

CHAPTER 6

The Art of Waste

Contemporary Culture and Unsustainable Energy Use

TOBY MILLER

The fundamental message of this chapter is that contemporary culture hinges upon unsustainable energy use. Whether the topic is fine art or reality TV, each one is complicit with our global environmental crisis. This development also articulates to a new form of diminished worker power—the cognitariat. Together, these tendencies present artists with serious ethical, political, and economic questions. Many of them are responding to those challenges in constructive, reflective ways that can stimulate the rest of us to join the dots and appreciate just how dangerous digital culture is to our world, even as we rely so much on it.

A fascinating, unholy, productive convergence is underway: even as artists are becoming more connected to the global communications infrastructure due to their digital delights, workers in that infrastructure are shifting, like so many others, toward the contingent, discounted labor force that artists have known and occupied for decades. Electronic or e-waste artists operate in a sector that relies on discounted labor and hence exemplifies wider work trends, even as their art incarnates a vanguard ecological awareness.

The particular focus of the chapter is on the art of e-waste and the question of artistic labor. I hope that readers who produce or enjoy all forms of media culture will think anew about their practices of work and consumption thanks to the provocations that e-waste artists offer, both industrially and textually. My methods in this piece derive from political economy, environmentalism, and

S
N
L

KSD

cultural studies, focused on the material relations of meaning and the interplay of cultural subjectivity, ecology, and power. This eco-materialism emphasizes the materiality of discourse and the discursivity of materiality. That is to say, it refuses the notion that objects lack meaning or meanings exist independent of objects. It is also profoundly connected to the fundamental question, “*Cui bono?*” when discussing the allocation, utilization, and impact of resources as they touch the lives of workers, citizens, and all the Earth’s creatures.¹

Some scenery needs to be in place to show how culture contributes to ecological problems and models postindustrial labor. Let’s start by clearing our minds of cant: for all the recycling bins that we assiduously fill and empty, we live in an age of waste. A seemingly disposable world is inexorably disposing of itself. The 2013 report from the Intergovernmental Panel on Climate Change makes that plain.² The next step is a political-economic rather than a purely ecological one: to recognize that the ultimate side effect of rapacious capitalist growth will be, paradoxically, the *end* of rapacious capitalist growth. True believers’ faith that the market is a self-limiting and self-sustaining jewel of human nature may well have the effect of *ending* human nature. So good luck with that one.

We were all brought up believing that mining and manufacturing were the world’s principal polluting culprits. The difficult news for media and cultural studies and the art world is that our beloved electronics are also crucial components of this destructiveness. Their toxic parts, forms, and norms pervade our world, from old fat-screen television sets to modish computing clouds, from museums’ carbon footprints to Facebook and Twitter engagement announcements. The deleterious effects of these technologies is felt in the mines and factories that produce them, the offices and cars that house them, and the municipal dumps and fire pits that bury them.³

Yet such gadgets and sites are frequently regarded as signs of transcendent progress in a credulous world where life is routinely reinvented as an unconscious palimpsest of the past, driven by institutionalized amnesia.⁴ This compulsive repetition of a seemingly unfamiliar history is nowhere clearer than in techno-futurism’s predictions of social change. Seventy years ago, George Orwell described technologically determinist fantasies in words that resonate today with the same arid irony that first animated them:

Reading recently a batch of rather shallowly optimistic “progressive” books, I was struck by the automatic way in which people go on repeating certain phrases which were fashionable before 1914. Two great favourites are “the abolition of distance” and “the disappearance of frontiers.” I do not know how often I have

met with the statements that “the aeroplane and the radio have abolished distance” and “all parts of the world are now interdependent.”⁵

Today’s *mantra* is very similar to the fantasy that Orwell noticed and abjured all those years ago: utopian yearnings for a world free of institutional constraints. The latest media technologies are said to obliterate geography, sovereignty, and hierarchy in an alchemy of truth and beauty. A deregulated, individuated, technologized world makes consumers into producers, frees the disabled from confinement, encourages new subjectivities, rewards intellect and competitiveness, links people across cultures, and allows billions of flowers to bloom in a postpolitical cornucopia. It is a bizarre utopia. People fish, film, fornicate, and finance from morning to midnight. Consumption is privileged, production is discounted, and labor is forgotten. Powerful communications institutions cleave to themselves a sense of universal enlightenment through wires and wireless that their products offer individuals. So Facebook features “Peace on Facebook” and claims the capacity to “decrease world conflict” through intercultural communication, while Twitter modestly announces itself to be “a triumph of humanity.”⁶ Machinery, not political-economic activity, is the guiding light: technology and consumption rather than activism and citizenship.

The wonderfully named Progress and Freedom Foundation’s *Magna Carta for the Information Age*, for instance, proposes that political-economic gains made for democracy since the thirteenth century have been eclipsed by technological ones:

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.⁷

The foundation has closed its doors, no doubt overtaken by progress, but it’s a historical Whiggish discourse of unfurling liberty for all continues to ring loudly in our ears, tinnitus-like. *Time* magazine exemplified this love of a seemingly immaterial world when it chose “You” as 2006’s “Person of the Year,” because “You control the Information Age. Welcome to your world.”⁸ On the liberal left, the *Guardian* is prey to the same touching warlockcraft: someone called “You” heads its 2013 list of the hundred most important folks in the media.⁹ Rupert Murdoch was well behind, at number eight. You, Rupert, head to head. No contest, really.

