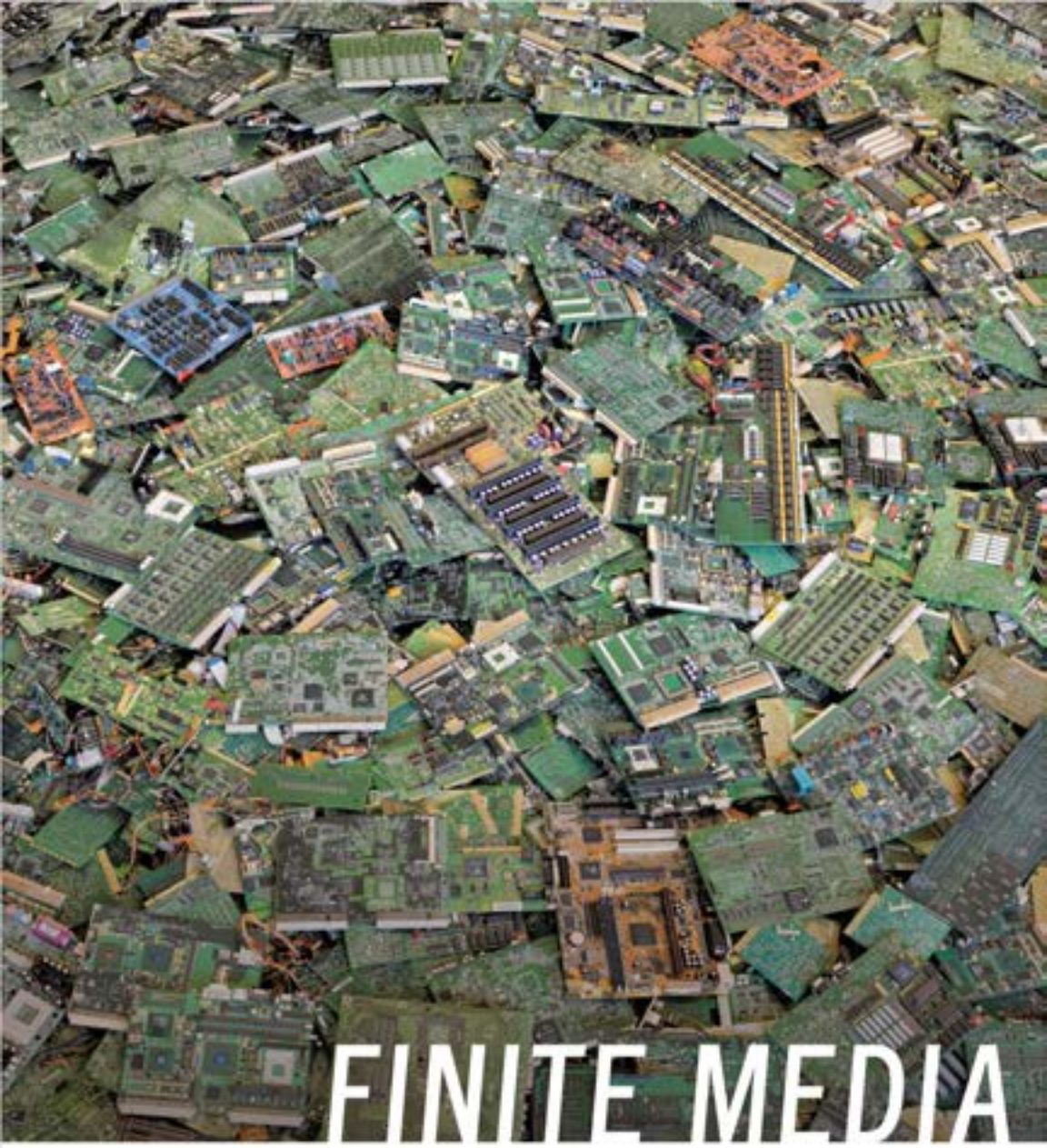

FINITE MEDIA

ENVIRONMENTAL IMPLICATIONS OF DIGITAL TECHNOLOGIES

SEAN CUBITT

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Finite Media
Environmental Implications of Digital Technologies

