

## Spectral Frequencies

### Neoliberal Enclosures of the Electromagnetic Commons

*Edward D. Melillo*

They hang the man and flog the woman  
That steal the goose from off the common,  
But let the greater villain loose  
That steals the common from the goose.  
—English folk poem, ca. 1764<sup>1</sup>

Acts of enclosure have been fundamental to the expansion of capitalism. During the eighteenth and early nineteenth centuries, the termination of customary rights to resources previously held “in common” facilitated Western Europe’s transition from feudal production for use to capitalist production for exchange. To accomplish these enclosures, capital relied upon state-sponsored violence, which dislocated those who depended upon resources in the public domain, such as the meadows, forests, and thickets of the English countryside. These acts of enclosure represented an emerging liberal regime of legal protections for private property. Such unsettling interventions also wrought the working class of Britain’s Industrial Revolution. The women and men displaced by enclosure, in the words of Karl Marx, “became sellers of themselves only after they had been robbed of all their own means of production, and of all the guarantees of existence afforded by the old feudal arrangements. And the history of this, their expropriation, is written in the annals of mankind in

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letters of blood and fire.”<sup>2</sup> Although such dispossessions of the many to enrich the possessions of the few may appear to us as bygone examples of primitive accumulation, it is crucial to recognize that the ideologues of neoliberalism have tenaciously outperformed their liberal predecessors by pioneering new frontiers of enclosure, ranging from the “inner” genetic material of living bodies to “outer” spaces beyond the earth’s atmosphere.<sup>3</sup>

In this paper, I examine the history of neoliberal appropriations in the oscillating electrical and magnetic fields that surround us, the electromagnetic Commons. The relationship between the neoliberal phase of capitalism and the expansion of new frontiers for privatization remains undertheorized. Such investigations reveal previously unexplored genealogies of neoliberalism and suggest possible modes of resistance to this regime of aggressive privatization.<sup>4</sup>

The existence of the electromagnetic spectrum was not confirmed until 1888. That year, German physicist Heinrich Hertz demonstrated the outward radiation of electromagnetic waves at the speed of light from an electrical stimulus. By the turn of the century, Italian inventor Guglielmo Marconi’s shortwave wireless transmissions across the Atlantic had inaugurated an era of human access to a previously unexploited wealth of natural resources within the spectrum. This spectrum contains the range of all possible radiation in the earth’s atmosphere, extending from low-frequency, long wavelengths used for modern radio broadcasting to high-frequency, short wavelengths, such as the gamma rays employed in a wide variety of medical procedures. Our interactions with this radiation are mediated by a dizzying array of technologies, from cell phones to radios, navigation devices to Internet servers, microwave ovens to X-ray machines, all of which operate at various frequencies in the electromagnetic spectrum. My analysis focuses on a closely related pair of historical developments in this Commons, namely the militarization of electromagnetic fields and the advent of so-called spectrum auctions in which governments have sold rights to exclusive bandwidth control to the telecommunications industry. Taken together, these twentieth-century shifts demonstrate the ways that capital has violently transformed the electromagnetic spectrum into *abstract space* — a hierarchical, homogenized space of control — for the realization of the neoliberal mantra, “stabilize, privatize, and liberalize.”<sup>5</sup>

Rendering visible these aggressive regimes of privatization exposes one of the key aspects of the neoliberal turn, namely the new enclosure movements. It also suggests that these *appropriations* of the electromagnetic Commons have generated recurring *apparitions* for their architects. Policy briefs, U.S. Department of Defense documents, and statements from neoliberal think tanks indicate that the proponents of electromagnetic enclosure have been haunted by the nagging abstractions and unquantifiable elements of their own discourses. When we sift through the shards of uncensored documentation generated by the military-industrial complex, constellations of imagined adversaries and incessant anxieties come into focus. The

emerging “Ghost in the Machine” may, in fact, be the ever-widening penumbra of use-values in the spectrum that defy regulation or escape direct control.<sup>6</sup> Institutional unease about these unbounded activities demonstrates the contingency and instability of electromagnetic enclosures, features that make them susceptible to forms of targeted resistance.<sup>7</sup>

During the late 1970s and early 1980s, a groundswell of neoliberal regimes displaced the postwar hegemony of global Keynesianism.<sup>8</sup> An axis of right-wing governments led by Ronald Reagan, Margaret Thatcher, Helmut Kohl, and Brian Mulroney extended the suffocating embrace of social marketization to North America, Western Europe, and Australia within a decade. Expressed as a relentless pursuit of the privatization of public goods and the management of social functions through free-market mechanisms, the architecture of the *enabling* neoliberal state supported the expansion of capital by eradicating so-called *distortions* of the welfare state. Curiously, the key tenets of neoliberalism rely upon a conspicuous inconsistency. In the words of Jamie Peck and Adam Tickell, neoliberalism “exists in a self-contradictory way as a form of ‘metaregulation,’ a rule system that paradoxically defines itself as a form of *antiregulation*.”<sup>9</sup>