To illustrate the pervasiveness of this magic via academic/policy examples, consider these three cases of barely contained scholarly and media exultation. First, bourgeois economists claim that cell phones have streamlined markets

in the Global South, enriching people in zones where banking, economic information, and market data are scarce. Fantastic claims are made for the marvel of mobile telephony in places that lack electricity, plumbing, fresh water, hospital care, and the like. These include “the complete elimination of waste” and massive reductions in poverty and corruption through the empowerment of individuals.¹⁰ *Forbes* magazine and the International Monetary Fund lap this type of research up, deeming it “seminal”—as they would.¹¹ Nielsen, the world’s leading media ratings company, published an unimaginably crass paean that began, “Africa is in the midst of a technological revolution, and nothing illustrates that fact [more] than the proliferation of mobile phones,” before casually noting that “more Africans have access to mobile phones than to clean drinking water.”¹²

Second, the world seems agog these days in the face of three-dimensional printers, which promise the cheap and spectacular production of art, among many other applications. But while some analysts predict that 3-D printers will have positive ecological effects by reducing the carbon used to transport goods,¹³ many use heated thermoplastic extrusion and deposition. Numerous factory studies have associated such processes with dangerous aerosol emissions, but minimal investigation has been done into the new printers, which generally lack exhaust ventilation or filtration systems. The first published study looked at ultrafine particle (UFP) production. It found that UFP emissions in an office using 3-D printing were alarmingly sizeable. Why alarming? UFPs can easily deposit themselves in people’s lungs, airways, and brains, producing high concentrations of adsorbed, absorbed, and condensed compounds. The epidemiological record corresponds to cardiorespiratory mortality, strokes, and asthma.¹⁴ E-waste issues galore of this type arise with new electronic textile art forms that merrily discard electronics en route to greater cultural glory.¹⁵ Translating that research into the cultural world can improve public health and stimulate a healthy skepticism about techno-rhetoric.

Third, recall the publicity generated when Kelvin Doe/DJ Focus, a fifteen-year-old Sierra Leonean, was invited to MIT in 2012 because he had constructed a radio station from detritus in trashcans. More than two million online viewings of the university’s video about him in just one week testify to the appeal of this apparently unlikely story of a prodigy from the Global South who was constructed as embodying the need to replace aid programs with individual initiative. *Fast Company* included him in its list of “100 Most Creative People in Business 2013” under the soubriquet “The Philanthropic Prodigy.”¹⁶

That account ignored an alternative one. It might have analyzed his achievement as an impressive moment in centuries of skillful cultural ragpicking, a

heritage that illustrates the constitutive power of creativity and collectivity as well as colonialism and pollution in forging conditions of existence for the young entrepreneur.¹⁷ Stories like his can draw us into the materiality and inequality at the heart of media technologies, and question their utility—but only if these versions are critical and sidestep contemporary fashion.

Technocentric utopianism is an extended dalliance with consumer communication technology's supposedly innate capacity to endow its users with transcendence. It shies away from addressing unequal infrastructural and cultural exchange.¹⁸ This discourse buys into individualistic fantasies of reader, audience, consumer, and player autonomy—the neoliberal intellectual's wet dream of music, movies, television, art, literature, performance, and everything else converging under the sign of empowered, creative audiences.

The New Right of cultural and communication studies invests with unparalleled gusto in this dream, populated with Schumpeterian entrepreneurs, evolutionary economics, and creative industries. It has never seen an “app” it did not like or a socialist idea it did. Faith in devolved culture-making amounts to a secular religion, offering transcendence in the here and now via a “literature of the eighth day, the day after Genesis.”¹⁹ Hence the Australian Council for the Humanities, Arts and Social Sciences informing the country's Productivity Commission that this is a “post-smokestack era”²⁰—a blessed world for workers, consumers, and residents, with residues of code rather than carbon. An astonishing claim from a country that survives on dirty-power exports that make it per capita among the greatest polluters in history²¹—yet why spoil a good story?

But as Orwell realized, the story is more complex. Max Weber insisted that technology was principally a “mode of processing material goods,”²² and Harvey Sacks emphasized “the failures of technocratic dreams[:] that if only we introduced some fantastic new communication machine the world will be transformed.”²³ The Political Economy Research Institute's 2013 *Misfortune 100: Top Corporate Air Polluters in the United States* placed half a dozen media owners in the first fifty.²⁴ Cultural production relies on the exorbitant water use of computer technology, while making semiconductors requires hazardous chemicals, including carcinogens. At current levels, residential energy use of electronic equipment will rise to 30 percent of the overall global demand for power by 2022, and to 45percent by 2030, thanks to server farms and data centers and the increasing time people around the world spend watching and adding to screens.²⁵ So rather than seeing new communications technologies as magical agents that can produce market equilibrium and hence individual and collective happiness, we should note their other effects—and their continued exclusivity.

In 2011, the cost of broadband in the Global South was 40.3 percent of average individual Gross National Income (GNI). Across the Global North, by comparison, the price was less than 5 percent of GNI per capita.²⁶

E-Waste

Away from questions of content and use, when old and obsolete cell phones or other communication technologies are junked, they become electronic waste, the fastest-growing component of municipal cleanups around the Global North. E-waste has generated serious threats to worker health and safety wherever plastics and wires are burnt, monitors smashed and dismantled, and circuit boards grilled or leached with acid, while the toxic chemicals and heavy metals that flow from such practices have perilous implications for local and downstream residents, soil, and water. The accumulation of electronic hardware causes grave environmental and health harm as noxious chemicals, gases, and metals from wealthy nations seep into landfills and water sources across Malaysia, Brazil, South Korea, China, Mexico, Vietnam, Nigeria, and India, inter alia. The e-waste ends up there after export and import by “recyclers” who eschew landfills and labor in the Global North in order to avoid the higher costs and regulatory oversight of recycling in countries that prohibit such destruction to the environment and workers. Businesses that forbid dumping in local landfills as part of their corporate policies merrily mail it elsewhere. In that “elsewhere,” preteen girls pick away without protection at discarded televisions and computers, looking for precious metals to sell—less romantic ragpickers than MIT’s Kelvin Doe.²⁷

This material reality remains invisible to the new-media clerisy and bourgeois economics alike, but it *has* been recognized in the technocratic cloisters of communications diplomacy. In keeping with prevailing shibboleths, the International Telecommunication Union (ITU) predicts that communications technologies will connect the 6.5 billion residents of the Earth by 2015, enabling everyone to “access information, create information, use information and share information.” This development “will take the world out of financial crisis,” principally thanks to developing markets.²⁸ But the ITU also acknowledges that communications technologies cause grave environmental problems, so it presses for “climate neutrality” and greater efficiency in energy use.²⁹ The 2008 World Telecommunication Standardization Assembly in South Africa encouraged members to reduce the carbon footprint of communications, in accord with the United Nations Framework Convention on Climate Change.³⁰

In a similar vein, the Organization for Economic Co-operation and Development (OECD) says communications can play a pivotal role in developing service-based, low-polluting economies in the Global South through energy efficiency, adaptation to climate change, mitigation of diminished biodiversity, and diminished pollution. But it cautions that such technological advances can produce negative outcomes. For example, remote sensing of marine life may encourage unsustainable fishing.³¹

Then there is that delightful metaphor we are all now using: “the cloud.” It signifies the place where all good software goes for rest and recuperation, emerging on demand, refreshed and ready to spring into action. Seemingly ephemeral and natural—benign necessities of life, clouds rain then go away—nothing could be further from the truth when it comes to the power-famished server farms and data centers rendered innocent by this perverse figure of speech.