Duke University Press Durham and London 2017

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Printed in the United States of America on acid-free paper ∞

Library of Congress Cataloging-in-Publication Data
Names: Cubitt, Sean, [date] author.
Title: Finite media : environmental implications of digital technologies / Sean Cubitt.
Description: Durham : Duke University Press, 2017. | "A cultural politics book." | Includes bibliographical references and index.
Identifiers: LCCN 2016028022 (print)
LCCN 2016028817 (ebook)
ISBN 9780822362814 (hardcover : alk. paper)
ISBN 9780822362920 (pbk. : alk. paper)
ISBN 9780822373476 (e-book)
Subjects: LCSH: Digital media—Environmental aspects. | Digital media—Political aspects. | Digital media—Social aspects.
Classification: LCC HM851.C7825 2016 (print)
LCC HM851 (ebook)
DDC 302.23/1—dc23
LC record available at https://lccn.loc.gov/2016028022

Cover art: Chris Jordan, *Circuit Boards #2, New Orleans, 2005* (detail)

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ACKNOWLEDGMENTS

This book is dedicated to my teachers.

Drafts and fragments have appeared in earlier forms in *Theory, Culture and Society*, *Cultural Politics*, and *Media, Culture and Society*. I am especially grateful for my collaborators on the last of these, Robert Hassan and Ingrid Volkmer. The following editors have generously included essays feeding into this project in their collections: Alexa Weik von Mossner, Anil Narine, David Berry and Michael Dieter, Nicole Starosielski and Janet Walker, Larissa Hjorth, Natalie King, and Mami Kataoka, Paul Graves-Brown, Rodney Harrison and Angela Piccini, Ulrik Ekman, Claire Molloy and Yiannis Tzioumakis, Jay David Bolter, Lily Diaz, Morten Søndergaard, and Maria Engberg, Suzanne Buchan, and my collaborators on two anthologies, Stephen Rust and Salma Monani, who have been and remain an inspiration for ecomedia scholars everywhere. I have been fortunate enough (at the cost of a carbon footprint chilling to contemplate) to have talked through aspects of this research with colleagues at Transmediale, Steirischer Herbst, Central Saint Martins School of Art, the Cinémathèque Québecoise, ISEA Istanbul, the Screen Conference at the University of Glasgow, the Lancaster Institute for Contemporary Arts, the London School of Economics, Trinity College Dublin, and the Universities of Cambridge, Central Lancashire, Dundee, Espiritu Santo, Illinois, Johns Hopkins, Massey, Melbourne, Montreal, Oxford, Sao Paolo, St. Andrews, Siegen, Southampton, Sussex, Warwick, and

the West of England, and to them all I owe a deep debt of gratitude. Particular thanks are due to Lanfranco Aceti, John Armitage, Jon Beller, Ryan Bishop, Pat Brereton, Elinor Carmi, Jonathan Curling, Catherine Elwes, Jennifer Gabrys, Charlie Gere, R. Harindranath, Adrian Ivakhiv, Roger Malina, Janine Marchessault, José-Carlos Mariategui, Noortje Marres, Gabriel Menotti, Walter Mignolo, Maree Mills, Salma Monani, Jussi Parikka, Janine Randerson, Lisa Reihana, Ned Rossiter, Stephen Rust, Susan Schuppli, Jacob Scott, Gareth Stanton, Sy Taffel, Paul Thomas, Nathaniel Tkacz, Pasi Valiaho, Henry Warwick, Ken Wissoker at Duke, and the generous and insightful reviewers whose anonymous comments remade this book, my colleagues in the Leonardo and ecomediastudies.org networks, and the many more, human and nonhuman, with names to come.

For Alison, forever.

Finite Media

The Story of the Kelly Gang, dir. Charles Tait, 1906; DVD screen grab of the 2006 digital restoration. Source: National Film and Sound Archive of Australia.

