

Greening the Media

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INTRODUCTION

In the eager search for the benefits of modern science and technology we have become enticed into a nearly fatal illusion: that through our machines we have at last escaped from dependence on the natural environment.

—Barry Commoner, 1971, 12

The increasingly faster and more versatile computers, appealing mobile phones, high-definition TVs, Internet, tiny music players, ingenious photo cameras, entertaining games consoles and even electronic pets give us the idea of a developed, pioneering and modern world. It is indeed a new era for many; but the dark side of this prosperous world reveals a very different reality, that far from taking us to the future, takes us back to a darker past.

—Centre for Reflection and Action on Labour Issues, 2006, 4

We Have Met The Enemy and He Is Us.

—Pogo, *Earth Day*, 1970

Greening the Media focuses on the environmental impact of the media—the myriad ways that media technology consumes, despoils, and wastes natural resources. It introduces ideas, stories, and facts that have been marginal or absent from popular, academic, and professional histories of media technology.

Readers may not be surprised to discover that media technologies contain toxic substances, or that the workers who assemble their cell phones and computers do so under hazardous conditions. But if you are like us, you will be startled by the scale and pervasiveness of these environmental risks. They are present in and around every site where electronic and electric devices are manufactured, used, and thrown away, poisoning humans, animals, vegetation, soil, air, and water.

What follows is a list of the problems we examine in this book. They represent just a few of the ways that media technology has contributed to climate change, pollution growth, biodiversity decline, and habitat decimation—the constituents of our global ecological crisis.

In 2004, the Political Economy Research Institute shamed media owners by placing them at Numbers 1, 3, 16, 22, and 39 in its report *Misfortune 100: Top Corporate Air Polluters in the United States*. By 2007, a combination of information and communications technologies (ICT), consumer electronics (CE),¹ and media production accounted for between 2.5 and 3 percent of greenhouse gases emitted around the world. At that time, the Environmental Protection Agency (EPA) of the United States, a statutory authority, estimated that US residents owned approximately three billion electronic devices. The country's Consumer Electronics Association (CEA), which represents the industry's corporations, says \$145 billion was spent on its sector in 2006 in the United States alone, up 13 percent from the previous year. Since then, there has been an annual turnover of 400 million units, with well over half such purchases made by women.² The CEA refers joyously to a “consumer love affair with technology continuing at a healthy clip.” In the midst of a recession, 2009 saw \$165 billion in sales, and households owned between fifteen and twenty-four gadgets on average. By 2010, the country was spending \$233 billion on electronic products. Three quarters of the population owned a computer, nearly half of all US adults had a Moving Picture Experts Group Audio Level 3 (MP3) player, and 85 percent used a cell phone. Overall CE ownership varied with age—adults under forty-five typically boasted four gadgets; those over sixty-five made do with one.³

By all measures, the amount of ICT/CE on the planet is staggering. The investigative science journalist Elizabeth Grossman summarizes the situation this way: “No industry pushes products into the global market on the scale that high-tech electronics does. And no other industry employs a comparably complex global supply chain, both for manufacturing and for end-of-life materials recovery.”⁴

Rapid but planned cycles of innovation and obsolescence accelerate the production of electronic hardware and the accumulation of obsolete media, which are transformed overnight into junk. Today's digital devices are made to break or become uncool in cycles of twelve months and counting down (check your warranty). This may appear to be a welcome sign of abundance, a support for the idea that technological turnover is necessary and efficient—a good thing. But such growth comes at a cost. While it has helped enlarge the world economy by five times since the mid-twentieth century, the corresponding degradation of the globe's ecosystems has been 60 percent. If that rate is maintained, the economy will be eighty times

its current size by 2100; and the Earth's ecosystems?⁵ Even the Organisation for Economic Co-Operation and Development (OECD), perhaps the world's leading proponent of growth, acknowledges that prevailing "patterns of growth will compromise and irreversibly damage the natural environment."⁶

A sizeable amount of this invidious growth is linked to ICT/CE. By 2007, between twenty and fifty million tons of electronic and electric waste (e-waste) were being generated annually, much of it via discarded cell phones, televisions, and computers. E-waste has mostly been produced in the Global North (Australasia, Western Europe, Japan, and the United States) and dumped in the Global South (Latin America, Africa, Eastern Europe, Southern and Southeast Asia, and China) in the form of a thousand different, often lethal materials for each electrical and electronic gadget, though this situation is changing as India and China generate their own deadly media detritus.⁷

The extent of e-waste is truly astonishing. Twenty million computers fell obsolete across the United States in 1998; the rate was 130,000 a day by 2005. It has been estimated that the five hundred million personal computers discarded in the United States between 1997 and 2007 contained 6.32 billion pounds of plastics, 1.58 billion pounds of lead, three million pounds of cadmium, 1.9 million pounds of chromium, and 632,000 pounds of mercury. The EU is expected to generate upward of twelve million tons of e-waste annually by 2020.⁸ In 2007, the EPA reported that "of the 2.25 million tons of TVs, cell phones and computer products ready for end-of-life management, 18 percent (414,000 tons) was collected for recycling and 82 percent (1.84 million tons) was disposed of, primarily in landfill." Although refrigerators and refrigerants account for the bulk of e-waste from the EU, about 44 percent of its most dangerous e-waste measured in 2005 came from medium to small ICT/CE: computer monitors, TVs, printers, ink cartridges, telecommunications equipment, toys, tools, and anything with a circuit board.⁹

Enclosed hard drives, backlit screens, cathode ray tubes, wiring, capacitors, and heavy metals pose few risks while these materials remain encased. But once discarded and dismantled, ICT/CE have the potential to expose workers and ecosystems to a morass of toxic components. Theoretically, "outmoded" parts could be reused or swapped for newer parts to refurbish devices. But items that are defined as waste undergo further destruction in order to collect remaining parts and valuable metals, such as gold, silver, copper, and rare-earth elements. This process causes serious health risks to bones, brains, stomachs, lungs, and other vital organs, in addition to birth defects and disrupted biological development in children. Medical catastrophes can result from lead, cadmium, mercury, other heavy

metals, poisonous fumes emitted in search of precious metals, and such carcinogenic compounds as polychlorinated biphenyls (PCBs), dioxin, polyvinyl chloride (PVC), and flame retardants.¹⁰

One might think that understanding the enormity of the environmental problems caused by making, using, and disposing of media technologies would arrest our enthusiasm for them. But many intellectual correctives to our “love affair” with technology—our technophilia—have come and gone without establishing much of a foothold against the breathtaking flood of gadgets and associated propaganda promoting their awe-inspiring capabilities.¹¹

It is difficult to comprehend the scale of environmental destruction when technology is depicted in popular and professional quarters as a vital source of plenitude and pleasure, the very negation of scarcity and dross. In economies in which the watchword is growth, consumerism has become virtually uncontested as the cultural norm. A high-tech version of this consumerism assumes people to be calculating machines designed for shopping and pleasure seeking.¹² Perhaps the obsession with immediacy and interactivity via networks induces an ignorance of the intergenerational effects of consumption, inhibiting our awareness of the long-term harm to workers and the environment. Could constant connectedness be actively diminishing our ethical ability to dwell on interconnections between the present and future, between media and the Earth?

The enchantment with media technology certainly clouds much of the received history on the subject, making it hard to perceive its material connection to ecological decline. Social scientists have argued that widespread resistance to a critical, secular view of technology can be attributed to the *technological sublime*, a totemic, quasi-sacred power that industrial societies have ascribed to modern machinery and engineering. The emergence of the technological sublime has been connected to the Western triumphs of the post–Second World War period, when technological power supposedly supplanted the power of nature to inspire fear and astonishment.¹³

Media history is replete with similarly mad visions of technology’s potent blend of magic and science. In the nineteenth century, people were supposedly governed by electrical impulses. Telegraphy was conceived of as a physical manifestation of human intellect that matched the essence of humanity with the performance of labor. In the early twentieth century, radio waves were said to move across “the ether,” a mystical substance that could contact the dead and cure cancer. During the interwar period, it was claimed that the human “sensorium” had been subjected to “training” by technology. By the 1950s and ’60s, machines were thought to embody and even control consciousness.¹⁴ In our own time, this strange enchantment has attached itself to wireless communication, touch-screen phones and

tablets, flat-screen high-definition televisions, 3-D IMAX cinema, mobile computing, and so on.

Three qualities endow the media with unique symbolic potency—volume, verisimilitude, and velocity. The media proliferate everywhere and all the time; they are good at producing the truth; and they are increasingly quick at doing so. In addition, the technological sublime that governs their reception and use is reinforced by what media scholars Tammy Boyce and Justin Lewis call the “virtual nature” of media content, which diverts attention from the industry’s “responsibility for a vast proliferation of hardware, all with high levels of built-in obsolescence and decreasing levels of efficiency.”¹⁵ This is a longstanding tendency. According to Grossman, built-in or planned obsolescence entered the lexicon as a new “ethics” for electrical engineering in the 1920s and ’30s, when marketers, eager to “habituate people to buying new products,” called for designs to become quickly obsolete “in efficiency, economy, style, or taste.”¹⁶ Fast fashion and short life span certainly characterize ICT/CE products, with cell phones and computers leading the charge. And as planned obsolescence, fast fashion, and short life span reach “dizzying new heights,” there is an overstated sense of preeminence and newness attached to whatever the latest media gadget happens to be. Sociologists have identified a “cult of the present,” comprised mainly of cyberenthusiasts, who fetishize novelty as if each new version magically reboots their hipster identity into a perpetual now-ness.¹⁷

References to the symbolic power of media technology are so ubiquitous that they incite minimal if any scrutiny. The hymnal can be found across the internet, the press, children’s textbooks, and academia. Although the litany is banal, its repetition is somehow exciting: technologies change us; the media will solve social problems or create new ones; monopoly ownership no longer matters; the internet killed journalism; social networking enables social revolution; the planet must be comprehensively wired; every child must have a laptop; cell phones must proliferate; the media deliver a cleaner, postindustrial capitalism; and we must all become cultural producers.¹⁸

Here is one commonly heard assessment of media technology from the twilight zone of the technological sublime:

A major feature of the knowledge-based economy is the impact that ICTs have had on industrial structure, with a rapid growth of services and a relative decline of manufacturing. Services are typically less energy intensive and less polluting, so among those countries with a high and increasing share of services, we often see a declining energy intensity of production . . . with the emergence of the Knowledge Economy ending the old linear relationship between output and energy use (*i.e.* partially de-coupling growth and energy use).¹⁹ (Houghton, 1)

Such statements are filled with technologists' jargon. They mix half-truths and utter nonsense. In reality, old-time, toxic manufacturing has moved to the Global South, where it is ascendant; pollution levels are rising worldwide; and energy consumption is accelerating in residential and institutional sectors, due almost entirely to ICT/CE usage, despite advances in energy conservation technology. As we will show, these are all outcomes of growth in ICT/CE, the foundation of the so-called knowledge-based economy. ICT/CE are misleadingly presented as having little or no material ecological impact.