The U.S. National Mining Association and the American Coalition for Clean Coal Electricity gleefully avow that the “Cloud Begins with Coal.”³² They boast that the world’s information and communications technologies use fifteen hundred terawatt hours each year—equivalent to Japan and Germany’s overall energy use combined. That’s 10 percent of global electricity—and 50 percent more than aviation. The association and the coalition even quote Greenpeace,³³ against the grain, on the horrendous environmental implications of data centers, as support for the endless coal opportunities to come! Big mining and big coal just can’t help themselves, so excited are they by the importance of their polluting ways for the present and future of the cloud. Meanwhile, Google disclosed in 2011 that its annual carbon footprint was almost equal to that of Laos or the United Nations Organization, largely due to running its search engines through clouds.³⁴

The Cognitariat

What about the making of culture—the things that reside in the cloud? Aren’t corporate and governmental cultural gatekeepers and hegemony fundamentally undermined by the new technological possibilities of creation and distribution, which can scarcely be likened to the horrors of mining and manufacturing in their impact on either work or the environment? In the new era, readers become writers, listeners transform into speakers, viewers emerge as stars, fans are academics, and vice versa. The economy glides into an ever-greener postindustrialism. The comparatively cheap and easy access to making and circulating meaning afforded by Internet media and genres is thought to have eroded the one-way hold on culture that saw a small segment of the world as producers

and the larger segment as consumers, even as it makes for a cleaner economy. New technologies supposedly allow us all to become simultaneously cultural consumers and producers (prosumers)—no more factory conditions, no more factory emissions. More artists, and more power to artists.³⁵

In this era of the “prosumer,” anyone can *be* an artist. Zine writers are screenwriters. Bloggers are copywriters. Children are columnists. Bus riders are journalists. And think of the job prospects that follow! Coca-Cola hires African Americans to drive through the inner city selling soda and playing hip-hop. AT&T pays San Francisco buskers to mention the company in their songs. Urban performance poets rhyme about Nissan cars for cash, simultaneously hawking, entertaining, and researching. Subway’s sandwich commercials are marketed as made by teenagers. Cultural-studies majors become designers. Graduate students in New York and Los Angeles read scripts for producers and then pronounce on whether they tap into audience interests. Precariously employed part-timers spy on fellow-spectators in theaters to see how they respond to coming attractions. Opportunities to vote in the Eurovision Song Contest or a reality program disclose the profiles and practices of viewers, who can be monitored and wooed in the future. End-user licensing agreements ensure that players of corporate games online sign over their cultural moves and perspectives to the very companies they are paying in order to participate.³⁶

In other words, corporations are using discounted labor. Business leeches want flexibility in the people they employ, the technologies they use, the places where they do business, and the amounts they pay—and inflexibility of ownership and control. The neoclassical doxa preached by neoliberal chorines favor an economy where competition and opportunity cost are in the litany and dissent is unforgiveable, as crazed as collective industrial organization. In short, “decent and meaningful work opportunities are reducing at a phenomenal pace in the sense that, for a high proportion of low- and middle-skilled workers, full-time, lifelong employment is unlikely.”³⁷ Even reactionary bodies like the U.S. National Governors Association recognize the reality: “Routine tasks that once characterized middle class work have either been eliminated by technological change or are now conducted by low-wage but highly skilled workers.”³⁸ Cultural workers, from jazz musicians to street artists, have long labored without regular compensation and security. That models the expectations we are all supposed to have today, rather than our parents’ or grandparents’ assumptions about life-long, or at least steady, employment.

Hence the success of Mindworks Global Media, a company outside New Delhi that provides Indian-based journalists and copyeditors who work long-distance for newspapers whose reporters are supposedly in the United States

and Europe. There are 35 percent to 40 percent cost savings.³⁹ Or consider the advertising agency Poptent, which undercuts big competitors in sales to major clients by exploiting prosumers artists' labor in the name of "empowerment." That empowerment takes the following form: Poptent pays the creators of homemade commercials seventy-five hundred dollars; it receives a management fee of forty-thousand dollars; and the buyer saves about three hundred thousand dollars on the usual price.⁴⁰ The slogan says it all:

Accelerate your video career
Access the biggest brands. Build your network. Get paid.

Antonio Negri redeployed the concept of the cognitariat from the Reaganite futurist and digital *Magna Carta* signatory Alvin Toffler to account for this phenomenon.⁴¹ Negri defines the cognitariat as people undertaking casualized cultural work who have heady educational backgrounds yet live at the uncertain interstices of capital, qualifications, and government in a post-Fordist era of mass unemployment, limited-term work, and occupational insecurity. They are sometimes complicit with these circumstances because their identities are shrouded in autotelic modes of being: work is pleasure and vice versa; labor becomes its own reward.⁴² The art world is a model.