INTRODUCTION **ECO-MEDIATION**

Say not the struggle naught availeth,
The labour & the wounds are vain,
The enemy faints not nor faileth,
And as things have been they remain.
—**Arthur Hugh Clough**

Of the original sixty minutes of *The Story of the Kelly Gang*, shot by Charles Tait in 1906, only seventeen minutes remain, much of it in the poorest condition. The film records a moment of colonial rebellion, the wild Irishman Ned Kelly refusing the yoke of his imperial masters. Often referred to as the world's first feature film, *The Kelly Gang* is a triumph of realism. We see again animals, plants, and geology now buried under roads and buildings. The nitrate stock, brilliant sunlight, and sharp lenses catch all the flickering of background leaves and grass, as characters approach or remove themselves from the scene. Even the armor is authentic: not Kelly's own, but the helmet and breastplate worn by Joe Byrne, a member of his gang, still a living memory at the time the film circulated, to considerable profit, through the Victorian and South Australian goldfields where the Kellys rode and met their end, and around the colonies. Tait's deep focus and his taste for authenticity place the film in a specific aesthetic tradition of pictorial realism, and enough remains for us to understand the main action. Yet what strikes twenty-first-century viewers is the developing chaos of the blistering support and the silver halides sitting on it, as well as the artifacts produced in the

archival process and its transfer to the web-ready MPEG-4 codec. *The Story of the Kelly Gang* is not in any simple way about ecology, but it is itself an ecological artifact, one that links human, technological, and organic worlds in the context of colonialism, and so acts as a talisman for the work undertaken in this book.

When we speak of film as a "living medium," we should take the term literally. The nitrate stock *The Kelly Gang* was shot on is formed by adding camphor as a plasticizer to nitrocellulose, also known as guncotton, a close relative of nitroglycerine (the foundation of the Nobel fortune). It is extremely flammable. Even without fire, the stock gradually outgasses, leaving a sticky and unworkable gel. Such decomposition is as much a fact of film as it is of any other living matter. The archivist's task is to preserve the film in a form as close as possible to an ideal master print at an ideal first screening, to conserve light passed from one time to another. Against this preservationist homage to the ideal, from the point of view of the film itself, the filmstrip is a slowly percolating chemical soup, a patch of molecular combination and mutation. The archival life of film (Fossati 2009) includes this struggle between the order of the archive and the entropy of what the archivist understands as decay, but which can also be understood as the evolution of a new artifact from the old.

In this instance, according to Sally Jackson and National Film and Sound Archive of Australia historian Graham Shirley,

> The surviving fragments were digitally scanned by Haghefilm Laboratories in Amsterdam using the DIAMANT digital restoration system. This allowed major cleaning to remove dirt, scratches and other blemishes, and eliminated the jitter characteristic of the original footage. This digital approach also allowed for the re-creation of frame content which had otherwise been lost through physical deterioration. To achieve this, the Haghefilm restorers copied and modified content from adjacent frames to replace missing information in damaged ones. The result is the cleaner, clearer and much more detailed film we have today. (Jackson and Shirley 2006)

This is interesting on two counts: First, commenting on a blog post about this film, Melbourne blogger Carl Looper suggested, "Some of that 'boiling' may be a function of the restoration algorithms"; and second, because it suggests an even closer correlation between chemical and digital intelligence at work in the clip. Such multiply nonhuman mediations raise with even greater urgency the question of mediation itself, the processes that mediate between

populations and environments, and in which environments, it now appears, play a significant role. The Diamant system works in precisely the opposite direction to MPEG and other codecs (compression-decompression systems for transmitting video), which compress video signals by removing anything that appears to the algorithm to be extraneous. The principle of capturing the maximum amount of detail is important for the master copy of a film, but for distribution codecs play on the psychological optics of the good enough, trusting the standard observer to skip over damage and fill in visual blanks. Archivists revert to the maximal principle, even at the cost of promoting probability over actuality.

