theatre, she wishes to see the body. When she is shocked at the sight, the immediate response of the nurses and doctors is: she perhaps needs a psychologist to talk to. The assumption here is: since Dorrit is pregnant, and the child inside her is the property of the state, the emotional and psychological being of the mother-body is also a matter of state observation and treatment (if required).

The monitoring of the health of the clones, handmaids, and such live capital by the state is a judicialization of health and sickness.[3] The health regimen that mandates the taking of pills and medication, the forced quarantine procedures (in films like *Quarantine, Outbreak*), and mandatory health checks are part of this judicialization. Kathy observes in *Never Let Me Go* that the students at Hailsham "have some form of medical almost every week" (Ishiguro 2005: 13). In another incident, the teacher, Miss Lucy, informs them that they must keep themselves healthy because they are "special" (67–9).

In all these texts, and particularly in *Handmaid's Tale*, the "subjects" are subject to uninterrupted surveillance so much so that even the washrooms are fitted with cameras, as Dorrit notes with horror in *The Unit*. In the film version of *Never Let Me Go*, the children scan their wristband at various points within Hailsham. There is mutual surveillance as well, where the handmaids surveil each other. Surveillance is part of the judicialization project in these dystopian texts.

But this is not all. In films like *Repo Men* the company's acts of repossession, however horrific and fiendish, are perfectly *legal* and *legitimate* in the new world. Just as the ownership of the fetuses is not assigned to the mother-body but is automatically the property of the state in *The Unit*. This means, simply, that the bioeconomy that capitalizes upon or of human bodies is accompanied and facilitated by a full-fledged *legal* or state apparatus.

Acquiescence then is not a negotiable matter, as we see in the lives of Dorrit or Offred who, eventually, agree to do their "duties" as mandated by the law: handing over their bodies, and whatever it may contain, to the state. The property laws have expanded to now govern everything, from molecule to full-fledged human bodies.

The drive to reengineer crops and the resultant chaos in the political economy—smaller farmers ruined, large corporations monopolizing production—mark *Oryx and Crake*:

> The wars were over the new Happicuppa bean, developed by a HelthWyzer subsidiary. Until then the individual coffee beans on each bush had ripened at different times and had needed to be handpicked and processed and shipped in small quantities, but the Happicuppa coffee bush was designed so that all of its beans would ripen

simultaneously, and coffee could be grown on huge plantations and harvested with machines. This threw the small growers out of business and reduced both them and their labourers to starvation-level poverty. (Atwood [2003] 2013: 210)

It is the reproduction of *life* itself that is both corporatized and judicialized in these biocapitalist novels. Allison Dunlap says about *Oryx and Crake*:

By controlling and commodifying the production and reproduction of both human beings and non-human animals, the capitalist scientists of *Oryx and Crake* diminish the possibility of human exceptionalism, reducing both non-human animals and humans to controllable commodities. (2013: 3)

Another extensive study of the judicialization of life may be seen in Paolo Bacigalupi's *The Windup Girl*. Thailand is the only country to have survived global agricultural disaster because of its strict national laws on importing of seeds and agro-products, and their closely guarded seedbank projects. What is important in this novel about the judicialization (as property) of life itself, in this case, food crops such as rice, is that the drive toward such legally instituted control of Nature is the work of global agricultural corporations. In mark contrast to other sci-fi/dystopian novels that focus on human lives, *The Windup Girl* turns its attention to plant life. Bacigalupi writes:

AgriGen and its ilk were threatening embargo over intellectual property infringement, but the Thai Kingdom was still alive. Against all odds, they were alive. As others were crushed under the calorie companies' heels, the Kingdom stood strong. *Embargo!* Chaiyanuchit had laughed. *Embargo is precisely what we want! We do not wish to interact with their outside world at all.* And so the walls had gone up—those that the oil collapse had not already created, those that had not been raised against civil war and starving refugees—a final set of barriers to protect the Kingdom from the onslaughts of the outside world. (2011: n.p., emphasis in original)

Andrew Hageman examining the ecological themes in the novel speaks of its attempt at a "resistance to a totalitarian ecological gaze" (2012: 291). In the course of a conversation Lake Anderson the American has with Akkarat, Anderson presents his demand: access to the Thai seed bank. Akkarat replies:

The seedbank has kept us independent of your kind. When blister rust and genehack weevil swept the globe, it was only the seedbank that allowed us to stave off the worst of the plagues. (Bacigalupi 2011: n.p.)

