The Marvelous Clouds

Toward a Philosophy of Elemental Media

John Durham Peters

THE UNIVERSITY OF CHICAGO PRESS CHICAGO AND LONDON

JOHN DURHAM PETERS is the A. Craig Baird Professor of Communication Studies at the University of Iowa. He is the author of *Speaking into the Air* and *Courting the Abyss*, both also published by the University of Chicago Press. He lives in Iowa City.

The University of Chicago Press, Chicago 60637
The University of Chicago Press, Ltd., London

Printed in the United States of America

24 23 22 21 20 19 18 17 16 15 1 2 3 4 5

ISBN-13: 978-0-226-25383-1 (cloth)
ISBN-13: 978-0-226-25397-8 (e-book)
DOI: 10.7208/chicago/9780226253978.001.0001

Library of Congress Cataloging-in-Publication Data
Peters, John Durham, author.
The marvelous clouds : toward a philosophy of elemental media / John Durham Peters.
pages cm
Includes index.
ISBN 978-0-226-25383-1 (cloth : alk. paper) —
ISBN 978-0-226-25397-8 (e-book)
1. Communication—Philosophy. 2. Written communication. 3. Internet. I. Title.
P91.P48 2015
302.2'01—dc23

2014044823

♾ This paper meets the requirements of ANSI/NISO Z39.48-1992 (Permanence of Paper).

“By small and simple means are great things brought to pass.”
—Alma 37:6

“The mid-world is best.”
—Ralph Waldo Emerson

Contents

Chapter 1

Understanding Media

"Einer Hilfe bedarf der Mensch immer."
(The human being always needs a help.)—F. W. J. Schelling

A Medium Must Not Mean But Be

In his wonderful memoir *A Tale of Love and Darkness*, Amos Oz recounts how his parents in late 1930s and early 1940s Jerusalem would periodically make a long-distance call to relatives in Tel Aviv. Every three or four months the occasion would be solemnly arranged in advance by letter. The families on each end would meet by a pay phone at the designated hour after a long countdown. "Then all of a sudden the phone would ring in the pharmacy, and it was always such an exciting sound, such a magical moment." After all the buildup the conversation went like this: "What's new? Good. Well, so let's speak again soon. It's good to hear from you. It's good to hear from you too. We'll write and set a time for the next call. We'll talk. Yes. Definitely. Soon. See you soon. Look after yourselves. All the best. You too." And then they hung up and went back to corresponding about the next call, months away. Oz, who can be one of the funniest storytellers anywhere, plays on the humor of a conversation that is over as soon as it begins. But a series of calls discussing future calls was not just an absurdist cycle. Oz's family members weren't calling to trade news but to do something more primal—to hear each other's voices, to as-

sure themselves that they were still alive, present in real time. They were doing something as profound as the seventeen-year locusts emerging to sing and breed for another cycle. Each phone call was nervously hedging against the prospect that it might be their last, every "soon" an act of hope. The telephone as a lifeline was magnified by historical circumstances: the fate of the Jews in Palestine and Europe hung by a thread, and how bad it was in Europe was just starting to be known.[1]

Oz's kin were sharing tokens of presence by means of a communications infrastructure. The import of the call was existential, not informational. The two parties had nothing to say, but everything to mean. Seeing communication as disclosure of being rather than clarity of signal frees up the notion of "medium" for greater service. The media of sea, fire, star, cloud, book, and Internet all anchor our being profoundly, even if we can't say what they mean. The same is true for the body, as it is for nature generally, the ultimate infrastructure. [2] Wittgenstein once said: "In der Mathematik ist *alles* Algorismus, *nichts* Bedeutung."[3] (In mathematics *everything* is algorithm, *nothing* is meaning.) He could have said the same of media. And of music. And of most things that really matter.

A medium must not mean but be. Oz's relatives were maintaining their ecosystem of relations before they were trading updates. Even among people, media of all kinds serve elemental roles. Once communication is understood not only as sending messages—certainly an essential function—but also as providing conditions for existence, media cease to be only studios and stations, messages and channels, and become infrastructures and forms of life. These material, environmental senses inform the recent reach of the media concept beyond messages to habitats.[4] Media are not only important for scholars and citizens who care

1. Amos Oz, *A Tale of Love and Darkness*, trans. Nicholas de Lange (Orlando: Harcourt, 2005), 10–11, 13.

2. Paul N. Edwards, "Infrastructure and Modernity: Force, Time, and Social Organization in the History of Technical Systems," *Modernity and Technology*, eds. Thomas J. Misa, Phillip Brey, and Andrew Feenberg (Cambridge, MA: MIT Press, 2002), 185–225, at 196.

3. Ludwig Wittgenstein, *Philosophische Grammatik*, *Schriften*, vol. 4, ed. Rush Rhees (Frankfurt: Suhrkamp 1969), 468.

4. Peter Simonson, "Our Places in a Rhetorical Century," keynote address, Rhetoric Society of America, Boulder, Colorado, 24 June 2011, associationdatabase.com/aws/RSA/asset_manager/get_file/35611.

about culture and public opinion, but for everyone who breathes, stands on two feet, or navigates the ocean of memory. Media are our infrastructures of being, the habitats and materials through which we act and are. This gives them ecological, ethical, and existential import. There is little as marvelous as the sea, the sky, or another person's presence, but most philosophy of media has rushed past these elements too quickly. Birds sing, says Charles Hartshorne, not only because they are defending territory or attracting a mate, but because natural history has endowed them with a love of singing such that birdsong in some way participates in the striving for form and fitness that is the essence of evolution itself.[5]

At some level, expression and existence merge. This chapter explains the intellectual landscape for this rethinking of the media concept.

1964 in Jubilee

Marshall McLuhan's *Understanding Media* (1964) recently celebrated its fiftieth anniversary, and this book revisits his claim that media are not only carriers of symbolic freight but also crafters of existence. In the heyday of the broadcast era, a time in which the few addressed the many by means of mass communication, McLuhan protested that media were themselves the message and took media in a radically diverse way, with roads, number, housing, money, and cars figuring in his analysis alongside more typical twentieth-century media candidates such as advertising, movies, and telephones. Both of these moves—ontologizing and pluralizing of media—make him strikingly relevant in the digital era. McLuhan helped invent media studies in the spirit in which I pursue it, though the field both has and deserves a wider lineage. Much is maddening about McLuhan—his obscurity, mischievousness, and willingness to make up or ignore evidence—but his brilliance covers a multitude of sins. He has become an unmissable destination for media theorists. Essential are his ideas that each medium has a grammar, an underlying language-like set of protocols for arranging the world and the organs of

5. Charles Hartshorne, *Born to Sing: An Interpretation and World Survey of Bird Song* (Bloomington: Indiana University Press, 1992).

sensation into a distinct "ratio," and that new media can both extend and do violence to ("amputate" was his term) the bodies of those coupled with them. He had an outstanding library at his disposal and read it well.[6]

But *Understanding Media* was not the only key work of media theory from 1964. It shares a joint jubilee with the French paleoanthropologist André Leroi-Gourhan's monumental two-volume work *Le geste et la parole*, from 1964–65, translated as *Gesture and Speech*. This treatise offers an evolutionary account of human anatomy and its shaping by language and tools. The two books have an uncanny convergence in some ways: *Understanding Media* treated technologies as extended bodily organs; *Le geste et la parole* treated bodily organs as extended technologies.[7] Some other books from the same year deserve a mention as well: Stanisław Lem's *Summa technologicae*, Norbert Wiener's *God and Golem, Inc.*, Stuart Hall and Paddy Whannel's *The Popular Arts*, Herbert Marcuse's *One-Dimensional Man*, Claude Lévi-Strauss's *Le cru et le cuit*, Margaret Mead's *Continuities in Cultural Evolution*, and Gilbert Simondon's *L'individu et sa genèse physico-biologique*. The year 1964 was a good time to be thinking big thoughts about technology, culture, and society. McLuhan and Leroi-Gourhan, Lévi-Strauss and Simondon, Lem and Wiener especially saw the convergence of biological and technical evolution, and Lem and Wiener probed even the theological stakes of the collaboration of life and programming.[8]

Leroi-Gourhan has been very important for continental, especially German, media theorists because he thinks as they do—that is, morphologically, in terms of the stretchy bounds of possibility, the intertwining of form and matter, with an acute sensitivity to the technical pressures exerted upon bodily shape. For Leroi-Gourhan, the evolutionary history of the human body is inseparable from language and technology. He is the great theorist of the essential technicity of human beings. His stamp

6. For an excellent recent treatment, see Florian Sprenger, *Medien des Immediaten: Elektrizität-Telegraphie-McLuhan* (Berlin: Kadmos, 2012).

7. See Michael Cuntz, "Kommentar zu André-Georges Haudricourt's 'Technologie als Humanwissenschaft,'" *Zeitschrift für Medien- und Kulturforschung* 1 (2010): 89–99 at 89, and Kyle Joseph Stine, *Calculative Cinema: Technologies of Speed, Scale, and Explication* (PhD diss., University of Iowa, 2013), 237–58.

8. See my "Philosophy of Technology 1964/2014," Södertörn Lectures, 11 (Huddinge, Sweden: Södertörn University, 2014).

will be evident in this book, especially but not only in chapter 6, which treats his relevance for a theory of the body as a medium. Certainly not all of his claims hold up after five decades of ongoing archaeological and genetic research. (For that matter, many of McLuhan's claims don't hold up today, perhaps mostly because they didn't hold up in 1964. One reads McLuhan for sparks, not scholarship.) Leroi-Gourhan showed the coevolution of the human musculoskeletal form with techniques such as walking, gathering, chewing, speaking, drawing, writing, and remembering. He understood that the intertwinement of embodied practice and technical objects went from cranium to toe. For him the human condition was defined precisely by our standing on two feet—and by our consequent impossibility of separating nature and culture.