GREENING THE MEDIA

We have written this book knowing that a study of the media's effect on the environment must work especially hard to break the enchantment that inflames the popular and elite passion for media technologies. We understand that the mere mention of the political-economic arrangements that make shiny gadgets possible, or the environmental consequences of their appearance and disappearance, is bad medicine. It's an unwelcome buzz kill—not a cool way to converse about cool stuff. And it won't win us many allies among high-tech enthusiasts and ICT/CE industry leaders.

We do not dispute the importance of information and communication media in our lives and modern social systems. We are media people by profession and personal choice, and deeply immersed in the study and use of emerging media technologies. But we think it's time for a balanced assessment with less hype and more practical understanding of the relation of media technologies to the biosphere they inhabit.

This book is our attempt to present the issues in a critical manner with an eye to how media consumers, activists, researchers, and policy makers can move ICT/CE production and consumption toward ecologically sound practices. In the course of this project, we have found in casual conversation, lecture halls, classroom discussions, and correspondence consistent and increasing concern with the environmental impact of media technology, especially the deleterious effects of e-waste toxins on workers, air, water, and soil. We have learned that the grip of the technological sublime is not ironclad. Its instability provides a point of departure for our investigation and critique of the relationship between the media and the environment. As we will show, there is no place for the technological sublime, technophilia, or technological fads in projects to green the media.²⁰

Chapter 1 addresses media consumers in order to clarify the material and ethical issues attendant to the rapidly growing rates of ICT/CE

production and consumption. Our prognosis for individuals and institutions encourages a more-considered judgment of the relation between the environment and technology. The way technology is experienced in daily life is far removed from the physical work and material resources that go into it. In this sense, consumers experience the technological sublime in a manner reminiscent of what Karl Marx called “the Fetishism which attaches itself to the products of labour” once they are in the hands of a consumer, who lusts after them as if they were “independent beings.”²¹ There is a direct but unseen relationship between technology’s symbolic power and the scale of its environmental impact, which the economist Juliet Schor refers to as a “materiality paradox”—the greater the frenzy to buy goods for their transcendent or nonmaterial cultural meaning, the greater the use of material resources.²² We think that ecologically sound uses of media are possible without the overblown emphasis on technology’s wonders, but reenchancement with both low-wattage culture and nonhuman nature are prerequisites. To that end, we introduce three forms of ecological ethics for assessing attitudes and actions that affect the environment—one that is human centered, another that is Earth centered, and another somewhere in between. With an eco-ethical turn away from the technological sublime, and technophilia more generally, we pose some key questions for readers to consider as they work through the book. The first and most important question to ask is how much media technology is socially necessary, not only on an individual or household basis but also on institutional and social scales. In addressing this question, our focus moves from the limitations of green consumption onto key case studies of the media’s environmental and labor problems, concluding with possibilities for green governance, green citizenship, and green media design.

In chapters 2 and 3, we assess the material environmental impact of media technologies—from paper to tablet computers—by investigating the ecological context of “words” and “screens” respectively. We have built brief historical accounts of media technology from an ecological perspective into chapters 2 and 3. When we began our research, there was no tradition of ecological media history to draw on. But although this story has yet to be comprehensively documented, we discovered evidence of a fascinating, infuriating, complex, and contradictory historical relationship between media, environment, and society. In parallel to a succession of key moments in capitalist development, environmental effects of media technology began to emerge in small, incremental stages in the fifteenth century. The volume of toxic drips and harmful puffs increased over four centuries, spreading across the Earth in a pattern of uneven development established by merchants, mercenaries, and missionaries. The Industrial

Revolution brought crucial transformations in the scale and scope of media technology, as the convergence of chemical, mechanical, and electrical processes accelerated the accumulation of toxins in the environment. In the twentieth century, these innovations launched the era of electronic media and US hegemony while increasing the burden borne by the Earth's ecosystems.²³

In chapter 4, we examine the relationship between the environment and labor in the global assembly lines and salvage/recycling yards where media technologies are built and dismantled. We draw on supply chain research to comprehend the global scale and intersectoral linkages that characterize ICT/CE "labor convergence."²⁴ We find that the greening of ICT/CE labor will require a broad international effort to bring about structural changes in the production, distribution, and disposal of media technologies. This necessitates greater transparency in working conditions throughout the ICT/CE supply chain, a goal that can unite workers, activists, researchers, policy makers, and unionists.

In chapter 5, we evaluate the environmental effects of bureaucratic thinking in the design, deployment, and regulation of ICT/CE. We focus on the gains and obstacles to green global governance enacted by decision-making bureaucrats, who play an important gatekeeping role in determining the ICT/CE we get and how their production, consumption, and disposal is regulated. We offer a brief historical account of bureaucratic thinking about technology and an assessment of the eco-ethics upon which such thinking is predicated. We use two case studies to illustrate current business strategies for large-scale green projects, and in a final section we review global policies that reflect bureaucratic approaches to green governance. We find some promising changes in state and corporate governance, but the bulk of bureaucratic thinking remains anchored to the belief that unfettered economic growth is necessary and good, with the eco-ethical limitations that this implies.

We sharpen this critique in chapter 6 by turning to green citizenship and governance. Here, we had to modify fundamental notions of citizenship, which are rooted in ideas of national rights and responsibilities, to account for the transterritorial nature of ecosystems and the global division of labor around ICT/CE. We offer examples of three emerging forms of green citizenship identified by the eco-political economist John Barry: he suggests that *environmental citizenship* is practiced part-time within such institutional settings as schools, offices, and other workplaces; *sustainability citizenship* strives for broad systemic change, with examples found in a mix of the research- and policy-oriented work of critical advocacy groups, scholars, unionists, and activists; and *resistance citizenship* involves direct

action designed to pressure corporate and government bureaucrats to revolutionize their behavior, policies, and practices, and is enacted by groups like Greenpeace.²⁵ This chapter concludes with the fictional odyssey of a green citizen on a quest to uncover the environmental and labor conditions within the global supply chain of ICT/CE. This scenario is also something of a synthesis of the book's analysis. It helps us imagine not only the obstacles faced by a dedicated green citizen but also many of the conditions needed to green the media.

We hope to make a convincing case that the media are, and have been for a long time, intimate *environmental participants*. In researching this book, we have learned that technology is yesterday's, today's, and tomorrow's news, but rarely in the way that it should be. The prevailing myth is that the printing press, telegraph, phonograph, photograph, cinema, telephone, wireless radio, television, and internet changed the world *without* changing the Earth. In reality, each technology has emerged by despoiling ecosystems and exposing workers to harmful environments, a truth obscured by both symbolic power and the power of moguls to set the terms by which such technologies are designed and deployed. Those who benefit from ideas of growth, progress, and convergence, who profit from high-tech innovation, monopoly, and state collusion—the military–industrial–entertainment–academic complex and the multinational commanders of labor—have for too long ripped off the Earth and workers. The implications are stark. They inform what is to come in this volume.²⁶

. . .

As teachers and researchers, we are concerned with how media studies and the related fields of communication, film, literary, and cultural studies have addressed the environmental impact of media technology. You may choose to follow us into this review of media studies. If you're more interested in the book's ecological analysis of media technology, do turn to the next chapter!

Although these disciplines have distinct traits and traditions, they have all largely ignored the physical environmental effects of media (spoiler alert) because of their overriding interest in consciousness. They focus on how books, newspapers, magazines, advertisements, films, programs, games, conversations, and sites reflect, refract, or create states of mind in audiences. This is so whether the topic is media effects, psychoanalysis, ownership, control, imperialism, play, interpretation, or textuality. The field has largely neglected the physical environment. Can it be nudged toward a materialist ecology?

MEDIA STUDIES

The central event of the 20th century is the overthrow of matter. In technology, economics, and the politics of nations, wealth—in the form of physical resources—has been losing value and significance. The powers of mind are everywhere ascendant over the brute force of things. (Esther Dyson, et al., 1994, 1.)

Most media experts would find little to criticize in this quotation from the modestly entitled *Magna Carta for the Knowledge Age*. For them, the principal role of the media is to inform, entertain, and involve the public, providing a grand conduit of knowledge and hence consciousness, a universal, devolved system of making meaning that transcends the centralized model of the mass media, transforming each consumer into a producer in the process. Information has been supplemented, and in some ways supplanted, by participation, with an emerging cacophony of democratic urges. The power of the mind is supposedly ascendant, thanks to the liberating role of ICT/CE.

Due largely to a surge of interest in the internet, books on technology make up over a fifth of media studies titles available in the United States.²⁷ Underlying this tendency is a tacit understanding that the materiality of technology—and its magical qualities—come prior to accompanying topics: Before there can be a story to analyze, a message to decode, or a pattern to identify in collective or individual media use, there has to be a physical medium, a technical means of communication. Books, magazines, money, and other printed media rely on a chain of production that begins with papermaking and printing. Similarly, radios, televisions, computers, cell phones, and music players arrive in our homes and offices with assembled and packaged parts derived from materials that have been excavated and manufactured, and delivering them relies on an array of electrical and electronic technologies. Cable and airborne networks are comprised of technologies that make the media possible. In short, apart from the immediate surroundings of offices, factories, forests, homes, vehicles, underpasses, jungles, stadia, prisons, mountains, parliaments, deserts, oceans, skies, hospitals, cemeteries, cinemas, and campuses where people engage the media, the physical foundation of media studies is machinery that is created and operated through human work, drawing on resources supplied by the Earth.

Despite this fact, media students and professors generally arrive at, inhabit, and depart universities with a focus on textuality, technology, and/or reception; they rarely address where texts and technologies physically come from or end up. Media critics for newspapers, podcasts, magazines, blogs, television, or radio may be more attuned to this political

economy, at least in terms of how corporations promote their wares, but they rarely share such knowledge with their audiences.

Media studies abstains from deep analysis of technology's materiality in part because the field remains in thrall to two largely distinct but eerily compatible discourses: First, a cult of humanism adores the cultural devotion afforded by consumer technologies that generate millions of texts and address viewers and users as empowered. Second, a cult of scientism adores the mathematicization of daily life afforded by the digital and its associated research surveillance of everyday life.²⁸

The humanistic side treats media technology as an enabler of human understanding, a tool for extending our capacities for expression and exchange. The mechanistic side draws on the scientific impulse to break down components of machines and study the entirety of communication. The former looks at relationships, relying on metaphors and pictorial codes; the latter looks at audiences, relying on linguistic codes and algorithms. The humanistic thinker emphasizes that technology is "a central character and actor in our social drama";²⁹ the mechanistic one emphasizes its linear progression from the Stone Age to computing.