A film, especially in deep focus, has a special claim to actuality in that it records actual motion, or fragments of actual motion. The actual always contains in itself the virtual: Every motion contains in itself the possibility of unforeseen development, only one of which becomes actual in the next frame, but all of which lie latent in the first. The Diamant algorithm, by dint of necessity, extracts from that virtual character of the individual frame an actuality that it interposes in the neighboring frames. The probable substitutes for the virtual in order to produce a new actual—the archival print—that is now what it must in some sense always be, since films as damaged as this cannot be projected. The *Kelly Gang* we see today (NFSA. 2016) is a representation of the film, an idealized representation of an idealized film. Thus, while the film itself slides toward the gel stage, the degradation of its materiality, its restorations migrate toward the Ideal. It is another ironic triumph of the Idea over the existent. It is as impossible to reconstruct the entropic chemistry of decay as to remake the original sixty minutes of *The Story of the Kelly Gang*. The fragments we view are a work of ongoing catastrophe, the work of humans, technologies, and natural processes: time and its space dissolving, the falling apart that is the pixel, the ordering power of reassembling what information we have across frames, the vector of this artifact moving on through time, now and forever pinned to migration from format to format. This is the work of an art which more than any that preceded it owns up to and embraces, if we learn to see, the effervescence of knowing and its perpetual evolutions. That effervescent commonality of human, technical, and natural processes is referred to in what follows as mediation.

Mediations are not communications (though all communications are mediated). Mediating does not require messages, nor even senders and receivers: It would be false to anthropomorphize the nitrate reaction or the semi-automated digital reconstruction as in some way capable of expression or intention. Mediation names the material processes connecting human and

nonhuman events—as the nitric acid catalyst mediates between molecules in the decay of nitrocellulose, and that mediation is mediated again by the Diamant algorithm. Mediation is the primal connectivity shared by human and nonhuman worlds.

Only in some limited and extraordinary cases does mediation become communication. Following Shannon and Weaver (1949), we might say that communication is about distinguishing the message as figure from noise as ground. The distinction prioritizes the distinct units of communication from the chaotic cosmic background. If, in Bateson's (1973, 351) aphorism, information is a difference that makes a difference, noise must be indifferent, and without effect. But then, why try to suppress it? Noise is defined by exclusion: It is what is not communication. But if we do try to grasp noise for itself, when we hear in the static the random burbling of the universe, we should recognize in it the basic flux of mediation, enthralling and distracting as the waves of the sea. Ecologies are not networks connecting previously separate things: Every element of an ecology mediates every other. Life mediates nutrients and sunlight, storing, changing, growing, passing, mutating, returning. *The Story of the Kelly Gang* mediates sunlight, lens, film, the chemistry of nitrate, the politics of archives, and the determinations of digital video. When we speak of the media, we tend to refer to the technological media of the last two hundred years; but everything that mediates is a medium—light, molecules, energy. This flux of mediation is logically prior to communication and to the objects we have learned, through communication, to distinguish from the background hum. The flow of mediation precedes all separations, all distinctions, all thingliness, objects, and objectivity. It precedes the separation of the human and the environmental.

And yet, everywhere in the human world, that flow is parceled out, delayed, amassed, ossified. The question is how, and to what purpose. It is not only that things appear to us as things instead of processes, nor that flux is without form or history. On the contrary, the inevitable mutation that necessarily accompanies mediation belongs to time's arrow, and to the increasing complexity of order as well as its opposite. Life is negentropic, perpetually constructing and defending order. The microcosmic density of ecosystems, human societies, and their interweaving moves toward the increasing mutual mediation of all lives, all deaths. The assertion that the world is composed of things is based on a rejection of this connectedness. Such an ontology of objects would be merely metaphysical were it not for the fact that it describes so accurately the way we see and understand the world. The question is how we, especially in the West, came to see the world this way. In turn, this raises