McLuhan and Leroi-Gourhan are not my only inspirations here. Media studies is a many-splendored field, packed with interesting studies and questions. Media scholars typically study print, broadcast, film, and Internet institutions and practices and their larger social, political, cultural, and economic consequences. Nearly three decades ago, Elihu Katz looked at this work and divided media studies, like Gaul, into three parts. He saw three streams conceiving media as givers of information, ideology, and organization. The first was a largely social-scientific tradition of empirical research on people's attitudes, behavior, and cognition in a mainstream political framework; the second was a family of critical approaches to media as battlegrounds of domination and resistance; and the third focused more historically on how media technologies shape underlying psychic and social order.[9]

Though much has happened since, Katz's diagnosis helps to show the edge space in which this book sits, namely, the third or technological tradition, which is also of course empirical and critical in its way, though it is much more liberal in what it admits into the object domain of media studies. If most mainstream media studies see media as objects or institutions, the tradition I present takes media as modes of being. Most of the recent interest in media among humanists fits in this tradition as well, and often ignores Katz's other two traditions, with their interests in audiences, institutions, and political economy, which can be a regret-

9. See Elihu Katz, "Communications Research since Lazarsfeld," *Public Opinion Quarterly* 50 (1987): S25-S45.

table omission; I personally want no part of a media studies that has altogether lost the ballast of empirical investigation and common sense.[10] The third way would include American writers such as Lewis Mumford and James Carey, Canadians such as Harold Innis and McLuhan, Frenchmen such as Leroi-Gourhan and Bruno Latour, and Germans such as Martin Heidegger and Friedrich Kittler. These figures, not all of whom recognize "media" as their central theme, take media less as texts to be analyzed, audiences to be interviewed, or industries with bottom lines than as the historical constituents of civilization or even of being itself. They see media as the strategies and tactics of culture and society, as the devices and crafts by which humans and things, animals and data, hold together in time and space. We will examine them in turn.

Leverage

Harold Innis was one of the first to insist that infrastructure should be at the heart of media theory. As a Canadian nationalist who had an acute sense of how the British, French, and American empires shaped his country's economic history and culture, and as a traveler in birch-bark canoes and railroads along old trade routes in the Canadian wilderness during research for his classic history of the fur trade, Innis was a connoisseur of chokepoints. Like Mumford, he thought media history had to be part of the history of warfare, mining, forestry, fishing, writing, and printing. (Mumford, a more sensuous thinker, would add loving, building, and making.) Like Carey, Innis thought the fact of media more important than what was relayed. A non-Marxist critical theorist, Innis was part of a mid-century chorus. The Frankfurt School, for instance, tended to see the special power of media exercised through the fabrication of dreams that teasingly placated social discontent with too easy visions of a better world, but Innis saw power at work on lower rungs of the abstraction ladder. He was interested more in organization than in content. Innis first studied staples such as fur, fish, and timber, later reconceiving

10. One example is W. J. T. Mitchell and Mark B. N. Hansen, eds., *Critical Terms for Media Studies* (Chicago: University of Chicago Press, 2010), an otherwise strong collection that reinvents media studies without regard to decades of social-scientific work.

staples as media and focusing on materials for the fabrication of written records, such as stone, clay, papyrus and paper, whose varying fortunes he traced from Egypt and Babylon through Greece, Rome, and Europe to twentieth-century North America. Innis saw media as spinners of time and space, and the whole expanse of human history as their stage. Innis's practice of media history as a mastery of detail is, as noted, inspirational for this work.

Someone with Innis's perspective never would have dreamed of using the term "old media" for the twentieth century. Impressed by digital media—smaller, faster, mobile, and programmable, scurrying like lithe little mammals around the old broadcast dinosaurs—many have come to call the great news and entertainment industries of the twentieth century "old media." They were actually "mass media," which is something more specific. Compared to mass media, digital media did seem like an enormous historical rupture. But if we place digital devices in the broad history of communication practices, new media can look a lot like old or ancient media. Like "new media," ancient media such as registers, indexes, the census, calendars, and catalogs have always been in the business of recording, transmitting, and processing culture; of managing subjects, objects, and data; of organizing time, space, and power. Media as large entertainment machines that provide news and entertainment on tap in a constant "flow," as Raymond Williams called it, are relatively unusual. The chief mode of communication in the heart of the twentieth century—audiovisual broadcasting—is the historical exception. Digital media return us to the norm of data-processing devices of diverse size, shape, and format in which many people take part and polished "content" is rare. Media offer utilities of many flavors, of which mass narrative is only one.[11] Innis is one of many who gave us a notion of media as vessels of storage, transmission, or processing. This definition is of great historical span, fitting both the hard drive and the abacus.

Media are not exclusively modern; in different shapes and sizes media have contributed to the history of life on earth and perhaps elsewhere. They are fundamental constituents of organization. They compose cities and beehives, archives and asterisms. There have been human media since the great pyramids and biblical scrolls, since the Persian postal sys-

11. My essay in Mitchell and Hansen, *Critical Terms*, develops these themes.

tem and Roman census, since Venetian counting houses and medieval cathedrals, since the emperor Qin Shihuang standardized Chinese characters, weights, and measures, began work on the Great Wall, and burned the books, thus unifying the Middle Kingdom for better or worse. Before civilization, humans had media such as graves, baskets, stars, families, and fire. We should never talk as if media did not exist before 1900 or 1800 (even though the ability to talk about media in this transhistorical way only emerged in the mid-twentieth century). All complex societies have media inasmuch as they use materials to manage time, space, and power. Kittler's point, that culture was always already a procedure of data processing, follows confidently in Innis's path. Kittler's word was *Kultur*, a term that can mean both "culture" and "civilization"—and, never shy about grand claims, he certainly meant to include both.

Innis always returned to the principle of leverage. By leverage I mean straightforwardly using a point to concentrate force over people and nature. Kingcraft, writing, control over irrigation, and calendrical prognostication were ancient techniques for funneling power to elites. Patriarchy, the concentration of power in the phallus, likewise exploits a small lever capable of large political and economic effects, and has been the rule since the beginnings of civilization, which can be understood as a systematic favoring of paterial over material powers. Civilization exploits fulcrums of all kinds: give me a point at which to stand, said Archimedes, and I will move the earth. (Hunter-gatherer societies never had such dreams or means of grandeur, and indeed most people on earth still live without access to the massive power that accrues to brokers, secretaries, and others who preside at switch points.)

One such fulcrum is documentation, discussed more in chapters 6 and 7. *Quod non est in actis, non est in mundo*: what is not in the documents is not in the world. Philip II, king of Spain during its seaborne empire's apex in the sixteenth century, liked to repeat this saying to justify the heaps of paper his mapping and information-gathering bureaus generated to administer his far-flung operations. So do recent media theorists. The saying's pithy expression of the ways in which data can both picture and manage the world has made it a favorite topos in work by German media scholars fascinated with processes that represent by intervening and intervene by representing, thus breaking down the old binary of map

and territory.[12] Like entrepreneurs, hackers, and revolutionaries, media theorists think in the ablative case: "by means of which."[13] Media are not only about the world; in ways it is our task to specify in these pages, they *are* the world. For most of my undergraduate students, a lost mobile phone means a lost limb or brain. Their lives are much more than their phones, but they live *by means of* them. These devices are the narrow gate through which their mental and social metabolism passes.

Philip's dictum also nicely evokes Innis's sense for the ways in which brokers and intermediaries—those who control the files, stand at the switch, or speak two languages—are the ones who earn fortunes and make and break empires. One of Innis's key insights was that each new medium breeds a cadre of specialists who figure out how to manipulate and program its special carrying capacities and standards. For Innis, the history of media was also an occupational history, the history of craftspeople who master medium-specific tactical skills and guard access to them—in a "monopoly of knowledge" as he called it—and then leverage that advantage to their gain. Egyptian hieroglyph-writing priests and medieval guilds provided him with vivid examples. The vast power and wealth of high-tech entrepreneurs is a more recent case. Media properties and quirks, when mastered, reveal fresh possibilities of control. (Media typically have narrow pass-through points. The same is true for living organisms.) For Innis, the task of the media historian was to understand the mischievous ratios of time, space, and power, and the blind spots and bottlenecks of infrastructures that earlier operators had figured out how to leverage.

Media have a world-leveraging power. Lenin was thinking ablatively when he saw that the key position in the Soviet Communist Party was that of secretary, since all documents passed the secretary's way, and he used it (supplemented by a wide range of other forms of ruthlessness) to gain control of the party, leading to the peculiarity that subsequent Soviet leaders were general secretaries rather than presidents. (He also

12. For instance, Cornelia Vismann, *Files*, trans. Geoffrey Winthrop-Young (Stanford, CA: Stanford University Press, 2008), 56; Siegert, *Passage*, 66 ff.

13. Marshall McLuhan to Walter Ong, 8 February 1962, *Letters of Marshall McLuhan*, ed. Corrine McLuhan, Matie Molinaro, and William Toye (New York: Oxford University Press, 1987), 285.

thought the secretary had more working-class street cred.) Lenin understood the power of recording and transmission, how traffic in documents passes for traffic in things. His successor Stalin understood something similar: the power of the editor's pencil to alter history. Stalin's pencil was one of the most lethal weapons ever, and the number of deaths that flowed from it will probably remain unknown.[14]

In media the sign *is* often the thing. The news media not only report the news: they make the news. Did William Randolph Hearst's *New York Journal* report the outbreak of the Spanish-American War or cause it? In journalism the breaking of a story is often the story itself. The headline declaring that one candidate has won the political debate not only reports events; it shapes them. Google and Facebook partake of a similar possibility-fixing power. My undergraduate students say that their romantic lives are not real until they are certified on Facebook. In real estate the title is not the house, but they who own the title also own the house. You still exist without identification papers in a foreign country, but in many practical ways you do not. Channel characteristics are not just trivialities; they are levers of abundant interest in their own right. For want of a nail, the kingdom was lost. Options traders buy and sell contracts, not tulips, wheat, or sides of beef. They traffic in dates and deals, not in goods. But hold onto the option too long, and you may end up with a vast shipment of wheat on your doorstep.[15] Sports are similarly unsentimental: it matters not what you are capable of, but what you do when it "counts" (i.e., when the public gaze of documentation is watching; we call athletic achievements "records.") The superpositioning of data over commodities, documents over values, and records over events lies at the heart not only of modern capitalism but of media operations in general.[16] Wherever data and world are managed, we find media.

14. Holly Case, "The Tyrant as Editor," *The Chronicle Review*, 11 October 2013, http://chronicle.com/article/Stalins-Blue-Pencil/142109/, accessed 11 October 2013.

15. James W. Carey, "Ideology and Technology: The Case of the Telegraph," *Communication as Culture: Essays on Media and Society* (Boston: Unwin Hyman, 1989), 216–22.

16. On modern capitalism and the invention of "Wertpapiere," see Werner Sombart, *Die Juden und das Wirtschaftsleben* (Leipzig: Duncker & Humblot, 1911), chap. 6.