Humanistic forms of inquiry have focused on themes raised in the content of texts and genres in the context of authors and societies, with a basis in rhetorical and novelistic writings from the principal Romance languages. Literary studies has provided a template through its claim to produce citizens imbued with national values. The history of printing has been peripheral to the mission of the study of English; thus, technological history has been a recent innovation across the humanities, largely being introduced in media studies. But a deeper ecological materiality has eluded the humanistic knowledge of media technology.

The humanistic bias that nature "is there for people to exploit" feeds into a binarism between nature and culture. It forgets the oneness of matter that René Descartes recognized, and the truly radical dimension of Darwinian evolutionary theory—not that we have ascended from others, but that we are inextricably related to them, logocentrically interdependent with forms of life that were previously deemed inferior.

What would happen to the humanistic approach if an ecological context were highlighted? Its focus on the symbolic environment would be enhanced by articulating links between the environmental impact of media technology and, say, media representations of the environment, from Romantic ideas of machines in the pastoral idyll to depictions of technological remedies for natural disasters in popular film, fiction, and TV. Such a transformation could link the humanities to the synthetic chemical ecology that people have introduced to the Earth as they have developed the media.³⁰

What would become of the mechanistic tradition, which has been a core element of the social sciences' claim to generate useable knowledge that can improve life, if an ecological context were focused on? This approach has paralleled and sometimes mimicked the rational-scientific methods of media engineers and designers. It drew early inspiration from telecommunications systems to envisage a network of compartments that would connect senders, channels, and receivers. Interest in the first two aspects faded quickly, and communication research began a decade-long concentration on reception. This served two powerful constituencies. In the 1920s and '30s, research on radio and film responded to anxieties about unruly domestic and insurgent international populations. Media technologies were perceived as persuasive machines that could influence people's worldviews to shape political and commercial outcomes. Much US social science research on the media, for example, developed as an extension of foreign policy (propaganda studies) and as academic support for the capitalist media (market research and audience studies).³¹ Methods were shared across commercial, academic, and governmental enterprises, creating a range of quantitative tools for observing large-scale social phenomena. This tradition envisioned technologies in narrower and more fragmented ways than humanistic media studies. Quantification of a medium's use, type, spatial distribution, component composition, and other related data was scarred by highly partial but pseudo-objective analytical contexts. The weakness of such knowledge is exposed when it is applied without a humanistic compass for direction—and via simplistic experiments whose results an eight-year-old could foretell.³²

One of the most influential ideas guiding both wings of media studies is that new technologies redefine the social and cultural relationships that earlier media helped shape. As the economic historian Harold Innis put it in the middle of the twentieth century, "The demands of the new media" are "imposed on the older media."³³ Old media cannot carry certain new content, such as streamed words and images in print. They are displaced by new media delivering higher-potency versions of old content through new channels (words and data are transmitted via telegraph and telephone; words, data, and music via radio; words, data, music, and images via TV and the internet; and so on). Some theorists regard these new media as additive rather than subtractive, cross-referencing one another and serving different as well as overlapping people and interests in "peaceful coexistence." For others, the arrival of the internet changes the story. They proclaim, for example, "la fin de la télévision" [the end of television] or even that "la televisión ha muerto" [television is dead].³⁴ It is true that most forms of new media have supplanted or supplemented earlier ones as central organs of authority and pleasure: newspapers versus speeches,

films versus plays, and records versus performances. TV blended what came before it and became a warehouse of contemporary culture. Today, the model of incorporation continues, but without necessarily terminating earlier forms. Television models the internet and vice versa, while print and telephony expand due to their convenience and durability.³⁵ And established cultural producers dominate across these media. Cybertarian true believers commonly refer to other forms of knowledge as “legacy media” and celebrate the idea of audiences transformed into producers. But many people visit websites that are really rather distant from these dreams, such as the BBC for news, which employs a lot of professionally trained journalists; YouTube for drama, which features material from TV; and Wikipedia for background, which follows the eighteenth-century format of an encyclopedia.³⁶

Sometimes these changes and predictions are celebrated; sometimes they are denounced. On the one hand, media studies buys into the individualist fantasy of reader/audience/consumer/player autonomy—the libertarian intellectual’s wet dream of music, movies, television, and everything else converging under the sign of empowered fans. On the other, it buys into the corporate fantasy of control—the political economist’s arid nightmare of music, movies, television, and everything else converging under the sign of empowered firms. Those antinomies shadow the fetish of innovation that informs much discussion of media technology, while ignoring the environmental destruction and centralized power that underpin it.

Media studies *does* provide a political-economic framework for understanding media technology, but the tendency is marginal, especially in the United States.³⁷ A few scholars have addressed the nexus of management, empire, labor, and the media from an ecological point of view.³⁸ But such a focus remains largely neglected next to the fulsome joy with which the “new” is made welcome. Consider the “new Right” of media studies, which invests in Schumpeterian entrepreneurs, evolutionary economics, and “creative industries” with unparalleled zest. It never saw an app it didn’t like, or a socialist idea it did.³⁹ Innovation animates economic growth as new products and services destroy existing ones, with anyone left standing the beneficiary. For example, Manuel Castells’s discussion of environmental movements fails to identify information technology’s polluting side, even as he details the movement’s reliance on such technology.⁴⁰ The irony of exemplary ironies.

The philosopher John Dewey may have been the first to suggest that communications exerted an environmental influence upon the organization of society⁴¹; the literary critic Marshall McLuhan went on to speak of the environment as a central concern of “media study.” For McLuhan, a

“TV is environmental and imperceptible, like all environments.” This was the medium’s famous message, the expert analysis of which McLuhan hoped would elevate media studies as a discipline (helping the fish become conscious of the water, as it were).⁴² Although the fortunes of McLuhanism waned academically, in the United States at least, by the 1970s, the idea had taken hold that media analysis was “resolved with a metaphor” of environments.⁴³ This substitution by the metaphorical still obscures the ecological context of media technology (search any database for media and environment, environmental impact of media, media and ecology, or related phrases, and you will see what we mean). And McLuhan’s belief that “as software information becomes the prime factor in politics and industry . . . suddenly *small is beautiful*”⁴⁴ continues to hold sway over the dematerializing fantasies of cybertarians.

Orthodox histories of media technology provide non-ecological, teleological narratives of heroic business innovators and plucky independent inventors dialing up freedom and fun for consumers, ringing in new forms of public knowledge to satisfy an innate desire for progress and artistic realism. Film critic André Bazin, for instance, tells us that film emerged as “an idealistic phenomenon,” with economic and social relations following the lead of desire—the desire for realism in cinema.⁴⁵ This mimetic fallacy assumes that the power of artists’ and audiences’ desires drives technological innovation in the media.⁴⁶

In accordance with these foundation myths, conventional accounts chart successive new media technologies appearing along relatively autonomous and benign paths that are as additive as they are competitive, as syntagmatic as they are paradigmatic. This history is rife with narcissistic accounts from the media themselves, which often tell us that digitization derived from the laid-back musings of California dreamers (what we sometimes refer to as “fun stuff”) rather than the military–industrial–entertainment–academic complex. Digitization supposedly fused the media in the 1980s to create today’s *Aufklärung*, delivering text, voice, data, video, and music to consumers and enabling them, *Gestalt*-like, to become producers.⁴⁷ “Prosumers” allegedly emerged from the dream to take over the means of production, streaming onto computers of every size and resolution—from tiny cell phones through middling laptops to large flat-screen TVs.⁴⁸ The cultural historian Andrew Ross describes prosumption as referring to “consumers who do more and more of the work that producers used to pay employees for.”⁴⁹ The prosumer is subject to the simultaneous triumph and emptiness of commodity aesthetics, in which signs substitute as sources and measures of value. The symbolic power of media technology is enhanced by the idea of a liberated consumer, which, like the commodity sign, provides no residual correspondence to a reality other than its own.⁵⁰ In embracing

simulation, “human needs, relationships and fears, the deepest recesses of the human psyche, become mere means for the expansion of the commodity universe.”⁵¹ Sociologist Jean Baudrillard laments a “submission to technology and to the crushing virtual reality of the networks and programs.” He argues that this dependence “is irreversible as it is the result of the fulfillment of our desires.”⁵² Likewise, for the philosopher Max Horkheimer, the supposedly resistant consumer is susceptible to a new mastery, and a new servitude, to those who labor to serve and shape that consumer—who, in another role, might be a different kind of person.⁵³ Meanwhile, marketers delight in selling this historical achievement as, for example, a “new TV ecosystem.”⁵⁴

Such odes to keyboard dexterity are hardly novel. Seventy years ago, Walter Benjamin wrote of photography that “a touch of the finger now sufficed to fix an event for an unlimited period of time.” Since the 1970s, “knowledge workers” have gained in status among economists thanks to information-based industries that promise endless gains in productivity and the purest of competitive markets. They form what geographer Joel Kotkin calls a putative “aristocracy of talent” elevated by the meritocratic discourse of progress, informatization, and the “creative industries,” luxuriating in ever-changing techniques, technologies, and networks. According to sociologist Armand Mattelart, because their work is abstracted from physical, dirty labor, knowledge workers thrive in the twilight zone of the technological sublime. Literary critic Michael Hardt and philosopher-politician Antonio Negri graphically, romantically, and inaccurately refer to the exchange of information, knowledge, and emotion that happens on computers as “immaterial labor.”⁵⁵ Business people love this form of talk, even dreaming up the term “virtual workers.”⁵⁶ Right-wing futurist Alvin Toffler invented the related concept of “the cognitariat,” which has since been taken up and redisposed by progressives. Negri uses the term to describe people mired in contingent media work who have heady educational qualifications and a grand facility with cultural technologies and genres.⁵⁷

This Pollyannaish decoupling perhaps reaches its acme in telecommuters, who not only have paper-free offices, but office-free work. Like the defense attorney Mickey Haller in Michael Connelly’s hardboiled Los Angeles novels, who works in a Lincoln Town Car driven by an ex-client, they operate from wires rather than buildings. But, according to the Institution of Engineering and Technology, the net amount of energy saved from telecommuting in the United States is, at best, 0.4 percent, because while people no longer drive to work, they end up living in suburbia and hence travel sizeable distances to experience actual life, in addition to increasing their domestic power use monumentally.⁵⁸

The cognitariat plays key roles in the production and circulation of goods and services by creating and coordinating media technologies and texts. It is defined by a narrow focus on consciousness:

- artists, comprising musicians, directors, writers, and journalists
- artisans, including sound engineers, editors, graphic designers, and cinematographers
- impresarios, connecting proprietors and executives to artists
- proprietors and executives, controlling employment and investment, negotiating with states
- audiences and consumers, paying for content, interpreting it in order to give media meaning, and eliding real barriers of entry to media production through their dubious anointment as producer-consumers (prosumers)

These groups operate within institutional contexts:

- private bureaucracies, controlling investment, production, and distribution across the media
- public bureaucracies, offering what capitalism cannot, while comporting themselves in an ever-more commercial manner
- small businesses, run by charismatic individuals
- networks, fluid associations formed to undertake specific projects

Most writings in media studies constrict the ambit of media labor such that the industry mavens and spectators listed above define production. This mirrors the growth ideology and apolitical enchantment with media technologies found in most trade publications, entertainment news outlets, and fan culture.