a question of whether it is our perception that works like this or whether the world has changed. I see the actors playing out the roles of Ned Kelly and his captors, but I also see the film stock raddled by time and rebuilt digitally. Each of them is self-consistent over time, and so I see them as things, but the coincidence of the seething surface and the filmed events is unique and ephemeral as the file plays on my computer screen. It is exactly this ephemerality that ties these "things" into a single process, a mutual mediation. I have learned to see this way, but I can also imagine or learn other ways of seeing. The same is not necessarily true of human mediation. Parceling out the planetary flow of matter and energy involves egregious inequality: Gold accumulates around one person, trash around another. There may well be an ontological truth, that every process is a mediation, and that reality is the archery of time, but there is no denying that the flow of mediations concentrates in bloated fortresses of control that operate by damming up the generosity of life and the mercy of mortality.

We have strong theories as to why the poor collude in their own oppression, but we lack understanding of why power and wealth still accumulate far beyond the capacity of their owners to enjoy them, long after any historical rationale, even to the point of the suicidal inactivity that has frozen the world's leaders in the oncoming headlights of climate change. Nothing oppresses us more than the idea that as things have been, they shall remain: that the only response to a thawing Arctic is to drill for oil there; that there is no Plan B, no alternative. Belief in the primacy of objects goes hand in hand with stronger belief in the potency of subjects, yet all evidence points toward a human polity without masters, in the sense of people who can control it. On the contrary, wealth accumulates, and the individuals standing at the nexus of accumulation are accidental to the process: The CEO is fired but the corporation lives on. In the modern era, the era of capital, accumulation has become an end in itself, systemically oriented against redistribution. A theme of this book therefore is that from a primal interweaving of all processes, we have arrived at a point where the world appears to us as things that must be ordered and amassed. It offers as a preliminary thesis that this process in turn begins in an original sin that severed humans from their environments: the privilege granted to communication, a necessary survival mechanism that, however, has come to risk the survival of the whole ecosystem.

Communication places us in relations of sender and receiver, object and subject, as it creates the distinction between the sovereign as acclaimed source of authority and "the capillary functioning of power" (Foucault 1977, 198) that communicates it. Capillary disposition creates a hierarchy of chan-

nels, the media through which we assemble our polities, and equally in which we construct our technologies, and by means of which we find ourselves confronted by the Other of nature. In the distinctions between polity, technology, and nature are realized their dependence on one another, a dependence that emerges only once the chaos of primal mediation has been organized, as the ancient creation myths begin in the separations of sky from earth, light from dark, sweet from salt water, and land and sea. The foaming surfaces of *The Story of the Kelly Gang*, quite as much as the flickering sheen of the leaves in its backgrounds, recall that primal mediation, yearning for its return. At the same time, as this book sets out to show, even communicating one's love of nature implies damaging it. The corollary of the assertion that every communication is mediated is that every communication is material. Paper, ink, printing presses all require wood, metals, animals, fire, and energy. Mass-circulation print media of the nineteenth century needed steam; the telegraph needed wires and electric generators; photography and cinematography needed silver and plastics from oil and coal. Much of this book is about the deep dependence of contemporary media on energy and materials. To communicate with one another, we also inadvertently communicate our dismissive relation to the humans and natural environments who pay the terrible price for its efficiency, even for its poetry.

But it is also the case that in this mutual dependence of human, natural, and technological there is a utopian orientation toward a future overcoming of their tripartite separation. *The Story of the Kelly Gang* is so emblematic because it presents the mutual mediations of human actors, technological agency, and natural processes. The dominant utopian mechanism today is technology, and its counterfaith is Gaia. It is precisely because that dualism is so potent that it is essential to turn our gaze toward the polity—the assembly of human beings in action—as the site from which might arise any alternative, and therefore by definition any future, since the future is only knowable by its difference from the present and past. It is we ourselves who must become other in order to produce an other world. The correlative is that we must cease to be human, and most of all cease to exist as exclusively human polity, which is the medium of communication par excellence. The road to that goal, however, must lead through the polis, the humanity of humans, and most of all through our communications in order to imagine a way out of stasis.