Technik and Civilization

So-called new media have pushed the logistical role of media back to center stage. We live in a palimpsest of new and old. Despite occasional prophecies of decline, the most fundamental media are still with us. Body, voice, and face remain at the heart of all our interactions, as writing does at the heart of all our transactions. For that matter, the mass media of radio, television, film, and journalism soldier on, often pressed into new shapes. Old media rarely die; they just recede into the background and become more ontological. The exception might be Western Union ceasing to send telegrams in 2006, but one might also say that the telegraph did not die: it was just absorbed into the internet.

All media raise perennial problems of life in civilization. "These marvels (like all marvels) are mere repetitions of the ages," said Melville.[17] Digital media have rendered a historical and imaginative service: their endless tagging, tracking, and tracing of our doings reminds us that data management for power, profit, and prayer is both ancient and modern. Collection of useful indicia from populations is as basic a task for communication systems as the offering of drama and news. Computation, broadly speaking, runs from ancient priests watching the stars to modern ones mining "the cloud." Some administrations can take data management to baroque extremes, as in the case of Renaissance Europe, but states have always in some sense been information states.[18] The history of new media is old.[19] "Out of old fields," said Chaucer, "comes all this new corn."

Much new corn in media studies has been brought forth in the German language. This book is not the place to sketch the story and increasingly varied (domesticated) strains of so-called German media theory or the life and thought of its foremost and most controversial practitioner, Friedrich Kittler (1943–2011), though it takes its bearings from this rich body of work. Here I want to underscore the infrastructural sensibility

17. Herman Melville, *Moby-Dick* (New York: Norton, 1967), 181.

18. Jacob Soll, *The Information Master: Jean-Baptiste Colbert's Secret State Intelligence System* (Ann Arbor: University of Michigan Press, 2009).

19. Benjamin Peters, "And Lead Us Not into Thinking the New is New: A Bibliographic Case for New Media History," *New Media & Society* 11 (2009): 13–30.

and metadisciplinary ambitions of German media theory, focusing on Kittler for the sake of convenience.[20] (Note that each term in *German media theory* is troublesome.)

Kittler loves to swerve away from whatever seems most obviously of humane interest and to instead focus on the structures behind it. Content is always an epiphenomenon. The book that made him famous and caused a major crisis in the academic establishment of German literature (*Germanistik*) was *Aufschreibesysteme 1800/1900* (1985), translated into English as *Discourse Networks*.[21] For Kittler, *Aufschreibesysteme* (literally, inscription or writing-down systems) were mixes of wetware, software, and hardware. They consisted of embodied agents such as mothers or doctors, cultural processing algorithms such as educational policies and psychiatry, and technical media such as writing or phonographs. As a research method, the hunt for discourse networks paired up unsuspecting synchronic bedfellows and saw literature, human beings, and mind as effects of such networks. Kittler sometimes had a chip on his shoulder and was a sarcastic controversialist in battling all forms of what he took to be academic nonsense. (Fortunately for the would-be pugilist, there is a never-ending supply.) Much could be said about his crotchets, errors, and genius: his disdain for social history, his love of war technology, his curious gender politics, and the ways in which his reflections about the media of knowledge making were partly reconnaissance missions for a remarkably successful military campaign on behalf of media studies in Germany. But how creatively the man could think, and how stimulating he always was to read, listen to, or talk to!

In any case, Kittler clearly launched the next evolutionary step in media studies.[22] Useful here is his notion that media form a needle's eye for novel historical and existential possibilities, a notion that spans his middle work on hardware and his last phase on Greek cultural tech-

20. For the best single introduction, see Geoffrey Winthrop-Young, *Kittler and the Media* (Cambridge: Polity, 2011).

21. Ute Holl and Claus Pias, "Aufschreibesysteme 1980/2010: In memoriam Friedrich Kittler," *Zeitschrift für Medienwissenschaft* 6 (2012), 114–92, present eleven evaluations as well as Kittler's unpublished foreword.

22. See Till A. Heilmann, "Innis and Kittler: The Case of the Greek Alphabet," in *Media Transatlantic: Media Theory Between Canada and Germany*, ed. Norm Friesen, Richard Cavell, and Dieter Mersch, www.mediatrans.ca/Till_Heilmann.html.

niques. Writing was the "Engpass," or strait and narrow gate, through which all meaning had to pass before the analog media of the late nineteenth century (sound recording and cinema) broke onto the scene. The phonograph and the camera recorded temporal process, including white noise, thus breaking the monopoly of the signifier. Time axis manipulation broke the regime of real time—and this brilliant point is central to this book, especially chapter 6. Optical, acoustic, and alphabetic data flows created distinct technical and experiential regimes. On the radio we were dumb and blind, but our ears stretched over great distances of space; on the telephone we were blind but our voices and ears could span the same distances; with the phonograph we could hear into the past. Quite like McLuhan, Kittler saw how each medium extended and handicapped the human sensorium.[23]

In his last, incomplete work on music and mathematics, eccentric and rare in almost every way, Kittler treated the Greek alphabet as the checkpoint through which Hellas had to pass. As if to defy centuries of European opinion, he did not think the great thing about ancient Greece was its drama, ethics, or politics: it was its media system, consisting of combined letters, numbers, and tones. For Kittler, the world-historical breakthrough of ancient Greece was not the philosophy of Plato or the tragedies of Euripides, which he, following Nietzsche, vigorously disdained: it was rather the invention of an alphabet with vowel notation that could act as a processing medium for poetry, mathematics, and music all at once, like a universal computer before the fact. Here he built on Heidegger by making media keys to nothing less than the history of being (*Seinsgeschichte*). Media for Kittler are world-enabling infrastructures; not passive vessels for content, but ontological shifters. Inconspicuous vehicular transformations can have gigantic historical effects. History's passage does not restrict itself to humans: being, after all, is large and contains multitudes.

Kittler reserves a special spot in paradise for what we might call the engineers of being, from Archytas to Alberti to Alan Turing. In each case he treats programmers rather than philosophers as history's most im-

23. See Kittler's introduction to *Gramophon Film Typewriter* (Berlin: Brinkmann und Bose, 1986); *Gramophone, Film, Typewriter*, trans. Geoffrey Winthop-Young and Michael Wutz (Stanford, CA: Stanford University Press, 1999).

portant actors. Archytas was Plato's contemporary and probably his acquaintance: whereas the latter's enormous legacy, in Kittler's opinion, was almost entirely destructive, Archytas first defined the quadrivium (the cluster of ancient mathematical arts), was the first engineer, and invented acoustics and percussion as a musical form. Western education fixed on the wrong man: Plato loosed "ideas" on the world, but Archytas showed us how to study sound, build catapults and rattles, and play the Pythagorean music of the spheres. Alberti, the fifteenth-century Florentine humanist, mixed theory and practice in architecture, perspective painting, and cryptography, and thus exemplifies one of Kittler's recurrent themes: that the Italian Renaissance, retrospectively so celebrated for its humanism, was great actually because its artists were engineers.[24] Alan Turing, one of Kittler's enduring heroes, is the arch-programmer, the great mathematical and code-breaking genius who stands for the computational inventions that have remade the ways in which we process and access the world. For Kittler, Turing was the key figure of our epoch: ours was the *Turing-zeit*, the era of Turing.

Late in life, Kittler sometimes expressed doubts about the concept of media. For my part, I think there is plenty of sugar left in the old beet. Part of Kittler's complaint was that *Medienwissenschaft* had been institutionalized as one academic field among many. He thought media studies should consider the media of study in general. For him, as for McLuhan, media studies was not just one more field to stir into the interdisciplinary mix, but the field of fields, one either "post" or "meta" that could reorganize and engulf all the others. Of course, media studies is known for ambitious statements about itself and many other things. (McLuhan had his share of such statements.) In his most famous or notorious utterance, Kittler wrote: "Media determine our situation." Another was his declaration of what he called information-theoretic materialism, an update of Philip II: "Nur was schaltbar ist, ist überhaupt." *Schaltbar* is hard to translate, suggesting being plugged into an integrated circuit, but the gist of the statement is: Only that which is networkable or switchable exists at

24. Friedrich A. Kittler, "Leon Battista Alberti," *Unsterbliche: Nachrufe, Erinnerungen, Geistergespräche* (Munich: Fink, 2004), 11–20.

all.[25] If Google can't find you, you don't exist. Wiring precedes being. Beyond the network there is only the *Ding-an-sich*. Grids and circuit boards are ontological in their effects. At its most ambitious, media studies sees itself as a successor discipline to metaphysics, as the study of all that is.

For Kittler, both philosophy and the humanities in general refused to think about techniques, and the enormous price was blindness to the history of being.[26] In Kittler's most radical view, media studies was a privileged form of seeing being as mediated. It was a way-of-seeing field, not an object field. Kittler saw a postdisciplinary kind of media studies that did not tarry at the well-tilled crossroads of humanities and social sciences, but went to the natural sciences, mathematics, engineering, medicine, and military strategy. His late criticism of media studies turned on his productively arrogant claim that knowledge is knowledge, that there is no such thing as special field knowledge of any sort, whether *Medienwissenschaft* or any other. He was ever the rebel against specialization, with all the risks such rebellion entails. In roving broadly into many fields, Kittler made plenty of amateur errors, something that I am certainly in no position to criticize. Another of his dicta deserves more fame than it has received: "Simple knowledge will do."[27]

The idea that media studies could include what recent academic jargon calls the STEM fields is clearly salutary.[28] Indeed, media studies is one confluence of knowledge that defies the old split of *Geist* and *Natur*. More than three decades ago we were told that the innovative exchanges were happening between the social sciences and the humanities,[29] but today humanists have rediscovered the natural sciences with fresh force. And with good reason. Nature turns out to be profoundly historical. Evolutionary biology has shown just how remarkably plastic species are, as populations adapt quickly to environmental exigencies across genera-

25. Friedrich Kittler, "Real Time Analysis: Time Axis Manipulation," *Draculas Vermächtnis: Technische Schriften* (Leipzig: Reclam, 1993), 182–207, at 182.

26. Friedrich Kittler, "Towards an Ontology of Media," *Theory, Culture and Society* 26 (2009): 23–31.

27. *Gramophon Film Typewriter*, 5, *Gramophone, Film, Typewriter*, xl.