In contrast, a growing body of critical scholarship into media labor is generating information from below the line of elite industry research, drawing on more diverse and independent sources, including labor unions and policy analysis, to consider the physical nature of work and what it does to people and the environment. Examples include Luis Reygadas's account of how television sets are made in Mexico, Jefferson Cowie's study of RCA's "seventy year quest for cheap labor," Pun Ngai's time spent on the electronics production line in China, and Vicki Mayer's investigation of similar workers in Brazil.⁵⁹

And the novelist Ralph Ellison tells a tale that doesn't suit the triumphalism of the new that impels conventional media history:

Like so many kids of the Twenties, I played around with radio—building crystal sets and circuits consisting of a few tubes, which I found published in radio magazines.

At the time we were living in a white middle-class neighborhood, where my mother was a custodian for some apartments, and it was while searching the trash for cylindrical ice-cream cartons which were used by amateurs for winding tuning coils that I met a white boy who was looking for the same thing. I gave him some of those I'd found and we became friends. . . . I moved back into the Negro community and . . . was never to see him again. (quoted in Smith, 2003, 93)⁶⁰

Ellison's story about scavenging for parts to build crystal sets reminds us that the history of media technology is rarely written as a sequence of happy or harmful accidents, or the outcome of searing racism. In this case, chance brought two young radio enthusiasts together, then discrimination kept them apart. Such an anecdote requires that we rethink standard explanations. The mimetic fallacy, a sweet story of art, markets, realism, or innovation that purportedly shapes technological change in the media, does not explain, for example, why film stock once privileged white skin tones over black. This occurred because the development of dye couplers to highlight darker-toned skin was not a priority for the movie industry. Whiteness came cheaply and early, at the nexus of aesthetics, chemistry, commerce, and race—a nexus that should disturb causation myths of immanent realism, pure supply and demand, or apolitical technological progress.⁶¹

Those of us who study, write, and teach about the media have an historic responsibility. Media studies must erase “the tenacious division that for so long separated sciences of description and sciences of interpretation, morphological studies and hermeneutical analysis,” recognizing with the cultural historian Roger Chartier that the “world of text . . . [is] a world of objects and performances.” The media must be traced through “their different and successive materialities,” accounting for both their open, malleable, polyphonic qualities and their closed, fixed, monaural ones.⁶² Media texts and technologies accrete and attenuate meanings on their travels as they rub up against, trope, and are troped by other fictional and factual texts, social relations, and material objects and as they are interpreted by readers—all those moments that allow a book, for example, to become a “literary thing.”⁶³

Understanding the media requires studying them up, down, and sideways, as found in notable anthropological approaches such as Laura Nader's ethnography of the powerful, George Marcus's multisited analysis, and Néstor García Canclini's insistence that “macrosociological approaches, which seek to understand the integration of radio, television, music, news, books, and the internet in the fusion of multimedia and business, also need an anthropological gaze, a more qualitative perspective, to comprehend how modes of access, cultural goods, and forms of communication are being reorganized.”⁶⁴ This means knowing which companies make media

technologies and texts; the physical processes of production, distribution, and consumption; the systems of cross subsidy and monopoly profit making; the complicity of media coverage, regulation, and ratings with multinational corporations' business plans in the circulation of texts; and press coverage of stars and awards, *inter alia*.

These approaches fruitfully connect media analysis to what literary critic Ian Hunter calls an "occasion . . . the practical circumstances governing the composition and reception of a piece," or as in the communicologists Alec McHoul and Tom O'Regan's description of a "discursive analysis of particular actor networks, technologies of textual exchange, circuits of communicational and textual effectivity, traditions of exegesis, [and] commentary and critical practice," with links to models of sender–message–receiver and encoding and decoding information.⁶⁵ These authors attempt to deliver us from the clutches of "immanence, from the imprisonment in corpses considered as unique dispensers of meaning," as do the ethnographer Bruno Latour and his followers with their actor network analysis of contemporary life as the sum of equal and overlapping influence among natural phenomena, social forces, and cultural production.⁶⁶ Latour notes: "Every type of politics has been defined by its relation to nature, whose every feature, property, and function depends on the polemical will to limit, reform, establish, short-circuit, or enlighten public life."⁶⁷ The linguist Stephen Muecke puts it another way: "We have only ever managed to philosophise with the help of things: the turning stars, apples which fall, turtles and hares, rivers and gods" and, for media studies, "cameras and computers."⁶⁸ Just as objects of scientific knowledge come to us in hybrid forms that are coevally affected by society and culture, so the latter two domains are themselves affected by the natural world.⁶⁹

Media technologies are creatures, then, of ideology, symbolic power, "corporations, advertising, government, subsidies, corruption, financial speculation, and oligopoly."⁷⁰ Yet they are not mere epiphenomena arising from this nexus of political and economic forces; nor are they simply channels of meaning and pleasure or dumb industrial objects. Rather, they are all these things. They are hybrid monsters, subject to rhetoric, status, and technology—to value, power, and science—all at once but in contingent ways.⁷¹ Thus, engagements with media technologies and texts must account for the conditions under which they are made, circulated, received, interpreted, criticized, and disposed of, considering all the shifts and shocks that characterize their existence as commodities—their ongoing renewal and disposal as the temporary "property" of varied, productive workers and publics. As a medium passes across space and time, it is remade again and again by institutions, discourses, and practices of distribution, reception, and disposal. That takes us beyond the rather musty corridors of academic

labor and media critique; it hauls us into the polluted corridors of material production and death that derive from a risk society.

Early modernity was about producing and distributing goods in a struggle for the most effective and efficient industrialization, with a devil-take-the-hindmost mentality and little consideration of the environment. We can see instances of this in capitalism's imposition of time discipline over working-class life. The risks posed by the unruliness of both capitalism's basic nature and the proletariat had to be managed to serve growth and progress. The result improved the productivity of industrial labor but introduced potential and actual harms to workers' minds, bodies, and communities. The increasing velocity of production and an unprecedented variety and volume of commodities fostered a fetishism that was detached from the natural environment.

Today, risk society is about enumerating and managing those threats via probability, by imagining possible outcomes. Rather than being an occasional factor, risk is now part of what it means to be modern. This aspect of modernity is characterized by having ever-more sophistication in measuring risks, even as their range and impact grow less controllable, because the technologies and markets that "improve" life also add unforeseen dangers. Risk societies admit and even promote the irrationality of the economy as a means, paradoxically, of governing populations. They naturalize despoliation, global labor competition, cyclical recession, declining life-long employment, massive international migration, overreaching technologies, and diminished welfare-state protections.⁷²

Ironically, the future orientation of risk society lacks the revolutionary sensibility of forward-thinking politics. Denizens of risk societies factor costs and benefits into everyday life as never before, while their sense of being able to determine the future through choice is diminished. The obsession with risk as inevitable weakens ideological commitments to Marxism, feminism, and anti-imperialism, for unlike the notions of a broad Left that once infused the struggles involved in these movements, political and social issues are delinked from a central organizing critique. A position adopted on, for instance, ecologically sound consumption says nothing about a position on popular democracy. The calculation of chance worsens the odds for radical change.⁷³

We think media studies can counter such approaches by relinking probability to politics. But, to do so, it must rethink the displacement of *meta-récits* such as Marxism, since that preference ironically mirrors capitalism's focus on microeconomic theory, privileging the firm and the consumer as units of analysis over attempts to understand *cui bono*.⁷⁴

Rather than the sender–message–receiver models of US communication studies, the circuit-of-culture methods of British cultural studies, or

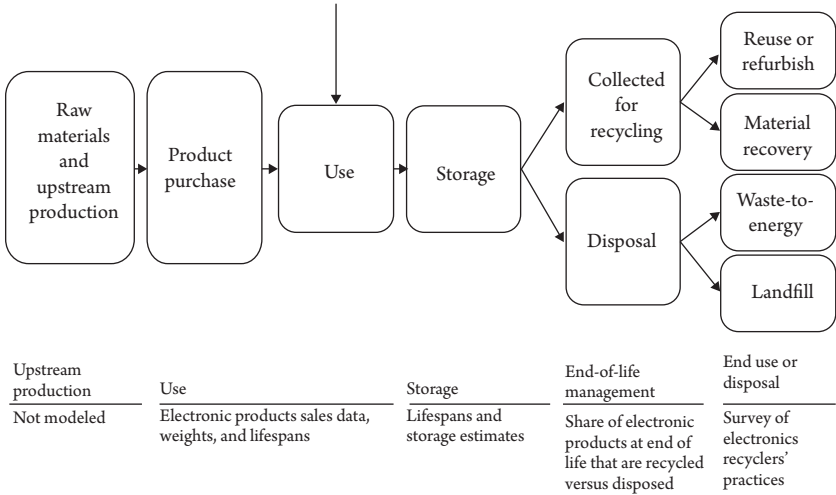


Figure I.1: The Life of Electronic Objects

the active-audience pleasures of feminist media studies, we need to look at what happens to objects as much as at brains (see Figure I.1).