The wider culture industries largely remain controlled by media and communications conglomerates, which frequently seek to impose artist-like conditions on their workforces (the cable versus broadcast TV labor process is a notorious instance). They gobble up smaller companies that invent products and services, "recycling audio-visual cultural material created by the grassroots genius, exploiting their intellectual property and generating a standardized business sector that excludes, and even distorts, its very source of business," to quote *The Hindu*.⁴³ In other words, the cognitariat—interns, volunteers, contestants, and so on—creates "cool stuff" whose primary beneficiaries are corporations.⁴⁴

At the same time, the governing assumption of Internet and arts boosters is that culture is an endlessly growing resource that can dynamize both society and economy. The Australian Academy for the Humanities calls for "research in the humanities and creative arts" to be tax-exempt based on its contribution to research and development, and subject to the same surveys of "employer demand" as the professions and sciences as a *quid pro quo*.⁴⁵ The Australian Research Council's Centre of Excellence for Creative Industries and Innovation has solemnly announced an "industryfacing [sic] spin-off from the centre's mapping work, Creative Business Benchmark."⁴⁶ In partnership with the Arts and Humanities Research Council, the UK's National Endowment for Science, Technology and the Arts says, "The arts and humanities have a particularly

strong affiliation with the creative industries” and provide research that “helps to fuel” them, in turn boosting innovation more broadly.⁴⁷ True believers all; none of the issues raised in this chapter seem to touch them—unlike the ITU or OECD.

The Good News

So that all looks rather bleak, doesn't it? If you are a credulous cybertarian and you have kept reading so far, is there any good news? If you are that much simpler being, a skeptic, where is the joy? And no matter who you are—where is the art? It is in the title, but does it figure here, apart from the spread of exploitative labor practices into the core of an allegedly postindustrial economy?

Environmental art covers many works that directly and indirectly represent nature. Older examples, from the canon of high European culture, might be Claude Monet's *London Series* or John Constable's *Clouds*.⁴⁸ More tendentious instances from today include such nonrepresentational, performative pieces as Richard Long's *A Line Made by Walking*, James Turrell's *Skyspace*, or Olafur Eliasson's *The Weather Project*, which assume nature is occupied and shaped by humanity, and vice versa.⁴⁹

They appreciate the lesson of Charles Babbage, the mythic founder of programmable computation. Almost two centuries ago, he noted the partial and ultimately limited ability of humanity to bend and control natural forces without unforeseen consequences: “The operations of man . . . are diminutive, but energetic during the short period of their existence: whilst those of nature, acting over vast spaces, and unlimited by time, are ever pursuing their silent and resistless career.”⁵⁰ E-waste artists are alert to these questions, both in terms of their own practice and the wider world of cybertarianism. While keen to use mixed-media methods and new technologies, they understand full well the risk as much as the potential that cleaves to gadgetry.⁵¹ Consider *Arte Povera*'s classic use of found materials, or such artists as Jessica Millman,⁵² Miguel Rivera,⁵³ Sudhu Tewari,⁵⁴ Natalie Jeremijenko, Nome Edonna's deviant art,⁵⁵ Chris Jordan,⁵⁶ Erik Otto,⁵⁷ or Jane Kim.⁵⁸ In 2014, Chris Jordan built the world's biggest e-waste artwork in Australia: a huge cell phone entitled “23.” Made by the artist with schoolchildren and eight thousand discarded phones, it stood for the 23 million unused cell phones sitting around Australian buildings, mute testimony to an insatiable culture of built-in obsolescence.⁵⁹

Yona Friedman focuses on redeployment rather than originality,⁶⁰ while Julie Bargmann and Stacy Levy start with the creative cleanup of waste rather than concluding with a painstaking one.⁶¹ The Carnegie Endowment's *Foreign*

Policy magazine circulated into the mainstream Natalie Behring's stunning collection of photos from "Inside the Digital Dump."⁶² Amsterdam's Urban Screens electronic billboards encourage active citizenship in public spaces, as do Ars Electronica of Linz and Melbourne's Federation Square.⁶³ Yuri Suzuki uses e-waste to rematerialize the map of the London Underground, encouraging people to think of iconic representations like the Roundel and the Circle Line as perennial, thus inviting them to ponder the little black boxes in their lives, from phones to tablets, as potentially reusable rather than necessarily replaceable items.⁶⁴ Peter McFarlane draws on his sales experience hawking built-in obsolescence to criticize "innovation." He makes discarded circuit boards simulate fossil life—an ironic comment on the path to self-destruction with which we began.⁶⁵ Rodrigo Alonso turns electronic trash into designer furniture.⁶⁶ Mairo Cacedo Langer reboots robots as Robo Planters, wacky pot holders with personality.⁶⁷ ReFunct Media #5 is less concerned with end products than reimagining our relationship to the process of creating e-waste.⁶⁸ Dani Ploeger explores e-waste and feminist struggles in performance pieces such as "Waste Circuits" and through anal electrodes.⁶⁹ These works remind us of the materiality of e-waste in phenomenological terms, as does Beijing's 798 Art Zone and its reuse of e-waste.⁷⁰

I want to focus here on work by Natalie Jeremijenko, who installed a Model Urban Development on the roof of the Postmasters Gallery's former headquarters in Chelsea, New York. The project features seven residential housing developments, a concert hall, and other public amenities, powered by human food waste. The installation toyed with new conceptions of urban futures, reimagining our relationship to nonhuman organisms. Jeremijenko's work is referred to as experimental design, or xDesign, and explores the opportunity that new technologies present for progressive, pacific change.

One of Jeremijenko's renowned projects is "Feral Robotic Dogs," which finds her adapting fallen (or are they risen?) toys to sniff out environmental toxins (see Figure 1). She hands them to victims of environmental racism, assisting them to identify and intervene in their situation.⁷¹ Her description of "Feral Robotic Dogs" emphasizes several aspects of the project: fun—the joy of learning about robotic dogs; safety—the need to use machines to counter environmental racism; access—the importance of working alongside people traditionally excluded from the use of such gadgets; and recycling—the lesson heeded by so many great artists and designers: that there is value in tinkering with success as opposed to seeking newness. The best innovation builds upon rather than displaces what went before. Dogs created as asinine executive toys are recreated as activist art works.⁷² One thinks here of Francis Alÿs, who makes "collector"