28. STEM = science, technology, engineering, and medicine.

29. Clifford Geertz, "Blurred Genres: The Reconfiguration of Social Thought," *American Scholar* 49, no. 2 (1979): 165–79.

tions. The life sciences are historical sciences, and life itself is interpretive, even rhetorical, as it adapts to the available means and looks to seize the *kairos*. All natural sciences have a hermeneutic element, but the sciences of natural history, such as cosmology, geology, evolutionary biology, paleovirology, and climatology, do so profoundly. Kittler always read works of literature and music as sources of truth, and there is something inspiring about his insistence that the humanities never give up on their cognitive claim: their task is not just the education of sensibility, but the ordering of knowledge, of which there is only one kind (with endless variants). The true humanist would also be a naturalist, one who produces knowledge about things that are, were, and are to come.

The humanities, seen broadly, are the homeland of *technē*. There is no humanity without arts, starting with the art of walking upright on two feet. We are already technical in mind and body, as Leroi-Gourhan insists. Not only do the natural sciences depend on instrumentation.[30] Humanists rely on pen, paper, computer, slide, classroom, file, voice, book, chair, glasses, and archive (library or Google). Whatever else they may be, the humanities are disciplines for the storing, transmission, and interpretation of culture (and maybe nature too). They have material conditions and media as much as any other form of inquiry. Kittler puts it polemically: "For the humanities there is nothing nontechnical to teach and research."[31] Poetry, music, dance all involve counting; without the primordial technology of writing, no humanities would exist at all. Since Rousseau, many have told the story of how our authentic humanness is violated by technology, a story still weakly resonating in some quarters.[32] The bigger sadness of this story is the divorce of the humanities from the infrastructures of being. Apparatus is the basis, not the corruption, of the world. Our beauties have counting and measure at their core. Music, the greatest of all arts humans enjoy, is mathematical and technical. For all his crankiness, Kittler saw (or heard) a sublime truth here.

The object domain of media studies is nicely captured in the title of

30. Lisa Gitelman, "Welcome to the Bubble Chamber: Online in the Humanities Today," *Communication Review* 13 (2010): 27–36, at 29.

31. Friedrich Kittler, "Universities: Wet, Soft, Hard, and Harder," *Critical Inquiry* 31 (2004): 244–55, at 251.

32. See Bernard Stiegler, *Technics and Time: The Fault of Epimetheus*, trans. Richard Beardsworth and George Collins (Stanford, CA: Stanford University Press, 1998), 100–133.

Lewis Mumford's classic book *Technics and Civilization* (1934). *Technics* was his translation of the German term *Technik*, much as we would translate *Politik* as politics or *Physik* as physics. This term deserves a revival in English. Mumford's polymathic ambitions set a course for media studies since: you should use the entire library as your source. To study media, you cannot just study media: on this point Innis and McLuhan, Carey and Kittler all agree, being scholars with an eye for preposterous analogies and miscellaneous learning. (Douglas Coupland called McLuhan an "information leaf blower.")[33] "In writing the history of media," says David Hendy, "we are, in effect, writing the history of everything else."[34] To understand media we need to understand fire, aqueducts, power grids, seeds, sewage systems, DNA, mathematics, sex, music, daydreams, and insulation; this book tackles a small subset of this roster. Technologically oriented media theorists love to unfurl a hitherto unsuspected object as a medium absolutely central to life as we know it (e.g., McLuhan on light bulbs and bicycles, clothing and weaponry). The creative vigor in German media studies since Kittler owes as much to archival mania as to theoretical innovation, the constant discovery of new materials hitherto untapped.[35] I confess to being moved by this spirit in this book's interest in ships, fire, night, towers, books, Google, and clouds. What we might call weird media theory has a bounty of objects, but that is both a blessing and a burden.

There is a danger, of course, of losing one's grip on what media are. "If everyone's somebody, then no one's anybody" (Gilbert and Sullivan), and what's true of prestige is also true of concepts: they must always stop short of complete universality. Because media are in the middle, their definition is a matter of position, such that the status of something as a medium can fade once its position shifts. A tendency in the philosophy of technology, especially object-oriented ontology, is to be so ambitious in celebrating quirky lists of things in all their varied wonder that the sometimes brutally hierarchical and unequal character of things dis-

33. Douglas Coupland, *Marshall McLuhan: You Know Nothing of My Work!* (New York: Atlas, 2010), 200.

34. David Hendy, "Listening in the Dark: Night-Time Radio and a 'Deep History' of Media," *Media History* 16, no. 2 (2010): 215–32, at 218.

35. Lorenz Engell and Bernhard Siegert, "Editorial," *Zeitschrift für Medien- und Kulturforschung* 1 (2010): 5–9, at 6.

appears from view. Bruno Latour, to whom I owe a lot, has polemically called for a "flat ontology," but in the works of some of his acolytes that can sound like a refusal to make critical judgments about the great inequality of things. Anyone interested in infrastructure, lookouts, and turning points needs old-fashioned sociology about how recalcitrant, not just how cool, "things" are. Ontology is not flat; it is wrinkly, cloudy, and bunched. Often, like the sea, it is stormy and harsh. I am only willing to go part of the way with a full philosophy of immanence. In a beautifully styled book Quentin Meillassoux has criticized what he calls "corrélationisme," the doctrine that meaning depends on a superintending human mind of some sort. [36] I fully endorse separating meaning from mind, but cannot abandon the critical project stemming from the post-Kantian critical legacy that he (like his less temperate followers) attacks. We need *Urteilskraft*, the capacity of judgment, more now than ever. The task is to find grounds for critique without a misguided subject-object distinction, an aim whose philosophical roots run from German idealism to the critical theory of the Frankfurt School, and in pragmatism and phenomenology as well.

Infrastructuralism

Infrastructure has come into prominence as a scholarly topic in the past two decades, reflecting wider political and economic changes as the Cold War waned, its large technical systems aged, and the tangle of networks known as the Internet was built. *Infrastructure* was first a military term. In World War II the British found Iceland's landing strip inadequate for their needs. As they were building a new airport in Reykjavik, they asked the Icelanders for financial support. Sorry, no, the Icelandic officials supposedly said—but feel free to take the airport with you when you leave. (The British did not, and it is still used for domestic flights.) Infrastructures are generally thought to be bulky and boring systems that are hard to carry, such as airports, highways, electrical grids, or aqueducts. Since the early nineteenth century the world has seen unprecedented development of infrastructure: railways, telegraphs, transoceanic cables,

36. *Après la finitude: Essai sur la nécessité de la contingence* (Paris: Seuil, 2006).

time zones, telecommunications networks, hydroelectric dams, power plants, weather forecasting systems, highways, and space programs. The Internet—"the new iconic infrastructure of our age," as Hillary Clinton put it—continues to motivate such questions.[37] Whatever else modernity is, it is a proliferation of infrastructures. "To be modern means to live within and by means of infrastructures."[38]

Infrastructures can be defined as "large, force-amplifying systems that connect people and institutions across large scales of space and time" or "big, durable, well-functioning systems and services."[39] Often they are backed by states or public-private partnerships that alone possess the capital, legal, or political force and megalomania to push them through. From Cheops to Stalin, infrastructures have been the playthings of dictators and tyrants; the Internet might seem a departure because of its apparent lack of centralized control, but there is plenty of state and market power shaping its development. Because of their vast technical complexity and costs, infrastructures are often cloaked from public scrutiny, their enormous risks and unintended consequences shielded from open debate. Traditional infrastructures are generally thought to be—or actively designed to be—immune to democratic governance, but remain open to sabotage if otherwise full of inertia (resistance to change).[40] They are almost always vulnerable to hijacking. Every tower invites toppling. "Once in place, infrastructures generate possibilities for their own corruption and parasitism."[41] Something there is that doesn't love a wall.

Though large in structure, infrastructures can be small in interface, appearing as water faucets, gas pumps, electrical outlets, computer terminals, cell phones, or airport security, all of them gates to bigger and submerged systems. Infrastructures are designed to reduce risk in under-

37. "Remarks on Internet Freedom," http://www.state.gov/secretary/rm/2010/01/135519.htm (accessed 25 September 2013).

38. Edwards, "Infrastructure and Modernity," 186.

39. Edwards, "Infrastructure and Modernity," 221; Paul N. Edwards, Geoffrey C. Bowker, Steven J. Jackson, Robin Williams, "Introduction: An Agenda for Infrastructure Studies," *Journal of the Association for Information Systems* 10, no. :5 (May 2009): 364–74, at 365.

40. John Keane, "Silence, Power, Catastrophe: New Reasons Democracy and Media Matter in the Early Years of the Twenty-First Century," Samuel L. Becker Lecture, 8 February 2012, University of Iowa.

41. Brian Larkin, "Degraded Images, Distorted Sounds: Nigerian Video and the Infrastructure of Piracy," *Public Culture* 16, no. 2 (2004): 289–314, at 289.

lying elements, but often produce new risks in doing so. Building systems means managing their side effects—and the side effects of the management itself. Electrical power lines, for instance, increase the risks of childhood leukemia.[42] The bigger the infrastructure, the more likely it is to drift out of awareness and the bigger the potential catastrophe. There were no train crashes before the railroad was built, and no potato famines before the monocultural overinvestment in that crop in Ireland. Leverage means vulnerability.

There are hard and soft infrastructures. Dams and websites, highways and protocols are equally infrastructural. There can be lightweight and portable as well as heavy and fixed infrastructures—a point made repeatedly by Innis. Compared with the concrete opera of Roman cities, roads, and aqueducts, the mathematics and history, philosophy and ethics, music and holidays of the Greeks and Jews are much more alive today. Indeed, what remains of Rome is its cultural engineering in religion, language, law, and the idea of Europe itself. Cultural continuity is often a greater achievement than continually functioning water or road systems: of all extant cultures, only the Chinese, Greeks, Indians, and Jews have managed to maintain their ethnic identity over multiple millennia (not without constant reinvention, of course). Software often outlasts hardware. In geologic time, all infrastructures suffer an Ozymandian fate. As Hegel noted of ancient Egypt, "The palaces of the kings and priests have been transformed into heaps of rubble, while their graves have defied time."[43] None are designed to outlast the typical life span of any civilization. The exception might be calendars, which in theory can be spun out on scales far vaster than any possible human maintenance, although any chance of keeping them closely synchronized with the sky will not last more than a few thousand years, thanks to the variability of the earth's motion. (Our calendar, as chapter 4 shows, requires updates much more often than that.) Civilization seems to have a limit of durability fixed in

42. J. D. Bowman, D. C. Thomas, S. J. London, and J. M. Peters, "Hypothesis: The Risk of Childhood Leukemia Is Related to Combinations of Power-Frequency and Static Magnetic Fields," *Bioelectromagnetics* 16 (1995): 48–59. Our choice to live irradiated in baths of wireless fields has unexplored health consequences.