This means following some surprising tracks, such as the critical path outlined in the US federal government's 2011 report on e-waste.⁷⁵ And the implications of doing such work are uncomfortable—as ironic as the massive proliferation of “green” branding skewered by *The Onion*'s “Obligatory Green Issue,” an “all-paper salute to the environment,” and as paradoxical as the fact that environmental scientists use energy to undertake and disseminate research that shows we must use less energy. After all, many of us grew up driven—or orchestrated—by the tenet that when we “add writing” to evolution, “history proper begins.”⁷⁶

Can a single critic or academic do such work? Collaborative scholarship is mostly frowned upon—or at least not understood—beyond the sciences. A commitment to the single-authored monograph's aesthetic-monastic model of knowledge entrenches such backwardness. We must get beyond that to create teams of scholars and activists from right across the human and other sciences, especially given the paucity of cradle-to-grave media work, using Chartier's fascination with archives and libraries and Latour's focus on factories and laboratories.⁷⁷ Core research subjects for this type of analysis include:

- policy documents from public bureaucracies (international, national, regional, state, and municipal governments) and private bureaucracies (corporations, lobby groups, research firms, nongovernment organizations, religions, and unions) on media subvention, awards, raw materials, and recycling

- debates (congressional/parliamentary, press, lobby-group, activist, and academic) pertaining to cultural and environmental policy
- budgets (for paper makers, printers, and publishers, for example)
- laws (relevant legislation and case law about labor, copyright, environmental impact, importation, and censorship)
- histories (acknowledging what came before and what is new)
- places (analysts in the Global North and South contextualizing their findings as partial, not universal, by examining other examples)
- people (who is included and who is excluded, who is highlighted and who is hidden, when technologies and texts are made)
- pollution (the environmental costs of textuality)
- science (independent, not just corporate, research)

Moving agilely between systems of subsidy, forms of policing, plans for commodification, methods of governmentality, and practices of waste disposal will help media studies intervene in the environmental relation between technologies and texts. As the current celebration of media technology inevitably winds down, perhaps it will become easier to comprehend that digital wonders come at the expense of employees and ecosystems. This would return us to Max Weber's insistence that we understand technology as a "mode of processing material goods." Conversation analyst Harvey Sacks explains that "the failures of technocratic dreams that if only we introduced some fantastic new communication machine the world will be transformed" derived from the very banality of such introductions—that every time they take place, one more "technical apparatus" is simply "being made at home with the rest of our world."⁷⁸ Media studies can join in this banality or withdraw the welcome mat for media technologies that despoil the Earth and wreck lives of those who make them. It is time to green the media by greening media studies.

CHAPTER 1



Consumers

If you . . . want the latest and greatest . . . you have to buy a new iPod at least once a year . . . Apple has a really strong environmental policy.

—Steve Jobs, quoted in Slade, 2007, 76¹

Only recently have we started to understand the negative impacts of digital electronic equipment worldwide. Most of us, overwhelmed by the technological wonders that these devices are capable of, forget to ask ourselves, “How have they been made?” “By whom?” “Where?” “Under what conditions?”

—Centre for Reflection and Action on Labour Issues, 1996, 4

Shop 'til you drop!² For anyone growing up in a culture oriented toward consumption, these are the marching orders that explain why we work and define who we are. They exemplify the all-encompassing idea of consumerism: to get inside us; to determine many if not most of our personal aspirations; and to reflect our sense of belonging in a capitalist society, in which virtually every public official, business leader, teacher, family member, work mate, and lover agrees that a high-consumption lifestyle is the norm. Even the word “consumer” is now regularly “used interchangeably with person in the 10 most commonly used languages, and most likely in many more.”³

It's easy to forget what Marx, our greatest ethnographer of shopping, noted: that commodities originate “outside us,” where they begin their life as an amalgamation of natural resources, energy inputs, labor, production processes, and political and economic arrangements.⁴ Accounts of the

work, raw materials, and exploitation that go into media technologies are generally displaced by representations of the leisure, style, and equality that supposedly come out of them. Apple thus refers to the iMac as a “modern art installation” and advertises “Do-It-Yourself Parts for iBook,” even though the company is notorious for sealing its products from inspection and customization.⁵ The Hong Kong-based advocacy group Students & Scholars Against Corporate Misbehaviour (SACOM) explains that “We are consuming the blood and tears of workers, a fact hidden from us by fancy advertisements.”⁶

Adorned with human characteristics of beauty, taste, serenity, and the like, media technologies compensate for the absence of these qualities in everyday capitalism via a “permanent opium war” of symbolic intoxication.⁷ They woo us with an attractive appearance in ways that borrow from romantic love, but reverse that relationship, teaching people about romance from commodities, which become part of them through the double-sided nature of advertising and “the good life” of high-tech luxury. Cultural critics capture this paradox with terms like “commodity aesthetics” and notions of “the *promesse du bonheur* that advanced capitalism always holds before... [people/consumers], but never quite delivers.”⁸ The intense come-hither stare of media technologies endows them with totemic power—they appear in the sublime form of fetishes that we should pursue with frenzied ambition.

This is not to propose that consumption is eradicable, pointless, or unpleasant. Fifty years ago, the renowned Jamaican cultural theorist Stuart Hall wrote about the spread of consumer electronics among the poor as part of “a legitimate materialism, born out of centuries of physical deprivation and want.”⁹ The point is to find ways to transcend the shallow roles assigned to us as consumers by marketers, microeconomists, and other boosters of unbridled consumption. To them, we are “desiccated calculators... rational-choice rodents moved exclusively by the short range and the quantifiable.” Our liberty is thereby reduced to the “freedom to choose” after “major political, economic, and social decisions have already been made.” Even the “time society has gained through technology is organized in advance for the [consumer].”¹⁰

These negative, system-serving ideas of consumption are ironically underpinned by a libertarian idea that says deregulated, individuated media making turns consumers into producers and subcultural rebels. Examples include blogging or posting videos online to riff on commercial culture or right-wing demagoguery, clicking on a link to endorse anti-war or environmental activism, mocking bourgeois manners, goading the law in the safety of cyberspace, or simply celebrating alternative lifestyles. These “prosumers” are supposedly freed from social confinement to

experiment with new subjectivities as they are rewarded for their intellect and competitiveness by the capacity to network with people across cultures in a postpolitical cornucopia.¹¹ The idea of a proactive consumer is quite capacious, though its claims don't stand up once we understand the limits imposed by technology and the political economy the consumer inhabits. For example, the possibilities for green presumption can be seen in the growing number of media users concerned about the material effects of commodities on the planet. A 2002 study reveals that half the US population engaged in consumer boycotts and their opposite, buycotts. These actions were frequently inspired by environmental concerns. But the next stage is for merchandisers to find ways to benefit from the boom of shoppers willing to pay more for goods labeled "green." New markets equal new markups, so they have joined the green-is-good chorus.¹²

These market-oriented notions of green presumption hardly aim to advance the goals of environmentalism; they are branding opportunities for retailers and other advertisers. A more significant movement toward green consumption is growing out of a widespread political aspiration to form a greener society. This is reflected in the global doubling of membership in environmental groups between 1980 and 2000. At the beginning of the new century, such participation rivaled "that of political parties" and exceeded "membership levels of other important civil society sectors." These numbers and events do not indicate an absolute swing away from the cultural paradigm of consumerism; but they do reflect people's readiness to know what goes on "outside" the commodity and, by extension, what relationships might flourish beyond the network of things that circumscribe our immediate surroundings.¹³

More important, consumer curiosity about the material provenance of commodities has begun to pose new ethical challenges to corporate defenders of the consumer society. For instance, there is evidence that green customer demand can push media businesses toward ecologically sound practices.¹⁴ This is part of a new understanding of accountability—called corporate social responsibility (CSR) by public relations managers. Such accountability, once applied to political organs and their responsiveness to their constituencies, has expanded in the early twenty-first century to encompass the relationship of corporations to their customers and the wider world.¹⁵ Among numerous examples of this trend is the Hearst Corporation's consumer magazine, *TheDailyGreen.com*—"dedicated to green living"—which stands in for the hundreds of firms waiting to do the bidding of the conscious consumer. There are also consultants who stand ready to aid corporations involved with ICT/CE that seek consumer approval for their green credentials and are looking for subtle ways of asking for it. International Shareholder Services (ISS), a proxy advisor for

many large institutional investors such as mutual and pension funds, astonished outsiders in 2002 by recommending that ExxonMobil stockholders vote in favor of renewable fuel research and anti-sexual discrimination policies and against child labor in Marriott hotels. Previously a right-wing stalwart, ISS had determined that “being perceived as a good corporate citizen might affect shareholder value” by appealing to socially concerned investors. Put another way, for the first time, ISS judged that being on the same side as environmentalists and unions made sense and cents, in keeping with studies that correlate stock valuations of companies with environmentalism. Whereas growth in professionally managed assets in the United States was about 15 percent annually before the global financial crisis, the figure was 40 percent for assets with mandates for “social responsibility.” Indeed, over 90 percent of *Fortune* 500 companies appear in “socially responsible” investing portfolios, which use the Dow Jones Industrial Average.¹⁶

Signs of a burgeoning institutional embrace of environmental ethics should not relieve us of our critical sensibilities. For starters, there are many obvious shortcomings to greening business-as-usual: It is contradictory, valorizing “a green commodity discourse” that promotes the magical fusion of environmentalism with growth, profits, and pleasure; it is transient, narrowly focused on what is right for investors and short-term gains, and therefore untrustworthy as an environmental partner; and it is superficial, guarding carefully against the acknowledgement of what is already known—that accelerating innovation, rising energy consumption, and government and business policies promoting a growth ideology are responsible for scarcity and climate change. In short, it is an inadequate response to consumers’ environmental worries, a shallow ethics that is inherently flawed by its faith in a doctrine of unending economic expansion and plutocratic form of participation, where money does not so much buy votes as qualify voters.¹⁷

The only upside, for the foreseeable future, is that persistent consumer demand for corporations and governments to take greater responsibility for environmental harm has forced self-described green businesses to generate a steady stream of documentation on supply chains and other physical processes in which commodities are produced. In combination with the increased publicity of science journalism that is focused on ecological problems, the sharing of publicly available information on the material reality of the life cycle of ICT/CE has begun to dampen popular enchantment with media technology.¹⁸ Despite some one-dimensional ethical displays on the part of green media businesses, consumers can now get a wider range of probing answers to the environmental questions set forth in the second epigraph above: How have media technologies been made? By whom? Where? And under what conditions?

The answers to these questions necessitate both desire and method if we are to understand the intimate relationship between media technologies and ecosystems. For a green consumer, this means learning some basics of environmental science and becoming comfortable with a relatively small but new vocabulary of consumption, which we draw on in this and forthcoming chapters. Green consumers will need to be familiar with processes that take place behind their screens yet at some distance from their media use, such as the environmental impact of prior inputs to media technologies from the Earth, extracted via mining, logging, and drilling; and subsequent outputs from technology into the Earth from emissions into air, land, and water whenever a media device is made.

Input effects involve the Earth's ability to provide resources whose quantities are either renewable or not (soils, forests, water, minerals, and so on). Ecologists call this the *source function* of the environment. Output effects involve the ability of the Earth's ecosystems to absorb and recycle wastes from media technology's electrical and chemical products and processes. Ecologists call this the *sink function* of the environment.¹⁹ As we show throughout this book, the effects of such inputs and outputs outlive the technology's existence, in some cases for generations, through deforestation; water pollution; carbon dioxide (CO₂) emissions; PCBs; dioxin; and other destructive processes, substances, and byproducts.