The decay of archival film is a mirror to the economics of accumulation. Capital gathers, hoards, and invests in a system that claims immortality for itself and dismisses death as something that occurs beyond its purview. *The*

Story of the Kelly Gang speaks intensely of the mortality of the materiality of media. Media are finite, in the sense both that, as matter, they are inevitably tied to physics, especially the dimension of time; and that their constituent elements—matter and energy, information and entropy, time and space, but especially the first pair—are finite resources in the closed system of planet Earth. Because they are finite, media not only cannot persist forever; they cannot proliferate without bounds. There are not enough of certain metals already for everyone on the planet to have the same access to equipment as Western consumers have become used to in recent decades. To create new materials means using up a finite stock of energy sources. The obsessive accumulation of everything that characterizes our era has limits.

For many ecologists, this problem has its origin in overconsumption. For materialists, the source is as likely to be overproduction. The two are difficult to disentangle, but this book leans toward the latter, not only because it offers a more persuasive explanation but because overconsumption is presented to us—politically—as an ethical issue, a matter for individuals, where overproduction is a political matter involving us as social beings. We are all worn down with the almost impossible moral obligation to shop ecologically, and to persuade others to. Ecological crisis, it is argued here, is not the fault of individuals but of the communicative systems, most of all the tyranny of the economy, of money as the dominant medium of twenty-first-century intercourse between humans and our world.

Communication is inextricably bound up in the concept of the commons. As we will see, the idea of common land, and of the open seas and later outer space as commons has a long, divisive history. In 1609, the great jurist Hugo Grotius took as his premise the following thesis:

> Now, as there are some things which every man enjoys in common with all other men, and as there are other things which are distinctly his and belong to no one else, just so has nature willed that some of the things which she has created for the use of mankind remain common to all, and that others through the industry and labor of each man become his own. Laws moreover were given to cover both cases so that all men might use common property without prejudice to any one else, and in respect to other things so that each man being content with what he himself owns might refrain from laying his hands on the property of others. (Grotius [1609] 1916, 2)

The seas fell into the category of things "common to all," but the "all" disguised a deeper belief in who exactly might lay claim to the freedom of the

seas. Grotius, in the first flush of the Dutch Republic's contestation with Portugal for access to the East Indies (Vieira 2003), was contesting the Portuguese claim to own access to the Spice Islands. For Grotius, the regulation of the seas fell under the law of nations. Colonized lands had a different destiny. Where there was evidence of "the industry and labor of each man," there too was evidence of property rights; but since the colonies gave the appearance of unworked lands, they were open to the "improvements" of clearing forests and establishing fields, and therefore to expropriation by the colonizers, regardless of the very different forms of working the terrain and its resources practiced by indigenous peoples. Grotius on this basis made a distinction between *terra nullius*, land that belonged to no one, and *res nullius*, the seas that belonged to all nations.

There thus appeared two forms of commons. In the case of the sea, "Grotius was not basing his argument on the traditional rights of the commons, which tended to be customary rather than codified, but on the limited notion of *res communis* found in Roman law" (Mirzoeff 2009, 292), a legal doctrine defining public goods as property of the *res publica*, the state. In the case of the land, the commons referred not to legal definition but to customary practice, specifically to territory to which everyone had access. As we will see, the contest over what status custom has in law, which precise features of the world can be considered the property of one or many states or one or many individuals, and under what conditions common goods can become private property has been a key feature of environmental history. In our times, the idea of a global commons is offered by influential writers like Hardt and Negri (2009) not as a return to the past but as a future, grounded in tradition but now applied not only to land, water, and air but to knowledge, genetic material, and many other new domains. In what follows, the idea of a return to the commons goes beyond Hardt and Negri in insisting that the new commons cannot be solely human, and that therefore our understanding of what it is to be human needs to change. That task is political, but it is also aesthetic, and deeply engaged in the mediations between humans and their environments, natural and technological.