43. G. W. F. Hegel, *Lectures on the Philosophy of Religion: The Lectures of 1827*, ed. Peter C. Hodgson (Berkeley: University of California Press, 1988), 321n339.

millennia, and maintenance of long-term systems of communication requires vast expense and expertise.[44]

Infrastructures tend to change incrementally, and have the inertia of previous innovations to build upon. They are improved upon modularly, and clearly illustrate the principle of path-dependence.[45] They demand labor and upkeep. They are infrastructures only to the degree that they are normalized into taken-for-granteds; they have social as well as technical components.[46] Retention of archaic functions and structures is as relevant in our media as in our tissues. Both bodily organs and technical *ὄργανα* (organa; "tools" in ancient Greek) are a hodgepodge of different environments layered upon each other. DNA is an archive of new and old. The same is true of any natural language (one reason why the history of words can be a great source of accumulated insight). We can call this the QWERTY principle: suboptimal patterns persist long past their initial conditions due to path-dependence.[47]

I am loath to introduce yet another "ism" into the scrimmage of academic brands, but if I were to do so, it would be the doctrine of *infrastructuralism*. After structuralism, with its ambition to explain the principles of thought, primitive or modern, by way of a combinatorics of meaning, and post-structuralism, with its love of gaps, aporias, and impossibilities, its celebration of breakdown, yearning, and failure, its relish for preposterous categories of all kinds and love of breathless syntax—perhaps it is time for infrastructuralism. Its fascination is for the basic, the boring, the mundane, and all the mischievous work done behind the scenes. It is a doctrine of environments and small differences, of strait gates and the needle's eye, of things not understood that stand under our worlds. Hence the quiet pun in the title of this chapter: infrastructural media are media that stand under.

44. See Marisa Leavitt Cohn, *Lifetimes and Legacies: Temporalities of Sociotechnical Change in a Long-Lived System*, University of California, Irvine, PhD diss., 2013.

45. Susan Leigh Star, "The Ethnography of Infrastructure," *American Behavioral Scientist* 43 (1999): 377–91, at 382.

46. Susan Leigh Star and Karen Ruhleder, "Steps toward an Ecology of Infrastructure: Design and Access for Large Information Spaces," *Information Systems Research* 7, no. 1 (1995): 111–34.

47. Paul A. David, "Clio and the Economics of QWERTY," *American Economic Review* 75, no. 2 (1985): 332–37; and S. J. Liebowitz and Stephen E. Margolis, "The Fable of the Keys," *Journal of Law and Economics* 33, no. 1 (1990): 1–25.

Infrastructure in most cases is demure. Withdrawal is its modus operandi, something that seems a more general property of media, which sacrifice their own visibility in the act of making something else appear.[48] Marx was a theorist of infrastructure not only in his fascination for industrial apparatus, but also in his analysis of how power relations are camouflaged. The greatest thinkers of infrastructure were never interested only in the gear; they always wanted to know why awareness of essential things so quickly fades into "beaten paths of impercipience."[49] (This is a version of the old moral mystery of why the quest to find bedrock principles of right action never finds any bedrock more certain than the ongoing quest itself.) Freud made vivid use of infrastructural metaphors, viewing the psyche in terms of cities, sewers, ruins, filing systems, and postal censorship; but he was also an analyst of clouded awareness, of our distorted communication with ourselves. Every memory trace for him was a crime scene investigation to show off his considerable forensic skills.

Perhaps the most explicit effort to understand how the fundamentals recede into the background was that of Freud's contemporary Edmund Husserl, who developed philosophical phenomenology. Marx, Freud, Husserl and their contemporaries all lived through terrific infrastructural transformations and thought that boredom and obviousness were ruses by which consciousness hides the marvelous, often devious workings that make it possible. The same is true with such nineteenth-century figures as Charles Darwin, W. E. B. Du Bois, Émile Durkheim, Charlotte Perkins Gilman, Ferdinand de Saussure, and Max Weber, with their analyses of the infrastructures of life, race, society, gender, and language. For thinkers born in the nineteenth century, it was madness not to observe the nexus, as they lived through the triumph of steam, coal, electricity, barbed wire, standard sizes, and standard time. All of them believed in the power of reason to either get to the bottom of things or make a greater mess of them. Freud's famous dictum, "Wo es war, soll ich werden" (Where it was, I should be), might be understood as the im-

48. Dieter Mersch, "Tertium datur: Einleitung in einer negativen Medientheorie," *Was ist ein Medium?*, ed. Stefan Münker and Alexander Roesler (Frankfurt: Suhrkamp, 2008), 304–21, at 304.

49. McLuhan, *Understanding Media*, 198.

perative to make all infrastructures clear. There is a deep infrastructural ethic in modern thought.

One of the key books that launched much of the recent interest in infrastructure, *Sorting Things Out* (1999) by Geoffrey Bowker and the late Leigh Star, brought a strong phenomenological heritage to infrastructure studies. Infrastructure was pushed beyond large, heavy systems to be a question of how basic categories and standards are formed, and how they are formed as ordinary. How the taken-for-granted gets constructed in the first place is a classic phenomenological question: how did the water ever become invisible to the fish? Bowker and Star see our worlds as bristling with standards and forgotten rules that produce everyday things in their everydayness and are sustained by the ghostly cumulus of bodies at work. Ordinary objects such as compact disks and pencils conceal "decades of negotiation." As Bowker and Star quip, "There is a lot of hard labor in effortless ease."[50] To break through the crust, they offer the concept of "infrastructural inversion," a cousin to what Harold Garfinkel called "breaching"—the intentional violation of a social norm to bring the background out into the open. Something similar happens with accidents and breakdowns: infrastructure comes out of the woodwork. Glitches can be as fruitful intellectually as they are frustrating practically.[51] Essence, intoned Heidegger (channeling Aristotle), is revealed in accident.[52]

Infrastructure is often as hard to see as a light rain through the window. Not only is it invisible by nature, but it can be camouflaged by design in what Lisa Parks calls "infrastructural concealment." [53] Some infrastructures (water, sewers, electrical and cable lines) are literally buried in the ground (or underwater) and others are designed to blend in with the scenery. More rarely, towers or hydroelectric dams are intentional

50. Geoffrey C. Bowker and Susan Leigh Star, *Sorting Things Out: Classification and its Consequences* (Cambridge: MIT, 1999); the quote from 9.35 has a useful definition of infrastructure.
51. See Peter Krapp, *Noise Channels* (Minneapolis: University of Minnesota Press, 2011).
52. "In einer *Störung der Verweisung* . . . wird aber die Verweisung ausdrücklich." Martin Heidegger, *Sein und Zeit* (1927; Tübingen: Niemeyer, 1993), 74.
53. Lisa Parks, "Technostruggles and the Satellite Dish: A Populist Approach to Infrastructure," *Cultural Technologies: The Shaping of Culture in Media and Society*, ed. Göran Bolin (London: Routledge, 2012), 64–84.

displays of power and modernity, and some architectural fashions have foregrounded the guts of a building (as in the Centre Pompidou in Paris, where extruded pipes and conduits are a flamboyant part of the design). In the twentieth century, broadcasting houses were temples of transmission that celebrated their own technicity.[54] In a similar way, as we see below, medieval clock towers were statements of civic wealth and eminence. Technologies are never only functional: any device always has an element of social display or "bling."

Forgetting seems a key part of the way infrastructures work. Star notes that they are often "mundane to the point of boredom."[55] But it all depends on what the structure is *infra* to. Infrastructure is often defined by being off the radar, below notice, or off stage. Redundancy may be boring, but the essence of robust systems is backup options. Technology, in contrast, is a concept biased towards newness: breathing, fire control, writing, or cities rarely count, even though that's where much of the hard work is. We have the unhelpful habit of isolating the bright, shiny, new, or scary parts of our made environment and calling them "technology," to the neglect of the older, seemingly duller parts. Horses were as important as tanks in both world wars, and bicycles have been as important as cars in recent decades.[56] There is a politics to boredom. "Mature technological systems reside in a naturalized background, as ordinary and unremarkable to us as trees, daylight, and dirt," says Paul Edwards, [57] He is completely right, but trees, daylight, and dirt, of course, are highly remarkable: they are also mature technological systems. ("The invariable mark of wisdom," said Emerson, "is to see the miraculous in the common."[58]) The perception of monotony is a measure of the breadth of mind: nothing would be boring to the mind of God. Studying how boring things got that way is actually a good way never to be bored. This book

54. See Staffan Ericson and Kristina Riegert, *Media Houses: Architecture, Media, and the Production of Centrality* (New York: Peter Lang, 2010).

55. "Ethnography of Infrastructure," 377.

56. David Edgerton, *The Shock of the Old: Technology and Global History Since 1900* (London: Profile, 2008).

57. Edwards, "Infrastructure and Modernity," 185.

58. *Nature, Selected Writings of Emerson*, ed. Donald McQuade (1837; New York: Modern Library, 1981), 41.

seeks to brew this elixir, wagering that the wonder of the basic can beat its banality.

Infrastructuralism suggests a way of understanding the work of media as fundamentally logistical. Logistical media have the job of ordering fundamental terms and units. They add to the leverage exerted by recording media that compress time, and by transmitting media that compress space. The job of logistical media is to organize and orient, to arrange people and property, often into grids. They both coordinate and subordinate, arranging relationships among people and things.[59] Logistical media establish the zero points where the *x* and *y* axes converge. McLuhan's slogan "The medium is the message" applies particularly well to them. They prepare the ground on which we can make such distinctions as nature and culture. They span ocean, ground, air, outer space, and cyberspace. Chapters 4 and 5 explore logistical media most fully, focusing on classic forms such as calendars, clocks, and towers. Other key examples are names, indexes, addresses, maps, lists (like this one), tax rolls, logs, accounts, archives, and the census. Money is surely the master logistical medium—a medium, as Karl Marx complained, that has no content in itself but has the power to arrange everything else around it.[60]

In arraying things around polar points, logistical media set the terms in which everyone must operate. The zero is the paradigm case of a logistical medium: an apparent nothing that marks out longitude and latitude, and orders of magnitude, and thus shapes the world; it is an operator that arranges data and regulates processing. (Few would complain if their bank accounts acquired an extra zero in the right place.) The zero is an Archimedean *παγκράτιον* (*pankration*), a lever that moves the earth. (Zero never exists in the numeral system of any natural spoken language, but is a creature of graphical practices, such as calendar making and accounting.) Brigham Young's cane served thus when it marked out the

59. Gabriele Schabacher, "Raum-Zeit-Regime: Logistikgeschichte als Wissenszirkulation zwischen Medien, Verkehr, und Ökonomie," *Agenten und Agenturen. Archiv für Mediengeschichte*, eds. Lorenz Engell, Joseph Vogl, and Bernhard Siegert (Weimar: Bauhaus Universität, 2008), 135–48, at 145. See also Judd Ammon Case, *Geometry of Empire: Radar as Logistical Medium* (PhD diss., University of Iowa, 2010); and "Logistical Media: Fragments from Radar's Prehistory," *Canadian Journal of Communication* 38, no. 3 (summer 2013): 379–95.