Perhaps the most important idea for green media consumption is environmental *sustainability*, which can be defined as the “nonnegotiable planetary preconditions” that set limits on how much the Earth can give to and absorb from economic, social, and cultural activities.²⁰ In its most radical interpretation, the idea of sustainability thoroughly discredits the growth model that subtends capitalism itself, though soft versions of sustainable development seek an accommodation with growth (we address these in chapter 5).²¹ For now, consider the tougher stance expressed by many environmental economists: there can be no compromise in the fusion of growth and sustainability. The idea of sustainable growth is “a bad oxymoron—self contradictory as prose and unevocative as poetry.” The economy is an “open” subsystem of the Earth's ecosystems, which are “materially closed.”²²

Human transgression of the limits of sustainability has led to the contemporary ecological crisis, which consists of four interrelated environmental problems:

- climate change (global warming), caused by historical overproduction of greenhouse-gas emissions (carbon dioxide, methane, and nitrous oxide);

- pollution in the overdeveloped world, including the effects of industrial dumping from the Global North to the Global South; with the rising levels of poisons disrupting biological development and immunological, endocrinal, neurological, and hormonal systems of “virtually all organisms”;
- reduced biodiversity—the Earth’s “sixth great extinction,” unique for being caused by one species; and
- disappearing habitat—50 percent of the Earth’s forests and 25 percent of sea habitats gone.²³

Throughout this book, we review the ways that media technologies have contributed to and deepened the eco-crisis. In this chapter, electricity usage by media technologies provides the first illustration of the scale of the problem facing green consumers. We follow that with a discussion of how consumers can connect to and think about the relationship between the environment and media technologies through an ecological-ethical orientation. We end with a brief case study of the cell phone, which brings several threads of the consumption problem together. Mobile telephony consumes us and the environment: it mixes sublime qualities into social conditions that make it indispensable; it is an exemplar of planned obsolescence; and it is an energy guzzler that brings hundreds of toxic compounds into the environment.

POWERING MEDIA IS A DIRTY BUSINESS

Integrated circuits will lead to such wonders as home computers—or at least terminals connected to a central computer—automatic controls for automobiles, and personal portable communications equipment. (Gordon E. Moore, 1965, 114)

In a famous article from the 1960s, the Fairchild Camera and Instrument Corporation chemist and future Intel founder Gordon E. Moore framed what has come to be known as “Moore’s Law.” It states that the number of transistors arrayed on an integrated circuit chip will double every two years for the foreseeable future, at minimal additional cost. His prediction was based on a semilog graph that extrapolated from developments between the invention of the integrated circuit in 1958 and 1965. Moore’s estimates have largely been exceeded. His work is cited approvingly every day, even as Intel is criticized for abusive, avaricious business practices that have led to massive antitrust cases, resulting in a billion euro fine levied by the European Commission.²⁴

A small section nestled in Moore's article has not been mentioned as enthusiastically or often as his saccharine promise. It addresses the consequences of a "heat problem" that could occur if computers became so small that they essentially had the same mass as their components. Moore suggested that this might make them "glow brightly with present power dissipation." He ultimately decided that the subsequent cost (always Moore's principal concern) would be manageable, thanks to the space available for cooling. But by 2011, the energy demands of the latest chip generations were reaching the limits of the electrical power supply, while the only way to avoid destructive heat levels was to create a kind of chip, known as dark silicon, on which some transistors were left unpowered while others were running.²⁵

The environmental impact of the media's energy consumption has a long history, beginning with the invention and deployment of telecommunication. We examine this history in more detail in the next chapter. Here, we focus on contemporary environmental concerns with electricity consumption.

The spread of a national electric grid across the United States entailed the inclusion of large transformers to regulate electricity flow and large capacitors for energy storage (microversions of capacitors are in all electronic devices; they make the current generation of touch screens work). Between 1930 and 1980, these devices used PCBs to cool and insulate—until they were banned. But the US Toxic Substance Control Act of 1976 (section 761.2) allowed these flame retardants to be used until 2025 in "nonleaking" transformers, capacitors, cables, and other enclosed equipment, as well as in "non-totally enclosed" older equipment still in use and in need of refits. PCBs are carcinogenic. Like dioxin, they are known as persistent organic pollutants because they do not degrade easily, travel great distances in waterways, and are absorbed into food chains through bioaccumulation.²⁶

The electrical industry has been one of the biggest emitters of PCBs into the environment—General Electric (GE) holds the record for PCBs dumped in US waterways.²⁷ Until 2011, GE was also one of the largest media companies in the country via its ownership of the massive TV network NBC and associated properties. Acting as clinically as one can imagine, GE announced a twenty-first century policy of "eco-imagination," a word that emerged from \$90 million of product development along with advertisements of trees growing from smokestacks and a computer-generated elephant dancing around a rain forest and a "clean" factory. The intention was to show that the company was "addressing the problems of tomorrow, today"—in reality, a response to regulations imposed in Europe (see chapter 5).²⁸

As we noted in the introduction, between 2.5 and 3 percent of the world's greenhouse-gas emissions in 2007 resulted from electricity consumed by media technologies, including personal computers, data monitors, printers, fixed and mobile telecommunications, televisions, local-area networks, and server warehouses. At that time, this level of emissions was virtually the same as aviation, if the energy required for ICT manufacture is included.²⁹

Electricity consumption at server warehouses worldwide doubled between 2000 and 2005. By 2006, they accounted for 1.5 percent of the use of the US electrical supply, which is about \$4.5 billion worth. In 2010, US server warehouses consumed between 1.7 and 2.2 percent of the total supply. In 2006, Google's server warehouse in Oregon was using the same amount of power as a city of 200,000 people, even though Google is considered more efficient than the bulk of the data center industry. By 2008, Microsoft was adding 20,000 servers a month. Google had perhaps half a million servers, while eBay and Amazon maintained such facilities by the thousands. The number of federal government data centers increased from 432 in 1998 to over a thousand in 2009, with a projected consumption of twelve billion kilowatt hours in 2011. The energy required to run them keeps going up. British data disclose that in the 1980s, 400–800 watts per square meter was typical; during the heyday of the dot coms, it was 750–1000 watts per square meter; and 1000–1200 watts per square meter between 2004 and 2006. A few years later, 1500–2000 watts per square meter became the norm. It is not surprising that the number of power stations being built around the world also began increasing—by 150 percent a year.³⁰

Although server warehouse power consumption grew at slower rates with the contemporary economic crisis, the industry continued to expand its overall energy demands. Assuming that server warehouses return to pre-crisis trends, their electricity consumption in the United States and the European Union could double every five years. Yet their existence and impact are largely immaterial to consumers. For example, cloud computing might as well result from invisible magic for all that we can see of it. Conversely, customers were able to visit or at least visualize telegraph and telephone exchanges, post offices, and so on, the buildings of which were as readily identifiable as was the labor to construct, maintain, and use them.³¹

According to the International Energy Agency (IEA), residential electricity consumption for powering ICT/CE is also growing at unprecedented rates, accounting for about 15 percent of global residential electricity consumption by 2009. By 2011, upwards of ten billion devices needed external power supplies, including two billion TV sets, a billion personal computers, and cell phones, which reached five

billion subscriptions in 2010, including 85 percent of the US public.³² In 2011, nearly three-quarters of the world's population owned one, and three-quarters of these accounts were held in the Global South. By 2009, about 40 percent of US homes had video-gaming consoles, which collectively consumed electricity at the same annual rate as San Diego, the ninth-largest city in the country. If media usage continues to grow at this rate, the IEA estimates that electricity consumption by electronic equipment will rise to 30 percent of global demand by 2022, and 45 percent by 2030.³³

WHAT CAN CONSUMERS DO ABOUT IT?

The amount of electricity needed to power media technologies seems to dwarf individual attempts to make media consumption environmentally sustainable.³⁴ Efforts to unplug this or that device appear insignificant in comparison to institutional consumption of electricity by business and government. Moreover, the environmental legacy of past electricity consumption presents consumers with a poisonous inheritance via PCBs, *inter alia*, that only large-scale cleanups could mitigate. The cost of repairing long-term damage to the environment adds weight to the argument that change must come from the top down—from laws, international accords, institutions, and technological fixes. It is particularly difficult for green consumers to formulate a point of intervention when gadgets are built with components that have seemingly disconnected production histories, such that they are manufactured all over the planet. Unlike boycotts and other consumer action against such merchandise as sporting apparel, one would be hard pressed to pinpoint individual action against many of the firms that operate in the globally dispersed electronics manufacturing sector. Consider Greenpeace's methods, chronicled in *Ethical Consumer* magazine as an "economic vote" via "shareholder activism," whereby social movements purchase a financial stake in polluting companies in the hope of changing corporate conduct.³⁵ It is clear that humiliating giant multinationals in a very public way induces apoplexy in fossil-fuel capitalists and their political and intellectual allies. But we should note the premise of Greenpeace's strategy: it assumes the futility of consumer decision making as a basis for massive change.³⁶

These conditions militate against a focus on individual consumption as the key area for people to enact their environmentalism.³⁷ For this reason, it is important to elaborate a political vision that cultivates connectedness among consumers via green citizenship—a shared commitment to confront the eco-crisis and press for greener governance through media policy. This book proceeds towards that end.

Nevertheless, we wish to preserve a role for individuals and households as part of a larger movement to reorient society away from growth and toward sustainability. Small changes from the ground up can draw from existing cultures of sustainability in which routines, rituals, norms and taboos incarnate ecologically sound quotidian practices.³⁸ At the heart of these practices is a deepening ethical regard for the intimate bond of human and nonhuman nature. This ecological ethics can be combined with political-economic critiques of a growth-based, consumerist system to develop ethico-political tools and commitments and move us from green consumption to green citizenship.³⁹

ECOLOGICAL ETHICS AND MEDIA TECHNOLOGY

After seeing electricity, I lost interest in nature. Not up to date enough.

(Vladimir Mayakovsky, quoted in Macauley, 1996, 114⁴⁰)

The discourse of consumer ethics can be a poorly disguised effort to slough off responsibility for saving the environment onto individual consumers who, as we have argued, are in no position to effect change on their own at the scale that is needed. Moreover, business strategies have adopted “ethical” environmental rhetoric to placate regulators, stave off further regulation, or argue that self-regulation makes government regulation irrelevant.