Three key terms describe what happened to the commons, both in Europe and in colonialism: enclosure, environment, and externality. The enclosure of common land and parceling out of common goods, including the geology lying under the land, the air and the radio spectrum carried through it, the sea and the rivers and waters running into it, was a historical moment, but is also an ongoing process. In many senses, modernity begins with the enclosures that for Marx lay at the beginning of capital, but which also began

the alienation of people from land that created the modern conception of nature (Thomas 1983), and created what we now know as the environment. Environments environ: surround, encircle, circumscribe. They become environments by being excluded from the communicative community alienated from them by enclosure. There is a strange contradiction here between enclosing and excluding. It is made only more complex in a third term, externality. An externality is, in economics, anything that can be used without cost. Workers, land, and machinery have to be paid for, but air is free. Firms can use as much of it, and dump as much waste into it, as they wish, without having to pay. Today, legislation applies a cost to the use of common goods like water, and to polluting common benefits like the atmosphere, but those costs are often minimal compared to profits, and treated accordingly. Nature, natural reproduction of species, and harvesting wild foods and medicines require investment in everything except the natural processes they rely on. These are the environments that become economic externalities. Enclosure makes something property: under Grotius's principles, what is not property is there to be exploited by anyone who cares to exploit it. The fate of communication in the modern world is tied up in the translation of the commons through enclosure, environmentalization, and externalization. These processes are not only historical but major features of the contemporary geopolitics of ecology, features that make it essential to consider the aesthetics of media and communication in direct relation to contemporary forms of colonialism. Following in the footsteps of the work done, among many other eco-critical thinkers of the materiality of media, by Grossman (2007), Feilhauer and Zehle (2009), Gabrys (2010), Maxwell and Miller (2012), and Parikka (2015), eco-politics and eco-aesthetics must be thought through in the context of post- and decolonial movements. Media and mediation cannot be separated from their environmental impacts, but for that very reason they are privileged tools in creating a future other than our dark now.

The archived footage resurrected in *The Story of the Kelly Gang* might be considered a microcosm of this potential: The film has grown and changed with its material substrate as that went through its secret and inhuman chemical afterlife. An environment and its inhabitants coevolve. A species does not discover an environment waiting for it. It cocreates that environment by acting in it, eating, excreting, building, reproducing, dying. Ecology is a science of relations and mediations, in which innumerable interactions must constantly re-create the end points "environment" and "inhabitant." These termini do not originate communications: The buzzing, blooming, interconnected flows of mediation come first, construing as needed from the

materials at hand the partners, from cells to ecosystems, that will be so mediated. This is the environmentalist account not just of natural but of human history. Too often we presume that the nonhuman has autonomy from human affairs, save only when anthropogenic processes threaten natural cycles. It is a direct consequence of such thinking that gives precedence to preserving wilderness over relationships between the human population and the environing world. Such anti-anthropocentrism reflects an ideal, not the actual circumstances. The aesthetic of mediation is political to the extent that it is mediated through public administration and never exists as pure immanence. If eco-critique is to have a political role, it must address the human as well as the organic, the environment of data centers, Tijuana maquiladoras, the recycling villages of southern China, and the habitat of London's North Circular Road quite as much as Antarctica.

The first chapters start from the premise that the Earth has finite resources, and that mediation depends upon them and their limits. They address in turn energy and matter. The first chapter engages with energy use and transmission, and then with the sources of energy in fossil fuels, nuclear power, and hydropower projects; and the second with materials, manufacture, and recycling. The environmental and human consequences tell a dark tale of colonialism, genocide, devastated ecologies, toxicity, extinctions, and a shameful legacy that will take more than decades to make right. Together these chapters advance the thesis that we are already ruled by cyborgs, vast biocomputer hybrids characterized by their lack of shame, their obsession with profit, their inhumanity, their suicidal tendency, and the integration of waste into their life cycle. They pay special attention to the burdens placed on the poor, in the megacities of the Global South, and among indigenous peoples. The intellectual and spiritual obligations owed by the green movement to First Nations is immense, but has not altered the ongoing destruction of indigenous lands and cultures. The price they pay for our media is a recurrent theme. The emphasis in the chapters on energy is on the scale of human suffering involved in environmental catastrophe, not in the future of climate change, but in the present and immediate past of energy generation and transmission, resource extraction, manufacture, and toxic waste.