60. On money, see Hartmut Winkler, *Diskursökonomie* (Frankfurt: Suhrkamp, 2004), 36–49.

center spot, the temple, around which the addresses of the Salt Lake valley ever after, like it or not, would be gridded. Logistical media pretend to be neutral and abstract, but they often encode a subtle and deep political or religious partisanship. People still debate whether our era is "AD" or "CE," and whether the day after Saturday is called "Sunday" or "first day" (see chapter 4). The point—as vanishing point, decimal point, and printer's spatium—is one of the most critical of all modern media.[61] Though logistical media usually appear as neutral and given, their tilt and slant can also call forth agitation.

Infrastructuralism shares a classic concern of media theory: the call to make environments visible. Perhaps McLuhan's most fundamental ethical call, against his horrified fantasies of mankind growing into a single hive mind, was the call to awareness.[62] McLuhan saw those of us who ignored our technological habitats "somnambulists," invoking the Greek myth of Narcissus to explain our media narcosis. Blessed are they, said Kittler, who could hear the circuitry in the compact disc or see it in the discotheque's light shows.[63] Ontology, whatever else it is, is usually just forgotten infrastructure.

Being and Things

The mention of ontology brings up another figure. I confess to finding myself reluctantly drawn into Heidegger's orbit. Thanks to a small army of brilliant interpreters who've helped detoxify his thought, he is absolutely indispensable if you are interested in how φύσις (*physis*, nature) and τέχνη (*technē*, art, technology) intermingle. Heidegger has benefitted from an offshore laundering brigade made up of highly diverse spirits. To read him—the effect is enhanced by reading him in German—a kind of euphoria builds as you follow step after stunning step and behold, to use his language, the world dawning in ways it never has before. He is

61. See Wolfgang Schäffner, "The Point: The Smallest Venue of Knowledge," trans. Walter Kerr, *Collection, Laboratory, Theater: Scenes of Knowledge in the 17th Century*, ed. Helmar Schramm, Ludger Schwarte, Jan Lazardzig (Berlin: Walter de Grutyer, 2005), 57–74.

62. "Today we need also the will to be exceedingly informed and aware." *Understanding Media*, 75.

63. Kittler, *Gramophon Film Typewriter*, 5; *Gramophone, Film, Typewriter*, xli.

the great student of the diverse shapes and seasons that being can assume. His thinking is as full of surprising, strange, and brilliant moves as Bobby Fischer's chess games. Heidegger is willing to sacrifice his queen—modern philosophy's most powerful piece, the knowing ego—in favor of secondary philosophical pieces such as "being" and "thing," which he then develops to devastating effect in his inexorable march toward checkmate. As in Fischer's case, Heidegger's genius did not prevent him from making disastrous judgments, but in philosophy, especially its more existential kinds, theory and life seem less separable than in chess. The obvious point here is his unrepentant membership in the Nazi party in the early 1930s, something whose import has been broken down at agonizing length by friend and foe alike; the recent publication of his *Schwarzen Hefte* has added fuel to the fire, and has more clearly documented his anti-Semitism.

The moral mystery of great work from compromised sources is perhaps properly a theological question about the productivity of sin, and a proper reading of any thinker such as Heidegger has to be critical. His Nazi affiliation is a symptom of the defective moral and political judgment that is visible elsewhere in his life and work. He is portentous, finds it hard to see nuclear war or the Holocaust as worse disasters than bad thinking, cannot take a joke, and is painfully, irresistibly lucid about so many subjects that matter so profoundly. His understanding that technology—*Technik*—is most important not for what it does to humans or society, but for how it reorders nature is especially crucial for my arguments. What to do? The tactic of pragmatist thinkers such as Latour and Richard Rorty is to rely on him heavily and mock him relentlessly. Latour quips that Heidegger only expects to find Being in the Black Forest, and that his account of technology sees "no difference between an atomic bomb, a dam, a lie detector, and a staple."[64] In an intemperate moment, Rorty called Heidegger a "self-infatuated blowhard," but Rorty's point was to emphasize Heidegger's lack of democratic sensibility.[65] Both Rorty and Latour, however, know clearly that it is wrong to read him as

64. Bruno Latour, *We Have Never Been Modern*, trans. Catherine Porter (Cambridge, MA: Harvard University Press, 1993), 65; "Can We Get Our Materialism Back, Please?" *Isis* 98, no. 1 (2007): 138–42.

65. Richard Rorty, "Heidegger and the Atomic Bomb," *Making Things Public*, ed. Bruno Latour and Peter Weibel (Cambridge, MA: MIT Press, 2005), 274–75.

a cultural pessimist who laments technology as simple forgetfulness of being; he is rather a theorist of technics, not as historic downfall, but as essential to the human estate and its "parliament of things"—one of Latour's notions that owes something to Heidegger.[66]

Latour is perhaps the "it" thinker of the moment in which this book is being written. He is ubiquitous, clever as hell, exactly the right person to help us worry productively about the anthropogenic manipulation of our habitat. This book's hope to provide a vision of the human estate in terms of ecology, technology, and theology fits Latour's orbit perfectly. He is the most prominent among many thinkers today pleading that our imagination of nature is an opportunity to reinvent everything about us and it. He is a fierce critic of any kind of hard nature-culture divide, which he thinks of as distinctive to modernity; instead, he wants us to see just how stubbornly real the "imbroglios" between humans and nonhumans can be. Ruefully, he notes the glee with which social constructionism is embraced by AIDS denialists, the Tobacco Institute, global warming skeptics, and others who invest heavily in public uncertainty about inconvenient scientific evidence. Latour thinks the critics of science have gone overboard in the rush "to emancipate the public from prematurely naturalized facts."[67] Many acres of critical scholarship have been devoted to exposing the political character of the supposedly natural, but it is just as interesting to see nature bubbling up in the midst of culture. Night, weather, grass, yeast all have an artifactual quality. One of the overriding messages in the genetic structure of sweet corn, poodles, or tulips is their coexistence with humans. DNA, as noted, is enormously responsive to environmental pressures, and thus profoundly historical. The world for Latour is shaped in concert by human and nonhuman actors, resulting in hybrid "things" that fuse will and material, craft and element.

Latour has radical ideas about nature and culture that confuse critics who read him either as a social constructionist or a realist. Neither is right: he is a philosophical pragmatist, one who recognizes both the making of facts and their terrific grip on the world, both the human shaping of nature and its recalcitrance to our plans. Latour is not the foe of science: he is its lover, and therefore prefers to see it naked. Science is onto-

66. Latour, *We Have Never Been Modern*, 142–45.
67. "Why Has Critique Run Out of Steam?" *Critical Inquiry* 30, no. 2 (2004): 225–48.

logically generative. To the question of whether microbes existed before Pasteur, Latour insists that anyone with common sense would answer with exasperation: Of course not![68] What could he possibly mean? This is not just nominalism, as if the identification of microbes brought them de novo into being. He means something stronger: in strict factuality, knowledge of nature has changed nature. Anthropogenic know-how has radically altered the population and being of microbes; whole new habitats have been opened up for them, such as yogurt containers, Petri dishes, and pharmaceuticals. Even more than populations, new knowledge has changed the past. After Pasteur discovered microbes, we forgot that they didn't exist before. Pasteur's feat was not only epistemological but historical: the past suddenly had to accommodate microbes where none were before. Discovery makes ontological ripples in history itself. What seems like common sense—that microbes were always there—turns out to be the deepest kind of idealism about the hidden constancy of unperceived things. Let's call this ontological reorganization of the past by new knowledge "the microbe effect."

Not only epistemology but politics is at stake in how we conceive of nature. What Raymond Williams said about "culture"—that it "is one of the two or three most complicated words in the English language"—certainly applies to "nature" as well.[69] The nature-culture distinction was absolutely critical for twentieth-century antiracist and feminist thought.[70] To take nature seriously as a category might set off alarms for critical scholars who've been carefully taught that concepts of nature were so irreparably infested with power that they were best left alone. There are classic sources for this idea. "Naturalization," said Roland Barthes, was the chief strategy of ideology. The domination of nature, said Walter Benjamin, was inseparable from the domination of people. Max Horkheimer and Theodor W. Adorno went further: the domination of nature not only exploited animals, vegetables, minerals, and other people, but also the bourgeois self, whose inner nature was mastered in

68. Bruno Latour, *Pandora's Hope: Essays on the Reality of Science Studies* (Cambridge, MA: Harvard University Press, 1999), 145.

69. *Keywords: A Vocabulary of Culture and Society*, rev. ed. (Oxford: Oxford University Press, 1983), 87.

70. See Robert Bernasconi, *Nature, Culture, and Race* (Huddinge: Södertörn University, 2010), and Joan W. Scott, *The Uses and Abuses of Gender* (Huddinge: Södertörn University, 2013).

steely frenzies of asceticism. (Hedonism was a form of resistance to this chilly regime, and they did their best to foreshadow the redeemed society with wine, cigars, and fine music.) For critical theory, definitions of nature and humans were always linked: the subject was defined against the object, the human against the animal, the male against the female, the white against the black, the master against the slave. In recent decades, enormous amounts of writing around gender and sexuality, race and ethnicity have developed such ideas.