It is important to reiterate that the cultivation of an eco-ethics within media consumption can fire up challenges from below by providing evaluative standards against which to judge manufacturers, policy makers, bureaucrats, and activists who play a role in greening media technologies. By ecological ethics, we mean the subset of ethics concerned with “how human beings ought to behave in relation to non-human nature.”⁴¹

Three ethical orientations define the way we might collectively evaluate a particular ecological dilemma posed by the production, consumption, and disposal of media technologies. At two extremes are anthropocentric ethics and eco-centric ethics, with an intermediate ethics combining elements of the others. The lines separating these categories are often blurred in practice; like all ethics, there are no ironclad rules of operation. But each in its own way has virtues and limitations that inform how we can evaluate the relationship of the environment and media technologies. The three schools can be distinguished by their answers to questions across three themes: (a) value: what is valued, which entities qualify for moral consideration, and what matters most?; (b) rights: what are the duties and rules that protect valued individual and collective entities?; and

(c) consequences: what are the utilitarian considerations of actions and motives that affect the well-being or happiness of those valued?⁴²

For anthropocentric eco-ethics, nonhuman nature has no value and hence no rights, except in relation to how humans are affected by changes to it. Although anthropocentric eco-ethicists see humans as ruling the Earth by virtue of their intrinsic value, they need not rule out an ecological ethics that helps humans flourish by finding instrumental value in nature as a means to happiness. For example, green consumers might prefer to purchase paper products composed mostly of recycled materials, because they understand that deforestation negatively affects their well-being. Anthropocentrism has provided the most politically expedient form of ethical discourse shaping environmental policy, at least in capitalist societies—namely, self-interest. But even this is a complex matter, for the narrow confines of self-interest can allow for a virtuous ethics oriented toward protecting nonhuman nature. Many consumers inferentially endorse virtuous ethics when favoring an ecologically sound life. Green consumption is perceived as a way to accumulate ethical substance in one's character.

In contrast to this human-centered ethics, eco-centric ethics holds that nature is the “ultimate source” of all value and should guide judgment of right/wrong and good/bad human action in relation to the environment. Eco-centrists are convinced that “some or all natural beings, in the broadest sense, have independent moral status.”⁴³ They believe that human domination of nature is fundamentally wrong/bad and that there is a right/good way to live an ecologically healthy life by putting the Earth's well-being first. For some eco-centrists, putting the Earth first is a matter of having an ethical regard for the integrity and ineffability of nature—for example, the ecologist Aldo Leopold's “land ethical” wonder at the sleepy skunk stirring during a midwinter thaw, or political theorist William Connolly's polytheistic “affinity of affect” for an unruly Australian cockroach.⁴⁴ In Gaia theory, eco-centric ethics reside in the notion of the Earth as one-big-organism. Eco-centric ethics also informs critiques of class, race, and gender oppression. Left biocentrists and ecofeminists argue that there is an inextricable link between the capitalist/masculinist subjugation of nature and doctrines of growth.⁴⁵

An intermediate form of ecological ethics accords some intrinsic value to nonhuman nature, but not so completely as ecocentrism. Nor is this “midgreen” ethics fully anthropocentric, though it rests on the principle that humans' “moral considerability” can be extended to other (sentient) beings, primarily nonhuman animals. Proponents of such an intermediate eco-ethics can be found among philosophical and ecological advocates of animal liberation (Peter Singer) and animal rights (Tom Regan) as well as biocentrism or life-centered ethics (Paul Taylor). However, when there is

a conflict between humans and other life forms, the intermediate position tends to privilege the former.⁴⁶

Anthropocentric eco-ethics includes many conflicting interpretations of how humans should value nonhuman nature. Some philosophers see human beings in absolute instrumentalist terms. For Horkheimer, we are a “rapacious race, more brutal than any previous beasts of prey,” preserving ourselves “at the expense of the rest of nature, since [we are] so poorly outfitted by nature in many respects” and must survive through violence. Thomas Hobbes holds that as part of “the war of all against all,” it is right for people to domesticate or destroy nature.⁴⁷ Georg Wilhelm Friedrich Hegel argues that a person can put his or her “will into everything.” An object or place thereby “becomes *mine*” since humanity “has the right of absolute proprietorship.” In his philosophy, people are unique in their desire and capacity to conserve objects and represent them, and a strange dialectical process affords them a special right to destroy as well. Willpower is independent of simple survival, which sets humanity apart from other living things. Humans’ semiotic power confers the right to destructive power, so “sacred respect for . . . unused land cannot be guaranteed.” The capacity to restrain oneself and master one’s “spontaneity and natural constitution” distinguishes people from animals. The necessary relationship between humans and nature asserts itself at the core of consciousness as a site of struggle for people to achieve freedom from risk and want. Nature’s “tedious chronicle,” where “nothing [is] new under the sun,” is rightly disrespected and disobeyed by the progress that comes with human dominion over it.⁴⁸

And there are endless examples of captains of industry and techno-science enacting this harsh moral code: Henry Ford argues that “unused forces of nature” must be “put into action . . . to make them mankind’s slaves,” and Vannevar Bush, US Director of the Office of Scientific Research and Development during World War II, speaks proudly of the drive to release humanity “from the bondage of bare existence.”⁴⁹

Writing against the dominant view of technology as “a means and a human activity,” Martin Heidegger argues that technology stages a more powerful social struggle. It makes “the unreasonable demand” that nature “supply energy which can be extracted and stored” in a way that challenges seasonal rhythms, bending them to the demands of work, growth, and competition. In this regard, Heidegger shares the Hegelian view of nonhuman nature as an instrument of humans. However, Heidegger’s discomfort opens up the possibility of a midgreen ethical consideration of non-human nature and a critique of instrumentalism. Similarly, David Hume maintains that animals, like people, “learn many things from experience,” developing “knowledge of the nature of fire, water, earth, stones, heights, depths, etc.” in addition to receiving instruction as part of domestication.

Rather than being merely sensate, advanced animals apply reason through inference. Jeremy Bentham did not go so far, but aptly asked of our duty of care to animals: “The question is not, Can they *reason*? nor, Can they *talk*? but, Can they *suffer*?” Here again, the impact of technology is not merely a human problem; it is a problem for other inhabitants of the Earth as well. There is a duty of care to the weak on the part of the strong to preserve their lives as denizens of shared space.⁵⁰

As we’ll see in later chapters, most environmental activism and policy directed at media technologies employ the least harsh of anthropocentric sensibilities, for example, by focusing on the cost of environmental degradation to collective human life. This characterizes the consequentialist assumptions of research on e-waste, global warming, alternative energy, air and water pollution, greening of industry, and so on, in which humanity is seen as the ultimate loser of bad ecological behavior.⁵¹ In this eco-ethics, media technologies carry both promise and peril for the environment. Media technologies are worthwhile because they enhance people’s ability to act and communicate as green consumers and concerned eco-citizens. But they work against our well-being when they pose hazards and deposit toxins into the environment or diminish our enjoyment of nature (for example by using ugly towers or cables) or otherwise foul the lives of creatures who share the Earth with us. Likewise, intermediate eco-ethics has implicitly guided judgments of media technology’s environmental threat to animals, such as in regard to birds killed by communication towers, habitats disrupted by chemical effluents and electromagnetic fields, declining biodiversity resulting from pollution, and climate change caused by ICT/CE production and use. Such midgreen eco-ethics is limited by the presumption of moral extensionism, in which rights are extended to individual species perceived to be more like humans and denied to those perceived as alien. Dogmatic animal-rights activists displace a human chauvinism with animal chauvinism.⁵²

By far the most disruptive ethical orientation for consumers of media technology is eco-centric ethics, which calls for a paradigm shift toward sustainability that is far more radical than either anthropocentric or intermediate eco-ethics. This position rejects technologies that can only flourish on the planet by damaging it. That’s a real deal breaker for most users of media technology, because they would have to undergo a fundamental conversion to give the Earth’s well-being preeminence over their beloved gadgets. For the eco-centrist, our environmental crisis necessitates the rejection of moral self-righteousness about the value or revolutionary potential of media technology. More generally, it means defending the rights of the Earth against the claims of human-centered progress via new technologies and growth-based expansion. Although eco-centric

ethics must work alongside light- and mid-green eco-ethics, the principles it embodies can inspire fresh approaches to green consumption of media technologies and problematize unthinking technophilia.⁵³ And its disenchantment with media technology necessitates a welcome re-enchantment with nonhuman nature, forming the basis for an expansive eco-ethical critique of business-as-usual as per Herbert Marcuse's signal recognition that:

the demands of ever more intense exploitation come into conflict with nature itself, since nature is the source and locus of the life-instincts which struggle against the instincts of aggression and destruction. And the demands of exploitation progressively reduce and exhaust resources: the more capitalist productivity increases, the more destructive it becomes. This is one sign of the internal contradictions of capitalism.... [Nature] is a dimension *beyond* labor, a symbol of beauty, of tranquility, of a nonrepressive order. Thanks to these values, nature was the very negation of the market society.

(1972, 11; also see McLaughlin, 1993)

We understand why Marcuse posits a “nonrepressive order” of nature, but we would modify his perspective with something beyond human consciousness, calling for eco-centric precaution even in the face of nature's beauty. An eco-ethical orientation toward nonhuman nature must advocate for more than humanistic categories of value. Beauty in a pristine landscape might appear to be a semiotic negation of market society, but it may also misrepresent the invisible chemical burden of a crystal flowing waterway or lush green mountainside created by human aggression against nonhuman nature.

Even among reactionary voices, an appreciation of nature and a mistrust of people and technology can lead to careful thinking. Plato admires the capacity of natural disasters to destroy social and technological advances, especially “crafty devices that city-dwellers use in the rat-race to do each other down.” Once such “tools were destroyed,” new inventions and a pacific society could emerge in the absence of mass violence, permitting the redevelopment of a legal system based on restraint. Similarly, Edmund Burke's cautionary words against the popular will and democracy's presentism endorse a rule of law that acknowledges each generation as “temporary possessors and life-renters” of the natural and social world. Society must maintain a sense of “chain and continuity” rather than act ephemerally like “the flies of a summer.” There must be “a partnership not only between those who are living, but between those who are living, those who are dead, and those who are to be born” to sustain “the great primeval contract of eternal society.” This notion of intergenerational responsibility remains a hallmark of sustainability.⁵⁴

The lesson of eco-ethical green consumption is that without a moral obligation to the environment (and, as we show in later chapters, to labor) we become “devices of our devices.” Commodity signs and preconfigured opinions urge us to “settle mindlessly into the convenience that devices may offer us.”⁵⁵ There is no better example of this devotion in the present than the cell phone.

THE WONDROUS CELL PHONE

“I want you to come and see me.”

Vashti watched his face in the blue plate.

“But I can see you!” she exclaimed. “What more do you want?”

“I want to see you not through the Machine,” said Kuno. “I want to speak to you not through the wearisome Machine.”

“Oh, hush!” said his mother, vaguely shocked. “You mustn’t say anything against the Machine.”

“Why not?”

“One mustn’t.”

“You talk as if a god had made the Machine,” cried the other. “I believe that you pray to it when you are unhappy. Men made it, do not forget that. Great men, but men. The Machine is much, but it is not everything. I see something like you in this plate, but I do not see you. I hear something like you through this telephone, but I do not hear you. That is why I want you to come. Pay me a visit, so that we can meet face to face, and talk about the hopes that are in my mind.”

She replied that she could scarcely spare the time for a visit.