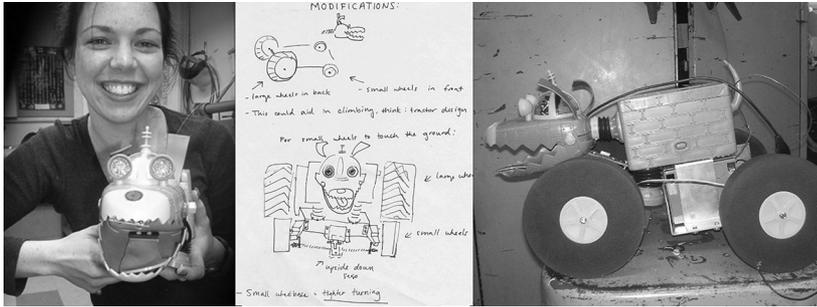


Figure 6.1. Feral robotic dogs, Elise (left and center) and Gollum (right). Elise was designed to seek out the toxin PERC from the ruins of the “American Linen” mass-quantity laundry business. Images courtesy of Natalie Jeremijenko.

toys from discarded magnets, cans, and other detritus to pick urban scraps while walking.⁷³

How Stuff Is Made (HSIM, <http://howstuffismade.org>) is Jeremijenko’s visual encyclopedia. It documents the physical processes, labor conditions, and environmental impact of contemporary manufacturing. Design and engineering students produce summative photo essays that describe these conditions of creation. HSIM reconsiders the responsibilities and capacities of design and engineering education in the light of sociopolitical constraints, organizational innovations, and globalization.⁷⁴

What can such works of art do in broader political terms? This question has exercised thinkers of every epoch and kind, from Plutarch to Trotsky. When we ponder avant-garde uses of spectacle, it’s easy to fall into either a critical camp or a celebratory one. The critical camp would say that rationality must be appealed to in discussions of climate change, and a progressive goal of capturing popular emotion will ultimately fail. Why? The silent majority doesn’t like the avant-garde, marketing outspends art, such occasions preach to a light-skinned, middle-class eco-choir, media coverage is slender, and crucial decisions are made in golf carts, not galleries. Conversely, the celebratory camp would argue that a Cartesian distinction between hearts and minds is not sustainable, a sense of humor is crucial in order to avoid the image of environmentalists as finger-wagging scolds, corporate capital must be opposed in public, the media’s need for vibrant textuality can be twinned with serious discussion as a means of involving people who are not conventional activists, and a wave of anti-élite sentiment is cresting. In 2013 *The Economist* predicted that the “silicon elite will

cease to be regarded as geeks who happen to be filthy rich and become filthy rich people who happen to be geeks,⁷⁵ with a backlash against cyberbarianism inspired by Occupy⁷⁶ and Anonymous.⁷⁷

Absent external evaluation of the social composition of art world participants, the nature of its coverage by old, middle-aged, and new media, and subsequent shifts in public opinion and reactions from lawmakers, it is difficult to be sure about the impact of such art. I generally incline toward the skeptic's view—but not in these instances. Why? Because I think the lugubrious hyper-rationality often associated with environmentalism needs leavening through sophisticated, entertaining, participatory spectacle. A blend of dark irony, sarcasm, and cartoonish stereotypes can be twinned with a radical departure from a cultural world that lines up to exploit the Earth with gullible consumers pressing their noses to the Windows and Apples of this world, looking for operating systems as if they were upgrading their own bodies. Jeremijenko's work, *inter alia*, instantiates just such endeavor.

Conclusion

Simmel argued that:

When we designate a part of reality as nature, we mean one of two things . . . an inner quality marking it off from art and artifice, from something intellectual or historical. Or . . . a representation and symbol of that wholeness of Being whose flux is audible within them.⁷⁸

The oeuvre mentioned briefly above helps one imagine the relationship of a sustainable, democratic, and pleasurable life—a healthy Earth, a functioning global democracy, and fun—to art. E-waste artists translate scientific and activist ideas and found or invented materials, encouraging us to think of the imminent, not just the past and present.⁷⁹ This engages popular culture in an avant-garde way that can feed back into the everyday and in turn be made sense of by public interest intermediaries as well as opportunistic commerce.

Perhaps I am describing/endorsing a very conventional view of art, such that it trials new forms of life that may be taken up by the mainstream. But I am seeking a different inflection, focused on the capacity of these works to exemplify and criticize a work and ecological disaster that must not be allowed to continue. Artists are uniquely placed to enliven such conversations, due to the centrality of their labor process to the spread and development of a cognitariat and their self-critical complicity with the environmental peril that is enabled

by digital culture. Their creative reuse of waste as art challenges our upgrade society's culture of built-in obsolescence, while the curating of such work by museums can be part of a wider commitment against e-waste.⁸⁰

William Morris asked some powerful questions a century and more ago about the links between labor, art, and the environment. He called for the art world to recognize its links to everyday life and problematize a Romantic separation of work from creativity:

Of all the things that is likely to give us back popular art in England, the cleaning of England is the first and most necessary. Those who are to make beautiful things must live in a beautiful place. Some people may be inclined to say . . . that the very opposition between the serenity and purity of art and the turmoil and squalor of a great modern city stimulates the invention of artists, and produces special life in the art of today. . . . It seems to me that at best it but stimulates the feverish and dreamy qualities that throw some artists out of the general sympathy . . . men who are stuffed with memories of more romantic days and pleasanter lands, and it is on these memories they live.⁸¹

E-waste artists at their best inhabit a world where these antinomies are put into dialectical play. They use the freedom of art to demand secure labor and a sustainable environment. E-waste turns a post-smokestacks world of impermanent cultural employment upside down, making us rethink the ecological and employment dualities of the contemporary moment.

Notes

1. The chapter draws on previous work and extends this into the response of artists to related problems. Richard Maxwell and Toby Miller, *Greening the Media* (New York: Oxford University Press, 2012); and <http://www.psychologytoday.com/blog/greening-the-media> (accessed March 13, 2014).

2. Intergovernmental Panel on Climate Change, World Meteorological Organization, <http://www.ipcc.ch/report/ar5/wg1/#.UkXnuGSG3UM> (accessed March 13, 2014).

3. Lisa Parks, "Energy-Media Vignettes," *Flow* 19, no. 8 (2014), available at <http://flowtv.org/2014/03/energy-media-vignettes/> (accessed Mar. 13, 2014).