Latour's strategy is not to abandon the concept of nature but to fight for it. He is not willing to let the natural sciences walk off with all the goodies. Obviously there is a long line of social thought celebrating nature red in tooth and claw that asserts the naturalness of gender, race, class, the free market, and all the rest. From Herbert Spencer to Richard Dawkins, the social application of Darwinist ideas is often a record of domination. But there is another biological tradition that reaches from Aristotle to Marx, Dewey and Dobzhansky, and beyond, as my colleague David Depew has shown, which makes a sustained effort to build a democratic biology based on the insight that the relations of organisms and environments involve the same processes of mutual adjustment and experimentation as are characteristic of a democratic society. For Dewey, societies evolved in the same way that organisms did, by adapting to the problems that appeared before them—except that societies had the advantage of self-conscious acceleration of learning from mistakes (which he called science); he saw deliberation "as a form of species-specific natural selection." Both evolution and democratic deliberation were governed by the variation, selection, and retention of options, sometimes wastefully, painfully, and tragically—99 percent of all species that have ever existed on the earth are now extinct—but Dewey thought the learning processes were analogous. Like his sources Aristotle and Hegel, Dewey thought that biology was the basis of politics and that politics in turn was rooted in biology.[71]

Political concepts are properly subjects of dispute, and thus it is a mistake to sell concepts of nature to the highest bidder; they are critical resources in need of vigorous struggle. To take "nature" seriously is not to

71. John P. Jackson and David Depew, "Darwinism, Democracy and Race in the American Century," manuscript in progress.

say that society as it is exists is supposed to be that way, but to recognize that our milieux are also made by history and thus are changeable. The concept of nature contains multitudes and has plenty to welcome people of every variety, including nonhuman ones. Democracy, as the endless work of inclusion, needs to stretch from the human to the animal and from the organic to the inorganic.

Experience and Nature

I have touched on some Canadian, German, and French thinkers relevant to this project, but there is another tradition that, like Heidegger, takes up the task of considering what it is to dwell among friendly things. Ralph Waldo Emerson knew the splendor and strangeness of being a humanoid in this peculiar cosmos, and he was one of the greatest of all students of anthropozoic comminglings. So were the many American writers that followed in his wake. They saw many things like Heidegger—the contrast between laudable techniques and dangerous technology, the way being strikes fear into you, the wonder of the most ordinary things. Thoreau and Heidegger resonate in many ways, as Stanley Cavell has been urging for decades: both, at first glance, look like pessimists lamenting lives lived in quiet desperation but, examined more closely, are ardent fans of practice, huts, ancient Greek literature, and techniques in their fullness. Both thought that philosophical questions could be fruitfully pursued through detailed attention to shoes, clocks, or the thawing mud. Thoreau's *Walden* is a festival of cultural techniques as well as a treatise on political economy, on housekeeping. Heidegger's meditations on dwelling always return to the equipment by which we exist.

Many American thinkers in the transcendentalist wake understood something like this. Herman Melville knew to watch the horizon for storm clouds and breaching whales from the masthead of a ship, and could butcher the whales and distill their oil. Emily Dickinson was a keen observer of the ways of plants, bees, and birds, a stitcher of an elaborate herbarium, and was very well informed about the natural history of her day, as was Emerson. Walt Whitman sang of being compassed about by strange creatures—animals, native peoples, slaves to be liberated—and envisioned a democracy with wild multitudes in its heart. (We should in-

clude Mumford, the devotee of Emerson and Melville, in this lineage.) Such ideas about the mixing of humans and nonhumans resonate through the pragmatists, William James and Charles Sanders Peirce in particular, both of them first-rate natural scientists in their own right who thought any philosophy of human existence would have to begin with the fact of organic evolution. Peirce saw signs as embedded in the sporting history of life, and James saw mind as one among many useful evolutionary adaptions. Together with Dewey, Peirce and James understood communication as the cultivation of fruitful activity in an evolving community, rather than as the matching of minds. Meaning was the by-product of the selective guesswork and self-correction of populations; the human community had the extra benefit of science to steer with. This book embraces the tradition running from Emerson and Melville to James and Peirce.

The transcendental Yankees had a certain practical healthy cheer toward the ordinary realm of chatter, commerce—or "commodity," as Emerson called it, or "secondness," as Peirce did later.[72] Heidegger, for all his towering genius, possessed little feel for this realm. To be sure, few have matched Heidegger's sense for the phenomenology of tools and things, but there was little civic tide in his sea. Two key requirements for a practicing democrat are common sense and a sense of humor, neither of which were among Heidegger's strong suits. (As Ken Cmiel once said of Heidegger, quoting a martial arts film, "Beware of holy men who can't dance.") Whatever wild ideas the Americans entertained—and they did so in abundance—they always ultimately refused to forfeit simple solidarity with otherness, including the mute and simple. They were quicker to make a truce with reification, with modernity, trade, impurity and imperfection, for better or worse, most famously in James's disastrously felicitous notion of the "cash value" of truth.[73] Patience with reification might be one of the first principles of understanding both nature and our fellow creatures. There is a lovable muteness to plants, animals, and clouds.

The fundamental question for American thinkers in a transcenden-

72. Emerson, *Nature*, 7–9. "Commodity" provides "temporary and mediate" service and "mercenary benefits." And for Emerson it is clearly the zone of *technē*.

73. Kenneth Burke, *A Grammar of Motives* (1945; Berkeley: University of California Press, 1969), 277.

talist vein was the relation of experience and nature, as Dewey, the great thinker of democracy, put it. They welcomed a fruitful instrumentality as the key to what makes us humans. The pragmatist lineage shares with Heidegger the intuition that being is found in everyday practices, algorithms, and programs. Both Heidegger and the New Englanders turn to the basic and show what is locked up in a meadow, ship, or pair of shoes. Both share the infrastructural intuition that what is generally taken as obvious is not obvious at all. Both are interested in the astonishment of media, technics, and animal lives seen within a philosophical-theological horizon—the subject of this book. For neither Emerson nor Heidegger, James nor Kittler, is there such a thing as a media-free life. Embedment in media is a handsome condition. Heidegger and the pragmatists, like Thoreau trying to measure the bottom of Walden Pond, know that any effort to fathom the fathomless will only measure our bottomless capacity for wonder. The pragmatists at least also knew that the occasional spell of boredom was essential to replenishing the world.

Both traditions are also interested in experiments in emergency, in getting close to the danger in order to feel its saving power, to use one of Heidegger's incantations. Both take an interest in what King Lear called "the unaccommodated man," in what to do after the protective shell of civilization has collapsed, when we are immersed in soil, air, and weather once more. (Melville's Ahab, an explicitly Lear-like character, smashes his quadrant or "heaven-gazer" in preparation for the final showdown with the white whale, in which he will lose all his cargo, including his own person.) This concern among the Yankees not only mirrors the rapacious pioneer ethos but embodies a deeper, ethically inflected sense for the uncanny husbandry humans have for the earth. Emergency preparedness was their constant theme: Thoreau called on us to "live in all respects so compactly and preparedly, that, if an enemy take the town, [you] can, like the old philosopher, walk out the gate empty-handed without anxiety."[74] Ishmael on the Pequod and Thoreau in his cabin explored human life without its supports. They asked what happens when we leave all our materials behind. (My interest in cetaceans in the next chapter is a version of this inquiry.) What is our readiness for the catastrophe when our materials break down? When the ship crashes, what will we do then? The

74. Henry David Thoreau, *Walden* (New York: Norton, 2008), 19.

transcendentalists and their pragmatist heirs were all students of "the advantages, though so dearly bought, which the invention and industry of mankind offer."[75] They teach us to think about and prepare for the loss of technics and civilization, which is also to prepare for our own demise, and to sing a lower tone, a rumbly gratitude for being.

Media and/as Nature

The concept of media, as noted, was connected to nature long before it was connected to technology.[76] It has roots in ancient Greece and Rome, but many of its key twists and turns are medieval and modern. *Medium* has always meant an element, environment, or vehicle in the middle of things. One key ancient Greek source is Aristotle's concept of *τὸ περιέχον* (*to periekhon*)—more or less "surrounding" or environment—which expressed "sympathy and harmony between the universe and man." This concept, says Leo Spitzer in an indispensable study, had "a 'skyey' quality," suggesting atmosphere, cloud, climate, and the air.[77] The concepts of *medium* and *milieu* have long orbited each other, as twin offspring of Aristotelian material and the Latin word *medius*, middle. Medium comes directly from *medius*, while *milieu* is the French descendant of *medius locus* or middle place; a milieu, like a medium, is a place in the middle. A related input is Aristotle's theory of vision, which posited a transparent in-between that enabled the eyes to connect with the object. He obviously did not use the term *medium*, which is of Latin origin, but his concept of *τὸ μεταξύ* (*to metaxu*), the in-between, prepares the way. The crucial move comes in the thirteenth century with Thomas Aquinas, who, in translating Aristotle, smuggles in the term *medium* to account for

75. Thoreau, *Walden*, 32.

76. The key text on the history of the term is Stefan Hoffmann, *Geschichte des Medienbegriffs* (Hamburg: Meiner, 2002). From a vast literature, see also Dieter Mersch, "Res medii. Von der Sache des Medialen," *Medias in res: Medienkulturwissenschaftliche Positionen*, ed. Till A. Heilmann, Anne von der Heiden, and Anna Tuschling (Bielefeld: Transcript, 2011), 19–38; John Guillory, "Genesis of the Media Concept," *Critical Inquiry* 36 (2010): 321–62; Mitchell and Hansen, eds., *Critical Terms for Media Studies*.

77. Leo Spitzer, "Milieu and Ambience," *Essays in Historical Semantics* (New York: S. F. Vanni, 1948), 179–316, at 223, 190.

the missing link in the remote action of seeing. Ever since, media have always stepped in to fill the environmental gaps to explain contact at a distance.[78] Spitzer quotes a Scholastic author writing in Aquinas's wake, who defined the enduring role of media: "Omnis actio fit per contactum, quo fit ut nihil agit in distans nisi per aliquid medium."[79] (All action occurs by contact, with the result that nothing acts at a distance unless by some kind of medium.) A medium, like its ancestor *periekhon* and sibling *milieu*, fills in the vacuum left open between important things.[80]

With Isaac Newton, *medium* became a more instrumental concept, "an intermediate agent," a condition for the transmission of entities such as light, gravity, magnetism, and sound. Newton's medium was transparent and relatively sterile compared to other more organic conceptions, though it was still the key and divine constituent of the universe as the *sensorium dei*. The *ether*, the later term for the universal medium posited by Newton, had an austere immaterial flavor compared with *environment*'s sense of vital interconnectivity. One was transcendent and the other immanent, one dry and the other fluid, one fit for physics and the other for biology. Both senses continue to resonate today in talk about media. In particular, German idealism and romanticism both explored with great creativity the notion of medium, perhaps one deep background for the warm reception of the media concept in recent German scholarship.[81]

The decisive break happened in the nineteenth century with the slow turn of *medium* into a conveyance for specifically human signals and meanings. The telegraph as a medium of communication combined physical phenomena long observed in nature (speedy immaterial processes) with an old social practice (writing to distant correspondents). The new concept of medium blurred together signal (physics) and symbol (semiotics), yielding some of the conceptual messes around "communication" that still haunt us. Perhaps the most critical shift came with spiritualism, around 1850, when a person, typically a woman imitating

78. Wolfgang Hagen, "Metaxy: Eine historiosemantische Fußnote zum Medienbegriff," in *Was ist ein Medium?*, ed. Stefan Münker and Alexander Roesler (Frankfurt: Suhrkamp, 2008), 13–29.