(E. M. Forster, 1997, 88)

Cell phones have been praised for broadening channels of communication, securing personal safety, integrating family life, developing peer groups, speeding up rendezvous, making users feel important, and confirming what Castells calls the “timeless time” and “space of flows” that characterize people’s experience of communication in a network society.⁵⁶ There are additional benefits that are claimed about the features of cell phones: They allow users to produce content, create their own languages, and draw personal meaning from design characteristics. On the other hand, cell phones cause a new form of inequality, because without one you lack access to the new sociality. In addition, they are biased toward young eyes and dexterous fingers, can spread rumors quickly, are vulnerable to viruses, distract drivers and pedestrians, can cause interpersonal conflicts between callers, and so on.⁵⁷

Cell phones are promoted as being crucial to democracy, economic efficiency, and green jobs. A dual discourse of virtue holds that cell phones and other ICT/CE will save the two “ecos”—the economy and ecology—along the lines of Barack Obama’s largely forgotten “Green New Deal.”⁵⁸ Mainstream economists claim that cell phones have streamlined markets in the Global South, thereby enriching people’s lives in zones where banking and economic information are scarce, thanks to the provision of market data. Exaggerated claims include “the complete elimination of waste” and massive reductions of poverty and corruption through the empowerment of individuals. Industry magazines such as *Advertising Age* positively salivate over the prediction that by 2013, there will be 4.5 billion users, well over half the world’s population, as the absence of conventional telecommunications and financial infrastructure is overcome thanks to digital wallets and micro-payment systems.⁵⁹ This happy state of affairs finds the world’s leading media ratings company, Nielsen, publishing an unimaginably crass account that begins “Africa is in the midst of a technological revolution, and nothing illustrates that fact [more] than the proliferation of mobile phones” then notes casually that “more Africans have access to mobile phones than to clean drinking water.”⁶⁰

Media historian Dan Schiller offers a contrasting view of mobile telephony. He challenges cell phone enthusiasts to query the way social stresses fuel new consumer needs, as people rush to buy inferior services at a high cost. This is particularly the case in the United States, where a decline in government oversight of media industries since World War II has resulted in increased privatization and diminished quality guarantees, standards, and regulation of competition. Schiller argues that poor-quality cell phone service in the United States is a function of telecommunication companies’ abilities to exploit a need for connectedness in times of social fragmentation.⁶¹

Schiller draws on Raymond Williams’s cultural analysis of television in the 1970s to describe the experience of displacement and deracination in modern life, a mode of sociality in which individuation (separateness and privacy) combined with mobility (transport and access). Williams suggests the term “mobile privatization” to capture the paradoxical feelings of being distinct from others yet capable of continuous connection with them.⁶² Whereas broadcast technology, in Williams’s view, is a social product of this industrial form, much like the suggestion of Castells and his acolytes that mobile technology is the network society’s structure of feeling, Schiller argues that political-economic arrangements allow mobile telephony to emerge in a form befitting divided societies. Perhaps this is what the musician Billy Bragg is referring to in “Levi Stubbs’ Tears” when

he sings, “She bought herself a mobile home/So at least she could get some enjoyment/Out of being alone” and the sentiment underpinning the band Straight Outta Junior High’s arch song “Cell Phones Suck.” Or maybe it echoes Benjamin’s Proustian lament for the loss of art’s aura because of photographic technologies that look back at us and carry our images and statements into a reciprocal loop. It certainly captures the ironic advent of the telephone as a commercial apparatus in 1870s Paris, in which it supposedly exemplified and countered the depersonalization of modern life by simultaneously helping to make the public private and the private public.⁶³ And it informs Weber’s understanding, from almost a century ago, of the role of the phone in fictive capital:

The “arbitrager” seeks a profit in that he simultaneously sells a good at a place where it is, at that moment, able to be sold at a higher price, while he buys it at a place where it is to be had more cheaply. His business is therefore a pure example of calculating the numbers. He sits at a telephone . . . and, as soon as he notices the possibility of, for example, making a profit from buying Russian notes or notes of exchange drawn on Russia available in London and then selling them in Paris, he places his orders. (2000, 344)

None of the research outlined above, worthy though it may be, engages the technology’s environmental relationships. For example, scientific studies have linked long-term exposure to cell-phone radiation to two types of brain cancer—glioma and acoustic neuroma—salivary gland tumors, migraines, vertigo, and behavioral problems in children. Various European health agencies have issued warnings about cell-phone radiation exposure (see chapter 5). As we will see in subsequent chapters, there are abundant toxic by-products and workplace hazards throughout the supply chain from cell phones and other ICT/CE, in addition to their life-cycle energy requirements (the “no-load” burden of plugged but empty chargers) and postconsumer existence (spent batteries, disposal, and recycling). The source materials used in cell phones vary among manufacturers. They all contain lead or tin solder and plastic (circuit boards and casings); involve chemical processing, including the use of detergents and etchants in chip production; and use tantalum, the mining of which has caused social and environmental harm in Africa. Most include mercury, though this is changing, and many require flame retardants made of polybrominated diphenyl ethers, which are bioaccumulative synthetic chemical compounds that cause neurological problems, though they are not well-understood. These phones also need batteries, the contents of which are toxic, including nickel cadmium, lead acid, nickel metal hydride, lithium ion, and lithium polymer components. Like generators, batteries are not primary energy sources but require raw materials and energy inputs prior to production and distribution.

Their environmental costs must be measured against their energy provision during their lifecycle.⁶⁴

Finally, cell phones carry dread post-consumption risks. As the environmental health scientist Oladele A. Ogunseitan warns: “In a phone that you hold in the palm of your hand, you now have more than 200 chemical compounds. To try to separate them out and study what health effects may be associated with burning or sinking it in water—that’s a lifetime of work for a toxicologist.” More than a hundred and thirty million of these devices are trashed annually in the United States alone, where people purchase replacements once a year, on average—a direct outcome of the business strategy of planned obsolescence.⁶⁵

We conclude here by wondering what the green consumer might say about the eco-ethical challenges posed by the cell phone.

Eco-centrism would remind us that the eco-crisis demands the immediate termination of all unsound ecological practices associated with the cell phone, letting the Earth’s well-being take precedence over human interests. Intermediate eco-ethics would include in this argument calls for action to stem the bodily and environmental burden of cell-phone manufacturing, use, and disposal. Studies of the persistent organic pollutants in land, air, and water would accompany epidemiological research to help guide solutions. Manufacturers might help reduce environmental burdens by looking for nontoxic source materials, and together with distributors create buy-back or recycling programs to keep spent phones and batteries out of landfills, as per 2006 legislation in California—not merely consumer/user repurposing outlined in the Castells study cited above. Along this mid-green line of thought, some life-cycle analysis (LCA)⁶⁶ concludes that the greenest phones would share the following design principles: the end of miniaturization, which leads to thoughtless disposal, as smaller gadgets falsely connote harmlessness; the use of standardized components to reduce the number of devices needed, which would discourage disposal and encourage reuse via replaceable modular parts and upgrades; the discontinuance of disposable phones; the substitution of green chemicals; and the expansion of and incentives for take-back programs. Of course, such LCA findings contradict business-as-usual in the ICT/CE industry. Progress in regulating the industry has been slow, hampered by such bureaucratic rigmarole as cost-benefit analysis (CBA) and risk management (see chapter 5).⁶⁷

Finally, anthropocentric eco-ethics might offer a range of responses, including application of the precautionary principle, a “better safe than sorry” guideline that requires withholding potentially toxic devices from entering the environment until there is scientific consensus about the consequences; or some form of CBA that settles for compromises and slow

reforms to ensure greater technological efficiency in the manufacture and disposal of the cell phones without disrupting profit and growth, with risks distributed along existing lines of socioeconomic stratification.

In the end, these eco-ethical options are not merely about the kind of phone a green consumer might wish were available; they are also starting points for a discussion about the kind of society we want to live in. The cell phone is a very odd thing when seen in this light—built upon the stressful fragmentation of social life, toxic high-tech industrialism, the searing divisions between rich and poor, and the false promises of consumerism.

CONCLUSION

The woman came back carrying a small cardboard box. She went directly to Bosch and handed it to him, then bowed as she backed away. Harry opened it and found the remains of a melted and burnt cell phone.

While the woman gave Sun an explanation, Bosch pulled his own cell phone and compared it to the burned phone. Despite the damage, it was clear the phone the woman retrieved from her ash can was a match.

“She said Peng was burning that,” Sun said. “It made a very foul smell that would be displeasing to the ghosts so she removed it.” (Michael Connelly, 2009b, 243)

This chapter has focused on both individual and institutional modes of technological consumption, examining how media technology and the environment are intimately related through electricity production and use, whose legacy and rising levels contribute massively to the ecological crisis the world faces in the twenty-first century. The collective problems were presented in the aggregate levels of consumption that have grown without interruption over decades. The problems for green consumption incurred by the individual consumer pale in comparison to those brought about by institutional consumers, although both individuals and institutions are slowly incorporating a green moral code into their respective worlds of media use. By far the biggest change has been in consumer awareness of the environmental impact of the products they buy, including ICT/CE. And although such green consumption has not been lost on marketers and manufacturers, who are finding ways to profit from it, the consumer demand for greater corporate and government accountability in addressing environmental harms is having real effects on business-as-usual. We identified a conflict that will persist for the foreseeable future between large institutional consumers, which promote an unstable and contradictory idea of sustainable growth, and eco-ethical orientations based on sustainability

and rejection of the growth doctrine. The stakes appear extremely high for anyone who understands the extent of the ecological crisis.

We will continue this argument in our chapter on citizens, in which we seek to subsume notions of consumer engagement into more effective political forms of environmental citizenship. In doing so, we challenge the conventional terms of national citizenship that think of the citizen and the consumer as alter egos of each other—the *national* subject versus the *rational* subject. In the late twentieth century, proponents of neoliberalism (or market liberalism) sought to redefine the current understanding of citizen engagement in politics as an artificial and meaningless endeavor, while framing consumption and individual acquisitiveness as a natural, god-given freedom.⁶⁸ The idea of “voting with your pocketbook” became a way for neoliberal citizenship to be expressed through consumption. But by adopting the tenets of the consumer, this citizen is reduced to a bundle of material desires. Though seemingly self-actualizing, they conform to general patterns of controlled market behaviors. If green citizenship were limited to this neoliberal idea, the green citizen would be nothing more than a self-limiting, self-controlling subject who conforms to a lifetime of purchasing behavior—shop ’til you drop. In this chapter, we have presented a number of arguments against this view of media consumption, which is not only demeaning but presumes that the consumer is completely vulnerable to the ideological effects of media technologies and the mystical powers of the technological sublime. As Immanuel Kant said, “I need not think, so long as I can pay.”⁶⁹ If we stop thinking about the eco-crisis, we’ll pay dearly.