Anderson admits: "we need new genetic material … we have exhausted our options and the plagues keep mutating" (n.p.). Then Akkarat reminds Anderson: "You're saying that you yoked the world to your patented grains and seeds, happily enslaved us all, and now you finally realize that you are dragging us all to hell" (n.p.). But this is not all. Anderson also seeks custody of an American, Gibbons, who has been "infringing" on their "intellectual

property" (n.p.).

As the novel clearly indicates, there is a link between intellectual property, capitalism, and the "ownership" of new and some old forms of life. The development of hybrid varieties—GMO, genetically modified organisms—has resulted in new regimes of knowledge-gathering, heavy financial investment, and tighter intellectual property laws. Elta Smith examining the "lively capital" of hybrid species writes:

> The mapping and sequencing of rice genomes provides an interesting set of cases for exploring the development of global governance through intellectual- property rights. The recent effort to map and sequence the rice genome not only illustrates the production of new scientific information, but also the simultaneous constitution of new intellectual- property regimes that do not (always) reflect current legal notions of property rights. (2012: 186)

Describing what she terms "hybrid properties"—a mixture of private and the public—Smith argues that "representations of the genome come into being with tacit property regimes attached to them" (187). Thailand's resistance, in the novel, is two-fold: an embargo on agricultural imports-exports from any part of the world/transnational agri-corporation, and keeping its own seedbank a secret archive for the future. Global intellectual property regimes, then, have *no* stakes in the country's agro-production. The obverse is also true: they have no access to the information about future, local crop varieties.

Bacigalupi links the ecological crises around destroyed crops, new varieties of diseases, and overall reduction in good grains across the world to the intellectual property regime—which would be an instance of the judicialization of life itself. "Nature" as such no longer exists in the novel: Nature has been appropriated and modified in unimaginable ways and this itself precipitates the crisis. When the agri-corporations remap the world in terms of resources and seeds, they also alter the very nature of Nature in those places: soon new diseases emerge that attack the genetically modified crops (that embody the global intellectual property regimes), destroying vast sources of food. Bacigalupi suggests that in the judicialization of life lies the root of the destruction of life.

In *Through the Arc of the Rainforest*, it is not crops that are to be capitalized upon. It is a strange material, the Matacão, that appears in the middle of the Brazilian forest, that various people but particularly business corporations, are interested in. Yamashita writes:

> The Matacão, scientists asserted, had been formed for the most part within the last century, paralleling the development of the more common forms of plastic, polyurethane and Styrofoam. Enormous landfills of nonbiodegradable material buried under virtually every populated part of the Earth had undergone tremendous pressure, pushed ever farther into the lower layers of the Earth's mantle. The liquid deposits of the molten mass had been squeezed through underground veins to virgin areas of the Earth. The Amazon Forest, being one of the last virgin areas on Earth, got plenty. (2017: 177)

Slowly, this effluent mass produces typhus, and "everyone around … could recognize the first symptoms of the disease—the red rash that began to cover the neck and ears and the

menacing headache that soon overcame the afflicted with such intensity that people were often seen rolling in the streets with their hands pressed to their heads" (160). Antibiotics do not work any longer, and soon it becomes a "national disaster" (161). The effluent product the corporations hope to monetize and the corporeal deterioration this product engenders across the national population are, unlike in the standard alien-invasion film, a home-grown substance, as Yamashita clearly identifies. It is of the Earth and human culture itself, even as it takes on form and qualities that mimic life and any natural substance: it has a "glow, moisture, freshness—the very sensation of life" (Yamashita 2017: 142), and is soon incorporated into credit cards, plastic surgery, fabric, upholstery, buildings, among other commodities of everyday life in the modern world. But the Matacão is also instrumental in *changing* the biome in and around itself. Mutations begin to set in, and Yamashita lists a species of butterfly that can only nest in the plastic "vinyl seats of Fords and Chevrolets," a mouse that can burrow into exhaust pipes with its mutated feet bearing "suction cups" and an immunity to toxic chemicals, insects that feed on rust, rats with additional limbs, and monkeys with new predatory behavior. A product that promises profits, suggests Yamashita, is at the heart of evolutionary changes across the ecosystem.

The ecological crisis over diseased crops and food shortages in the *Windup Girl*, or the disaster emerging from commercially viable but risky substances like the Matacaõ in *Through the Arc of the Rainforest* is a part of prospective global history. This disaster of biocapitalism in these texts is both the cause and the effect of a larger problem, which Melinda Cooper describes thus: "the political problematic is twofold. How can we contest the depletion, extinction, and devaluation of living possibilities without opting for the wholesale capitalization of a surplus life to come?" (2008: 49). Even the bets are in terms of genomic rice: Anderson offers to the Thai chief in *Windup Girl*:

> what if I offered you and your kingdom my company's next iteration of U-Tex rice? …
> And not just the rice, but the grain before it is rendered sterile. Your people can plant it
> and replant it for as long as it's viable against blister rust. (n.p.)