79. Spitzer, "Milieu and Ambiance," 201. Eustachius a Sancto Paulo (1573–1640).

80. See Steven Connor, "Michel Serres's Milieux" (2002), http://www.stevenconnor.com/milieux/

81. See Hoffmann, *Geschichte des Medienbegriffes*.

the telegraph's ability to bridge wide chasms, came to be called a *medium*, which no longer meant a natural element but a human intermediary between the worlds of the living and of the dead. A spiritualist medium was not an environment enveloping organisms but a person communicating meanings that were distinctly human—that is, located in minds (whether incarnate or not). This was a stepping-stone to the sense prevailing in the twentieth century that media were human-made channels that carried news, entertainment, advertising and other so-called content.[82] The spiritualist quest for communiqués from distant minds went together with the shrinkage of the notion of communication to mean intentional sendings among humans.

In the twentieth century, *media* came to mean the mass media of radio and television, cinema, newspapers, magazines, and sometimes books, but the term never completely lost its environmental meaning; indeed, mass media were so pervasive and elemental that they could fit nicely into the long lineage of medium as ambiance, and some, such as McLuhan and his followers, sought a more expansive (and ancient) notion of media ecology. Social theorists, in a similar spirit, would speak of the media of money, power, or love, as artists would speak of charcoal, pencil, watercolor, or oil as their media. The term could sometimes take a singular verb, turning into a mass noun like *spaghetti* (which is also technically a plural form), but most media scholars, at least, usually stick to the plural *media are* in order to defend an interest in medium specificity. Today the term *media* carries with it more than a century's worth of discourse about modes of meaning-making—perhaps a distant semantic index of the Anthropocene, when the human stamp touches all.

My aim is not to turn back to a precritical notion of media as natural. There are compelling reasons to restrict the concept of "medium" to the semiotic dimension.[83] I take the modern human-semiotic turn as an enrichment of the concept, but it is time to graft those branches back into the natural roots in hopes of a new synthesis. This does not mean that the

82. See Wolfgang Hagen, "Wie ist eine 'eigentlich so zu nennende' Medienwissenschaft möglich?" *Was waren Medien*, ed. Claus Pias (Zurich: Diaphanes, 2011), 81–101, esp. 86–93.

83. E.g. Hartmut Winkler, "Zeichenmaschinen; oder, warum die semiotische Dimension für eine Definition der Medien unerlässlich ist," *Was ist ein Medium?*, ed. Münker and Roesler, 211–21.

sea, fire, or the sky are automatically media in themselves, but that they are media for certain species in certain ways with certain techniques; in seeing media as ensembles of nature and culture, *physis* and *technē*, I try to stir together semantic strains that speak to a historical moment in which we cannot think of computation without thinking about carbon, or of the cloud without thinking about data. Today natural facts are media, and cultural facts have elemental imprint. We can see the Internet as a means of existence, in some ways close to water, air, earth, fire, and ether in its basic shaping of environments. Notions such as "the commons," so current in digital talk, or the wide interest in Jakob von Uexküll, the biologist who made the notion of *Umwelt* famous, for instance, revive the long tradition of thinking about milieu and ambiance.[84] Today's infrastructures invite an environmental view of media, and we are fortunate that the intellectual history of the concept offers ample justification and materials for that project. [85]

Sailing on Many Craft

The reader will already have noted that this book, while a defense of the idea that technics is central to whatever it is that makes us humans, is not especially utopian about our digital technofutures. Computers and their spawn have, of course, reshaped much about how many of us work, play, and learn. Digital devices have spread like rabbits in Australia. Organisms flourish when transplanted into habitats lacking in natural enemies, and computers have spread almost zoologically into our cars and ovens, clothes and garbage, music and minds, clothing and bodies. Perhaps, George Dyson once ventured, there were even new species evolving in the silicate habitat of fiber optic cables. Computers are rather like what Donna Haraway calls "companion species living in naturecultures" such as dogs, cats, and horses, though we have lived for millennia with animals

84. Geoffrey Winthrop-Young, "Afterword. Bubbles and Webs: A Backdoor Stroll through the Readings of Uexküll," in Jakob von Uexküll, *A Foray into the Worlds of Animals and Humans* (Minneapolis: University of Minnesota Press, 2010), 209–43.

85. See Ursula Heise, "Unnatural Ecologies: The Metaphor of the Environment in Media Theory," *Configurations* 10, no. 1 (winter 2002): 149–68.

and barely three decades with household digital gadgets.[86] Chips—as implemented into platforms and programs by dreamers, designers, and venture capitalists—have drastically altered our environments. Biology, Robert Carlson dramatically claims, has become technology.[87]

Yet all the basic problems remain amid the technical upheaval. The world is still mad, smart people make catastrophically boneheaded choices, Wednesday afternoon is still Wednesday afternoon, and doctors have no answer for almost everything that ails us. Digital media have not abolished bills, backaches, or crummy weather—to say nothing of rape, poverty, or scorn. The central ethical and political problems are perennial, however much many appliances open new social and political possibilities. New inventions do not release us from old troubles. A story from Bangladesh, whose government has run a two-front campaign to improve its informational and public health infrastructures, makes my point. Because the state has boosted the term so much, *digital* in Bangladeshi slang has apparently come to attach itself to things that are newfangled or modern, including the disposable toilet "Peepoo" baggies distributed in hopes of reducing the spread of disease and keeping the water clean.[88] This felicitous coinage has discerned a crucial truth: sometimes the digital just collects the same old poop.

Things in the middle, like spines and bowels, often get demeaned, but they too deserve their place in our analysis. Small means bring about that which is great. Media show up wherever we humans face the unmanageable mortality of our material existence: the melancholy facts that memory cannot hold up and body cannot last, that time is, at base, the merciless and generous habitat for humans and things. Media lift us out of time by providing a symbolic world that can store and process data, in the widest sense of that word. Like Aristotle or Arendt, I do think there is such a thing as the human condition, and that it involves earth, world, other people, labor, work, time, speech, action, birth and death, promise

86. Donna Haraway, *The Companion Species Manifesto: Dogs, People, and Significant Otherness* (Chicago: Prickly Paradigm Press, 2003), 65.

87. Robert H. Carlson, *Biology is Technology* (Cambridge, MA: Harvard University Press, 2010).

88. Stefanie Schramm, "Ab in den Beutel," *Die Zeit*, 10 June 2010, 38. This usage seems to be rare, however.

and forgiveness. But the human condition is recursive; it is a conditional condition: our actions change the conditions they act in, especially since they change us; we speak and act, and as we do we change the conditions in which we speak and act. As Walter Ong nicely puts it, "Artificiality is natural to human beings."[89] The crossroads of humans and things defines the domain of media studies. We are conditioned by conditions we condition. We, the created creators, shape tools that shape us. We live by our crafts and conditions. It is hard to look them in the face. In the grandest view, media studies is a general meditation on conditions. To try this adventure of ideas is the task of this book. It seeks nothing less than to sketch what Heidegger called "a poetic outline of [our] being, drawn from its extreme possibilities and limits."[90]

The questions of how to define nature, humans, and media are ultimately the same question. We know and use nature only through the artifacts we make—both out of nature and out of our own bodies—and these artifacts can enter into nature's own history. "The invention of the four-wheeled carriage, the plough, the windmill, the sailing ship, must also be viewed as biological ones," says Leroi-Gourhan.[91] Music and writing are as much a part of our natural history as are endothermy and bipedalism. Our technical know-how and bodily form have coevolved. The ballooning shape of human skulls and the bulging ears of Iowa corn are alike technical achievements. The history of fire forms a large chapter in the history of nature in recent millennia, as does the anthropogenic domestication and extinction of diverse plants and animals. Media help steer nature and humans as logistical techniques linking the anthroposphere and the biosphere, whose fates are now linked. Humans are at the planetary helm: our shipwreck won't ruin the planet, which has survived much bigger catastrophes, but it could ruin us. Wreck ruins the ship, not

89. Walter Ong, *Orality and Literacy: The Technologizing of the Word* (London: Routledge, 1982), 82–83.

90. Martin Heidegger, "The Ode on Man in Sophocles' *Antigone*," *Introduction to Metaphysics*, trans. Ralph Manheim (New Haven: Yale University Press, 1987), 155.

91. André Leroi-Gourhan, *Gesture and Speech*, trans. Anna Bostock Berger (Cambridge, MA: MIT, 1993), 246; *Le geste et la parole*, vol. 2 (Paris: Albin Michel, 1965), 48: "l'apparition du chariot, de la charrue, du moulin, du navire est aussi à considérer comme une phénomène biologique."

the sea. What was always the case for human nature, at least since we acquired language, and probably much earlier with fire and bipedalism—head to toe artificialization—is now the case for all nature.

As the next chapter makes clear, an argument in favor of human technicity is not at all the same thing as an endorsement of the engineering culture of technologists. Rather, it is to attempt a better hold of the human condition by acknowledging a connection to each other and to sea, sky, and earth. Our home is among plants, animals, and the dead in all their varieties. Media are not just pipes or channels. Media theory has something both ecological and existential to say. Media are more than the audiovisual and print institutions that strive to fill our empty seconds with programming and advertising stimulus; they are our condition, our fate, and our challenge. Without means, there is no life. We are mediated by our bodies; by our dependence on oxygen; by the ancient history of life written into each of our cells; by upright posture, sexual pair bonding, and the domestication of fire; by language, writing, and metalsmithing; by farming and the domestication of plants and animals; by calendar-making and astronomy; by the printing press, the green revolution, and the Internet. We are not only surrounded by the history-rich artifacts of applied intelligence; we also *are* such artifacts. Culture is part of our natural history.[92] "That's the sort of determined creature we are," in poet Galway Kinnell's pun.[93] Microbes and bits are both media of existence. Media studies can be a form of philosophical anthropology, of asking the question with which Socrates stumped Alcibiades: What is a human being?[94] I am also stumped, but I offer one answer in the next chapter: The human is a creature sailing on many craft.

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

93. "Astonishment," *New Yorker*, 23 July 2012, 57.

94. Plato, *Alcibiades* I, 129e.