4. Herbert J. Gans, "Sociological Amnesia: The Noncumulation of Normal Social Science," *Sociological Forum* 7, no. 4 (1992): 701–10.

5. George Orwell, "As I Please," *Tribune*, May 12, 1944, available at <http://teletlib.com/authors/O/OrwellGeorge/essay/tribune/AsIPlease19440512.html> (accessed March 13, 2014).

6. "A Cyber-House Divided," *Economist*, September 4, 2010, 61–62.

7. Esther Dyson, George Gilder, George Keyworth, and Alvin Toffler, *Cyberspace and the American Dream: A Magna Carta for the Knowledge Age*, version 1.2, Progress and Free-

dom Foundation, 1994, available at <http://www.pff.org/issues-pubs/futureinsights/fi.2magnacarta.html> (accessed March 13, 2014).

8. Lev Grossman, "Time's Person of the Year: You," *Time*, December 13, 2006, available at <http://content.time.com/time/magazine/article/0,9171,1570810,00.html> (accessed March 13, 2014).

9. "Media Guardian 100," *Guardian*, September 2, 2013, available at <http://www.theguardian.com/media/series/mediaguardian-100-2013-1-100> (accessed March 13, 2014).

10. Robert Jensen, "The Digital Provide: Information Technology, Market Performance, and Welfare in the South Indian Fisheries Sector," *Quarterly Journal of Economics* 122, no. 3 (2007): 879–924.

11. Dean Karlan, "Every Which Way We Can," *Finance and Development* 49, no. 4 (2012), available at <https://www.imf.org/external/pubs/ft/fandd/2012/12/karlan.htm> (accessed March 13, 2014).

12. Jan Hutton, "Mobile Phones Dominate in South Africa," *Nielsen Wire*, September 30, 2011, available at <http://blog.nielsen.com/nielsenwire/global/mobile-phones-dominate-in-south-africa> (accessed March 13, 2014).

13. Thomas Campbell, Christopher Williams, Olga Ivanova, and Banning Garrett, *Could 3D Printing Change the World? Technologies, Potential, and Implications of Additive Manufacturing*, Atlantic Council, 2011, available at http://www.acus.org/files/publication_pdfs/403/101711_ACUS_3DPrinting.PDF (accessed March 13, 2014).

14. Brent Stephens, Parham Azimi, Zeineb El Orch, and Tiffanie Ramos, "Ultrafine Particle Emissions from Desktop 3D Printers," *Atmospheric Environment* 79 (2013): 334–39.

15. Andreas R. Köhler, Lorenz M. Hilty, and Conny Bakker, "Prospective Impacts of Electronic Textiles on Recycling and Disposal," *Journal of Industrial Ecology* 15, no. 4 (2011): 496–511.

16. David Lieberman, "Deadline's YouTube Channel Rankings," *Deadline.com*, November 23, 2012, available at http://www.deadline.com/2012/11/deadline%E2%80%99s-youtube-channel-rankings-2/#utm_source=sailthru&utm_medium=email&utm_campaign=breakingnewsalert; Hayley Hudson, "Kelvin Doe, Self-Taught Engineering Whiz From Sierra Leone, Wows MIT," *Huffington Post*, November 19, 2012, available at http://www.huffingtonpost.com/2012/11/19/kelvin-doe-self-taught-en_n_2159735.html; Jeff Chu, "The Philanthropic Prodigy," *Fast Company*, May 13, 2013, available at <http://www.fastcompany.com/3009225/most-creative-people-2013/43-kelvin-doe> (all accessed March 13, 2014).

17. Martin Medina, *The World's Scavengers: Salvaging for Sustainable Consumption and Production* (Lanham, Md.: AltaMira, 2007).

18. Christine L. Ogan, Manaf Bashir, Lindita Camaj, Yunjuan Luo, Brian Gad-die, Rosemary Pennington, Sonia Rana, and Mohammed Salih, "Development Communication: The State of Research in an Era of ICTs and Globalization," *Gazette* 71, no. 8 (2009): 655–70.

19. James Carey, "Historical Pragmatism and the Internet," *New Media and Society* 7, no. 4 (2005): 443–55.

20. CHASS, *CHASS Submission: Productivity Commission Study on Science and Innovation*, 2006, available at <http://www.chass.org.au/submissions/pdf/SUB20060807TG.pdf> (accessed March 13, 2014).

21. Simon Lauder, "Australians the 'World's Worst Polluters,'" *World Today*, September 11, 2009, available at <http://www.abc.net.au/news/2009-09-11/australians-the-worlds-worst-polluters/1425986> (accessed March 13, 2014).

22. Max Weber, "Remarks on Technology and Culture," trans. Beatrix Zumsteg and Thomas M. Kemple, ed. Thomas M. Kemple, *Theory, Culture and Society* 22, no. 4 (2005): 23–38.

23. Harvey Sacks, *Lectures on Conversation*, vols. 1 and 2, ed. Gail Jefferson (Malden, Mass.: Blackwell, 2005).

24. See http://www.peri.umass.edu/toxicair_current/ (accessed March 13, 2014).

25. Maxwell and Miller, *Greening the Media*. Some of the citations it includes are: Jad Mouawad and Kate Galbraith, "Plugged-In Age Feeds Hunger for Electricity," *New York Times*, September 20, 2009; International Energy Agency, *Gadgets and Gigawatts: Policies for Energy Efficient Electronics—Executive Summary* (Paris: Organization for Economic Cooperation and Development, 2009), 5, 21; Climate Group, *Smart2020: Enabling the Low Carbon Economy in the Information Age* (London: Global Sustainability Initiative, 2008), 8–23; Simon Hancock, "Iceland New Home of Server Farms?," *BBC News*, October 10, 2009, available at news.bbc.co.uk/1/hi/programmes/click_online/8297237.stm (accessed March 13, 2014); Organisation for Economic Co-Operation and Development, *Greener and Smarter: ICTs, the Environment and Climate Change* (Paris: Organisation for Economic Co-Operation and Development, 2010), 19.

26. International Telecommunication Union, *Measuring the Information Society: Executive Summary* (Geneva: International Telecommunication Union, 2012), 4.