Grain functions here, as Elta Smith would say about GMO, as "scientific information, as a model cereal, as a major food staple, as a cultural icon" (Smith 2012: 194). For Thailand, rice is indeed all this.

When Yamashita meets Kazumasa Ishimaru, the Japanese rail engineer with the mysterious ball in orbit around his head, who comes to Brazil as the key player in the future of the Matacão, she points to the links between the global elites and power structures: because Ishimaru becomes integral to the Americans' imperial designs on the Matacaõ. Biocapitalism, evidently, brings Asian Americans into the fold too.

Capitalization, via globalization and judicialization—and Bacigalupi make it clear the two are inseparable—demands greater resources and control over food production, and it is precisely this that leads to the global ecological crises. The response to such a globalizing judicialization is what Thailand represents in the novel: a national (and nationalized) judicialization of its genetic material and data.[4]

Bacigalupi suggests that Thailand's attempt to secure its environment—the ecosystems for

its essential crops—through intellectual property regimes is in fact a securitizing of national identity (Thai sovereignty in the face of global onslaughts) and biological security for its people. The judicialization of life via this national intellectual property regime is linked, then, to both: the *economic* and *biological* domains. Now, as Atwood's, Yamashita's and Bacigalupi's texts, many ecodystopian texts may not be about the risks of the present. Rather, they signal the possible outcomes and the risks that may emerge if we continue along this path of bioengineering. Molly Wallace sums it up thus: "As with most extrapolative fiction, the point is, first, to suggest that the means to the apocalyptic futures are already in the works and, second, to prevent the outcome imagined" (2016: 98). In these texts, both the natural and cultural "systems" are altered, some irrevocably.

What is irrefutable is that human history, and future, cannot be unpacked as the effect of human rational choices or agency alone. Andrew Rose, following the work of Timothy Mitchell, argues that "nonhuman communities are understood to have more than a simply passive role in an unfolding history created entirely by human-centered, rational agency, would radically alter our understanding of event" (2019: 129). Thus, pigoons, eco-disaster and its attendant mutant life-forms, climate change, bacteria, birds, and plastic are constituents of a "distributed agency" on Earth. If, as posthumanist scholars argue, one needs to see human life not as a cohesive, autonomous unit but as co-evolving with other forms of life as well as the non-living, then Rose's argument about the distributed agency of various elements on Earth is a posthuman vision. The biocapitalist social imaginary as it appears in these texts is the imagining of specific kinds of outcomes—the risks to which we are all *likely* to be subject to, and the kinds of precarious subjects we may evolve into.

An isolated and purified DNA molecule that has the same sequence as a naturally occurring gene is eligible for a patent because (1) an excised gene is eligible for a patent as a composition of matter or as an article of manufacture because that DNA molecule does not occur in that isolated form in nature, or (2) synthetic DNA preparations are eligible for patents because their purified state is different from the naturally occurring compound" (US Patent and Trademark Office 2005: 1093). (Cited in Jasanoff 2012: 167).

here have been other readings of this same theme, of the woman-as-reproductive-machine. For instance, Linda Myrsiades argues that "as long as a woman with her fetus, she achieves a social role that validates her … What she has gained is a compelling identification with a network that forces on her a social definition of her role as a pare" (1999: 222–3).

he term "judicialization of health" is being used in a slightly different sense here. It is usually employed to describe the increasing law suits being filed in countries like Brazil seeking access to expensive and/or essential drugs. I employ it to speak of the legal measures instituted by regimes in novels such as *Never Let Me GO, Handmaid's Tale*, and *The Unit*.

he model for Thailand's approach would be that of China. China, in response to the International Rice Genome Sequencing Project, the Beijing Genomics Institute started the genomic sequencing of its own rice. As Elta Smith (2012) notes, this was a *national* project but with public dissemination of the knowledge obtained from the sequencing.

SOURCES CITED

Atwood, Margaret. *The Handmaid's Tale*. Toronto: McClelland-Bantam, 1986.
Atwood, Margaret. *Oryx and Crake*. London: Virago, [2003] 2013.

Bacagalupi, Paolo. *The Windup Girl*. New Delhi: Hachette Ebook, 2011.

Bahng, Aimee. "Extrapolating Transnational Arcs, Excavating Imperial Legacies: The Speculative Acts of Karen Tei Yamashita's *Through the Arc of the Rain Forest*." *MELUS*, vol. 33, no. 4 (2008): 123–44.