The stories of heroic struggles, and some rare successes, against those who would despoil them is heartening (EJAtlas.org 2015), but does no more to resolve the structural problem of media's ecological impact than the injunction to consumers to save power. Chapter 2 therefore addresses suprana-

tional governance structures and attempts to understand how it is that they can organize sophisticated global structures to enable communications, but cannot make a decision about energy and other ecological topics. This too is a sad tale. The failure of political elites and the cyborg corporation to provide a decent living for the majority of the world's population, while destroying the very bases of the wealth they crave, would be a tragic spectacle, if it were the story of a human being.

The last two chapters turn toward the second great theme of the book, ecology as mediation. Inspired by pioneers of eco-critical humanities including Dipesh Chakrabarty (2009), Nicholas Mirzoeff (2014), the contributors to Tom Cohen (2012) and Henry Sussman's (2012) critical anthologies, and Joanna Zylinska (2014), these chapters take up McKenzie Wark's (2015) challenge: "Let's take this world-historical moment to be one in which to reimagine what the collective efforts of everyone who labors could make of the world, and as a world." The third chapter looks at how mediation between human population and environment defines politics, and has always been conducted through the capillary organization of technologies, in the first tools, the earliest rock art, and the oldest poetry. This "originary prostheticity" (Stiegler 1998, 98–100), the technology that is always human and the humanity that is always technological, is composed of media, from rituals to scientific instruments. These mediating technologies that are at the same time instruments of government divide and recombine relations between humans, and between humans, their environments, and the mediating technologies themselves. What environs us today, the environment of the twenty-first century, is no longer only what we call nature but the secondary environments of technology and data, with the human body in the process of also becoming an environment. Assessing potential economic, social, and political resources for change, it becomes apparent that the conditions under which we find ourselves demand a revolution in communications, a fundamentally aesthetic politics.

When Marx (1974, 820) wrote of the "realm of freedom" that "begins only where labour which is determined by necessity and mundane considerations ceases," he might have been speaking of the eudaemonistic ethics endorsed in this book, an ethics whose goal is the good life, a terrestrial paradise pursued through and realized in open communication of and between differences. Environmental criticism requires an elaborated theory of mediation, a concept that this book attempts to refine by testing it against the story of the materials that media are made of. Where other disciplines and professions take as their goal a specific good—health, shelter, justice, knowledge,

wealth—the arts, humanities, and the best of the social sciences undertake to debate these values and the weighting we should give them. When social science and humanities scholars remember this calling, we do our true work, which is to discuss what is the good life and how we are to live it. How are we to balance the claims of equality and wealth, freedom and justice, security and discovery? What is the value of harmony or peace? Can the aesthetic values of truth, beauty, and the good inform a realistic politics today? These questions may not be answerable, or not now. Where other vocations work toward solutions, the humanities' unhappy brief is to unearth problems. Environmentally informed critique is especially rich in problems. Our situation is appalling, our prospects bleak. The object of eudaemonistic politics is the collective good life, a life and a collectivity that is aesthetic and which, if the arguments in the first section are correct, must of necessity embrace more than the human privilege. Political aesthetics must recognize the desperate conditions we are in, if it is to create a meaningful alternative or identify signals from the internal contradictions of existing conjunctures and from new forms of cultural, political, and economic practice. Methodologically it embraces three tools: consideration of the complex interacting factors that produce a situation, event or instance; wonder at their extraordinary results, prepared to believe the evidence of its own eyes against habits of thought; and hope for the building of a good life for all, without exception and without favoring our own species. Not rescued from ruin but rescued as ruin, *The Story of the Kelly Gang* demonstrates that another and more inclusive commons is possible, but that it must be built out of the wreckage of the past.