27. Maxwell and Miller, *Greening the Media*. Readers may wish to consult Basel Action Network and Silicon Valley Toxics Coalition, *Exporting Harm: The High-Tech Trashing of Asia* (Seattle: Basel Action Network, 2002); Sherry Lee, "Ghosts in the MACHINES," *South China Morning Post Magazine*, May 12, 2002, available at http://ban.org/library/ghosts_in.html (accessed March 13, 2014); Xin Tong and Jici Wang, "Transnational Flows of E-Waste and Spatial Patterns of Recycling in China," *Eurasian Geography and Economics* 45, no. 8 (2004): 608–21; Zack Pelta-Heller, "HP's Printer Cartridges Are an E-Waste Disaster—Does the Company Really Care?," *AlterNet*, October 29, 2007, available at http://www.alternet.org/story/65945/hp%27s_printer_cartridges_are_an_e-waste_disaster_-_does_the_company_really_care (accessed March 13, 2014); Coby S. C. Wong, S. C. Wu, Nurdan S. Duzgoren-Aydin, Adnan Aydin, and Ming H. Wong, "Trace Metal Contamination of Sediments in an E-Waste Processing Village in China," *Environmental Pollution* 145, no. 2 (2007): 434–42.

28. Mike Hibberd, "Public Private Partnership," *Telecoms.com*, September 15, 2009, available at <http://www.telecoms.com/14505/public-private-partnership> (accessed March 13, 2014).

29. *ICTs for Environment: Guidelines for Developing Countries, with a Focus on Climate Change*, ICT Applications and Cybersecurity Division Policies and Strategies Department (Geneva: International Telecommunication Union, 2008); *ITU Symposium on ICTs and Climate Change Hosted by CTIC, Quito, Ecuador, 8–10 July 2009: ITU Background Report*, Telecommunication Development Sector (Geneva: International Telecommunication Union, 2009).

30. Hamadoun I. Touré, ITU Secretary-General's "Declaration on Cybersecurity and Climate Change, High-Level Segment of Council (Geneva: International Telecommunication Union, November 12–13, 2008), available at <http://www.itu.int/council/C2008/hls/statements/closing/sg-declaration.html> (accessed March 13, 2014).

31. John Houghton, "ICT and the Environment in Developing Countries: Opportunities and Developments," paper prepared for the Organization for Economic Cooperation and Development, 2009, available at <http://www.oecd.org/ict/4d/44005687.pdf> (accessed March 13, 2014).

32. Mark Mills, *The Cloud Begins with Coal: Big Data, Big Networks, Big Infrastructure, and Big Power: An Overview of the Electricity Used by the Global Digital Ecosystem*, National Mining Association/American Coalition for Clean Coal Electricity, 2013, available at http://www.americaspower.org/sites/default/files/Cloud_Begins_With_Coal_Exec_Sum.pdf (accessed March 13, 2014).

33. Greenpeace, *How Clean is Your Cloud?* 2012, available at <http://www.greenpeace.org/international/en/publications/Campaign-reports/Climate-Reports/How-Clean-is-Your-Cloud> (accessed March 13, 2014).

34. Duncan Clark, "Google Discloses Carbon Footprint for First Time," *Guardian*, September 8, 2011, available at <http://www.guardian.co.uk/environment/2011/sep/08/google-carbon-footprint> (accessed March 13, 2014).

35. George Ritzer and Nathan Jurgenson, "Production, Consumption, Prosumption: The Nature of Capitalism in the Age of the Digital 'Prosumer,'" *Journal of Consumer Culture* 10, no. 1 (2010): 13–36.

36. Richard Maxwell and Toby Miller, "'Warm and Stuffy': The Ecological Impact of Electronic Games," in *The Video Game Industry: Formation, Present State, and Future*, ed. Peter Zackariasson and Timothy Wilson (London: Routledge, 2012), 179–97; Toby Miller, *Cultural Citizenship: Cosmopolitanism, Consumerism, and Television in a Neoliberal Age* (Philadelphia: Temple University Press, 2007), and "Feminist Nudity? Video Consent? Moral Panic?" *Los Angeles Review of Books*, August. 23, 2012, available at <http://lareviewofbooks.org/essay/feminist-nudity-video-consent-moral-panic> (accessed March 13, 2014).

37. Cosma Orsi, "Knowledge-Based Society, Peer Production and the Common Good," *Capital & Class* 33 (2009): 31–51.

38. Erin Sparks and Mary Jo Watts, *Degrees for What Jobs? Raising Expectations for Universities and Colleges in a Global Economy* (Washington: National Governors Association Center for Best Practices, 2011).

39. Nandini Lakshman, "Copyediting? Ship the Work Out to India," *Business Week*, July 8, 2008, available at <http://www.businessweek.com/stories/2008-07-08/copyediting-ship-the-work-out-to-indiabusinessweek-business-news-stock-market-and-financial-advice> (accessed September 20, 2014).

40. Dawn C. Chmielewski, "Poptent's Amateurs Sell Cheap Commercials to Big Brands," *Los Angeles Times*, May 8, 2012, available at <http://articles.latimes.com/2012/may/08/business/la-fi-ct-poptent-20120508>; and <http://www.poptent.net> (both accessed March 13, 2014).

41. Antonio Negri, *Goodbye Mister Socialism* (Paris: Seuil, 2007); Alvin Toffler, *Previews and Premises* (New York: Morrow, 1983).

42. André Gorz, "Économie de la connaissance, exploitation des savoirs: Entretien réalisé par Yann Moulier Boutang and Carlo Vercellone," *Multitudes* 15 (2004), available at <http://multitudes.samizdat.net/Economie-de-la-connaissance> (accessed March 13, 2014).

43. Sharada Ramanathan, "The Creativity Mantra," *The Hindu*, October 29, 2006, available at <http://www.hindu.com/mag/2006/10/29/stories/2006102900290700.htm> (accessed March 13, 2014).

44. Andrew Ross, "Nice Work If You Can Get It: The Mercurial Career of Creative Industries Policy," *Work Organisation, Labour and Globalisation* 1, no. 1 (2006-07): 1-19; Carmen Marcus, *Future of Creative Industries: Implications for Research Policy* (Brussels: European Commission Foresight Working Documents Series, 2005).