Cooper, Melinda. *Life as Surplus: Biotechnology and Capitalism in the Neoliberal Era*. Seattle, WA: University of Washington Press, 2008.

Cooper, Pamela. "'A Body Story with a Vengeance': Anatomy and Struggle in *The Bell Jar* and *The Handmaid's Tale*." *Women's Studies*, vol. 26 (1997): 89–123.

DeLoughry, Treasa. "Petromodernity, Petro-finance and Plastic in Karen Tei Yamashita's *Through the Arc of the Rainforest*." *Journal of Postcolonial Writing*, vol. 53, no. 3 (2017): 329–41.

Dunlap, Allison. "Eco-Dystopia: Reproduction and Destruction in Margaret Atwood's *Oryx and Crake*." *Journal of Ecocriticism*, vol. 5, no. 1 (2013): 1–15.

Fumagalli, Andrea. "Twenty Theses on Contemporary Capitalism (Cognitive Biocapitalism)." Translated by Sabrina Ovan. *Angelaki*, vol. 16, no. 3 (2012): 7–17.

Hageman, Andrew. "The Challenge of Imagining Ecological Futures: Paolo Bacigalupi's *The Windup Girl*." *Science Fiction Studies*, vol. 39 (2012): 283–303.

Heath, Deborah, Rayna Rapp, and Karen-Sue Taussig. "Genetic Citizenship." In *A Companion to the Anthropology of Politics*, edited by David Nugent and Joan Vincent. Malden, MA: Blackwell, 2004, pp. 152–67.

Holmquist, Ninni. *The Unit*. Translated by Marlene Delurgy. New York: Other Press, [2006] 2017.

Ishiguro, Kazuo. *Never Let Me Go*. London: Faber and Faber, 2005.

Jasanoff, Sheila. "Taking Life: Private Rights in Public Nature." In *Lively Capital: Biotechnologies, Ethics, and Governance in Global Markets*, edited by Kaushik Sunder Rajan. Durham and London: Duke University Press, 2012, pp. 155–83.

Myrsiades, Linda. "Law, Medicine, and the Sex Slave in Margaret Atwood's 'The Handmaid's Tale'." *Counterpoints*, vol. 121 (1999): 219–45.

Nayar, Pramod K. *Posthumanism*. Cambridge: Polity, 2013.

Parry, Bronwyn. *Trading the Genome: Investigating the Commodification of Bio-Information*. New York: Columbia University Press, 2004.

Petryna, Adriana. *Life Exposed: Biological Citizens after Chernobyl*. Princeton, NJ: Princeton UP, 2002.

Picoult, Jodi. *My Sister's Keeper*. London: Hodder and Stoughton, 2004.

Rollins, Mark. "Caring Is a Gift: Gift Exchange and Commodification in Ishiguro's *Never Let Me Go*." *CEA Critic*, vol. 77, no. 3 (2015): 350–6.

Rose, Andrew. "Insurgency and Distributed Agency in Karen Tei Yamashita's through the Arc of the Rainforest." *ISLE: Interdisciplinary Studies in Literature and Environment*, vol. 26, no. 1 (Winter 2019): 125–44.

Schwetman, John David. "'Shadowy Objects in Test Tubes': The Ethics of Grievance in Kazuo Ishiguro's *Never Let Me Go*." *Interdisciplinary Literary Studies*, vol. 19, no. 4 (2017): 421–40.

Smith, Elta. "Rice Genomes: Making Hybrid Properties." In *Lively Capital: Biotechnologies, Ethics, and Governance in Global Markets*, edited by Sunder Rajan. Durham and London: Duke University Press, 2012, pp. 184–210.

Sunder Rajan, Kaushik. "Introduction: The Capitalization of Life and the Liveliness of Capital." In *Lively Capital: Biotechnologies, Ethics, and Governance in Global Markets*, edited by Sunder Rajan. Durham and London: Duke University Press, 2012, pp. 1–44.

Tallbear, Kim. "Narratives of Race and Indigeneity in the Genographic Project." *Journal of Law, Medicine & Ethics*, vol. 35, no. 3 (2007): 412–24.

Tallbear, Kim. "Genomic Articulations of Indigeneity." *Social Studies of Science*, vol. 43, no. 4 (2013): 509–33.

Wallace, Molly. *Risk Criticism: Precautionary Reading in an Age of Environmental Uncertainty*. Ann Arbor: University of Michigan, 2016.

Yamashita, Karen Tei. *Through the Arc of the Rainforest*. Minneapolis: Coffee House Press, 2017.

INDEX