45. Australian Academy of the Humanities, *Submission in Response to Research Workforce Strategy Consultation Paper: Meeting Australia's Research Workforce Needs*, 2010, available at <http://www.innovation.gov.au/Research/Documents/Submission75.pdf> (accessed March 13, 2014); Stuart Cunningham, "Oh, the Humanities! Australia's Innovation System out of Kilter," *Australian Universities Review* 49, no. 1-2 (2007): 28-30.

46. Stuart Cunningham, "Developments in Measuring the 'Creative' Workforce," *Cultural Trends* 20, no. 1 (2011): 25-40.

47. Hasan Bakhshi, Philippe Schneider, and Christopher Walker, *Arts and Humanities Research and Innovation* (London: Arts and Humanities Research Council / National Endowment for Science, Technology and the Arts, 2008).

48. See https://www.google.com.mx/search?q=london+series+monet&es_sm=119&tbm=isch&tbo=u&source=univ&sa=X&ei=4laKU7ugOYPYOp_ugMgJ&ved=0CDMQsAQ&biw=1306&bih=651; and https://www.google.com.mx/search?q=constable+clouds&es_sm=119&tbm=isch&tbo=u&source=univ&sa=X&ei=EleKU4CEKsOVPJHBgJgO&ved=0CCcQsAQ&biw=1306&bih=651 (both accessed March 13, 2014).

49. John E. Thornes, "A Rough Guide to Environmental Art," *Annual Review of Environment and Resources* 33 (2008): 391–411; Amy Struppek, "The Social Potential of Urban Screens," *Visual Communication* 5, no. 2 (2006): 173–88.
50. Charles Babbage, *On the Economy of Machinery and Manufactures*, 1832, available at <http://www.gutenberg.org/ebooks/4238> (accessed March 13, 2014).
51. See <http://thecreatorsproject.vice.com/blog/8-projects-turning-deadly-e-waste-into-beautiful-non-deadly-works-of-art> (accessed March 13, 2014).
52. See <http://www.jessicamillman.net/1/post/2010/10/e-waste-crisis.html> (accessed March 13, 2014).
53. Priya Ganapati, "Old Hard Drives Get Sculpted into Cars, Bikes, Robots," *Wired*, December 10, 2009, available at <http://www.wired.com/gadgetlab/2009/12/hard-drives-sculpture/3> (accessed March 13, 2014).
54. See http://www.sudhutewari.com/DumpArt/ST_DumpArt.html (accessed March 13, 2014).
55. See <http://nomeedonna.deviantart.com> (accessed March 13, 2014).
56. See <http://www.chrisjordan.com/gallery/rtn/#unsinkable> (accessed March 13, 2014).
57. See http://www.erikotto.com/exhibitions_03.htm (accessed March 13, 2014).
58. See <http://ink-dwell.com/> (accessed March 13, 2014).
59. See <http://www.whatech.com/members-news/green-technologies/18565-melbourne-hosts-australia-s-largest-ever-e-waste-artwork-bringing-to-life-our-throw-away-technology-addiction>; and <http://www.mobilemuster.com.au/news/articles/2014-02/blog-article-mobilemuster-presents-chris-jordans-australian-tour> (both accessed March 13, 2014).
60. See <http://www.yonafriedman.nl> (accessed March 13, 2014).
61. See <http://www.dirtstudio.com/>; <http://www.stacylevy.com> (accessed March 13, 2014).
62. Natalie Behring, "Inside the Digital Dump," *Foreign Policy*, May/June, 2007, available at http://www.foreignpolicy.com/articles/2009/09/23/inside_the_digital_dump (accessed March 13, 2014).
63. See <http://urbanscreens.org> (accessed March 13, 2014).
64. See <http://yurisuzuki.com/works/tube-map-radio> (accessed March 13, 2014).
65. See http://petermcfarlane.com/Peter%20Macfarlane%20web%20site/03circuit_board.php (accessed March 13, 2014).
66. See <http://ralonso.com/?portfolio=new-2&lang=en> (accessed March 13, 2014).
67. See <http://www.instructables.com/id/New-Robo-planters> (accessed March 13, 2014).
68. See <http://www.ewasteworkshop.com/category/ar/> (accessed March 13, 2014).
69. See <http://www.daniploeger.org/#!wastecircuits/cvq4>; <http://www.daniploeger.org/#!electrode/c3kk> (both accessed March 13, 2014).

70. See <http://www.798district.com/> accessed March 13, 2014.

71. See <http://vimeo.com/10075678> accessed March 13, 2014; Kavita Philip, "Art and Environmental Practice," *Capitalism Nature Socialism* 19, no. 2 (2008): 69–74, 70.

72. See <http://www.nyu.edu/projects/xdesign/> accessed March 13, 2014.

73. See <http://www.francisalys.com/public/collector.html> (accessed March 13, 2014).

74. See http://steinhardt.nyu.edu/faculty_bios/view/Natalie_Jeremijenko accessed March 13, 2014.

75. Adrian Wooldridge, "The Coming Tech-Lash," *Economist*, November 18, 2013. See <http://www.economist.com/news/21588893-tech-elite-will-join-bankers-and-oilmen-public-demonology-predicts-adrian-wooldridge-coming> (accessed March 13, 2014).

76. See <https://www.facebook.com/OccupySiliconValley408> (accessed March 13, 2014).

77. See <http://anonnews.org/> (accessed March 13, 2014).

78. Georg Simmel, "The Philosophy of Landscape," trans. Josef Bleicher, *Theory, Culture and Society* 24, no. 7–8 (2007): 20–29.

79. Néstor García Canclini, *Art Beyond Itself*, trans. David Frye (Durham: Duke University Press, 2014).

80. Zulma-Lin Garcia-Morales, "E-Waste: A Growing Problem with Global Expectations," *Museums & Social Issues* 6, no. 2 (2011): 196–203.

81. William Morris, *Art and the Beauty of the Earth*, 1884; see <http://www.marxists.org/archive/morris/works/1881/earth.htm> (accessed March 13, 2014).