Despite the complex and diverse ways in which this ideological formula has become embedded in concrete localities, the neoliberal amalgam of metaregulation and antiregulation assumed its most potent configuration in the bureaucratic directives of international financial institutions.<sup>10</sup> By the 1990s, economist John Williamson’s technocratic notion of a “Washington Consensus” became the shorthand for the aggressive promotion, by any means necessary, of core neoliberal principles and policies throughout the developing world. These Structural Adjustment Programs, revealingly called SAPs, entailed violent suppression of dissent, egregious violations of economic and political sovereignty, and environmentally destructive practices, justified by the seemingly commonsense rubric of free trade, market liberalization, and sustainable development.<sup>11</sup>

Although neoliberal discourse employs the rhetoric of democratization through privatization, its proponents have been overwhelmingly comfortable with authoritarian regimes, as long as the leaders of these autocracies espouse unflinching commitment to free-market fundamentalism. In the wake of the Bretton Woods Agreements of 1944, the International Monetary Fund (IMF) and the World Bank funded right-wing military dictatorships in dozens of countries, from Kenya and Brazil to Indonesia and Pakistan.<sup>12</sup> Such regimes provided the enforcement mechanisms for the dismantling of social welfare programs and created political spaces where the cancellation of elections, bans on public assembly, and suppression of dissent became familiar means of “safeguarding freedoms.” This market Machiavellianism required little of totalitarian governments, other than the production of a privatized social landscape throughout the developing world. As a writer for *Forbes* magazine put it in 1992, “The dictatorship has gone, but the free market policies it

implemented live on in Chile. As a demonstration project for the developing world, Chile is priceless.”<sup>13</sup>

Among the core tenets of neoliberal discourse is the fundamental role of armed conflict in enforcing global economic growth. In such formulations, the success of capitalist globalization is predicated upon the ability of its advocates to deploy overwhelming military force in support of free-market expansion, the continuous enclosure of public Commons, and the promulgation of private property. *New York Times* columnist Thomas Friedman has argued that noncompliant players need to be mercilessly bludgeoned into submission. In *The Lexus and the Olive Tree* (2000), he brazenly asserts, “The hidden hand of the market will never work without a hidden fist.” As Friedman continues, there is a bomb behind every Big Mac: “Indeed, McDonald’s cannot flourish without McDonnell Douglas, the designer of the U.S. Air Force F-15. And the hidden fist that keeps the world safe for Silicon Valley’s technologies to flourish is called the U.S. Army, Air Force, Navy and Marine Corps.”<sup>14</sup> In the most recent chapter of neoliberal market expansion, the hidden fist “opened” Iraq for business. With a dramatic flourish, the relationship between violence and privatization was unveiled for all to see during the September 19, 2003, announcement by Coalition Provisional Authority Head L. Paul Bremer III that the United States would engage in “the full privatization of [Iraqi] public enterprises, full ownership rights by foreign firms of Iraqi businesses, full repatriation of foreign profits . . . the opening of Iraq’s banks to foreign control, national treatment for foreign companies and . . . the elimination of nearly all trade barriers.”<sup>15</sup>

To constantly augment the pummeling power of the neoliberal clenched hand, control of knowledge production and transmission is paramount. Throughout history, comprehension of combat-zone intricacies and the fabrication of internally coherent discourses about these details have been among the most confounding challenges for battlefield commanders. Nearly two centuries ago, Prussian military theorist Carl von Clausewitz wryly noted that a “great part of the information obtained in War is contradictory, a still greater part is false, and by far the greatest part is of a doubtful character.”<sup>16</sup> With the advent of widespread access to the electromagnetic spectrum, the production of knowledge in the theater of war underwent a radical shift. In the 1990s, U.S. military personnel began referring to “information warfare,” a new combat paradigm in which cognitive dominance became both the strategy and the objective.<sup>17</sup> “Information warfare cannot be waged by a military force unless it can effectively and efficiently control the electromagnetic spectrum,” note military analysts Earl S. Takeguchi and William J. Wooley.<sup>18</sup>

Despite the apparent infancy of the term, the precursors to this concept of “information warfare” extend deep into to the Cold War.<sup>19</sup> After the USSR began jamming radio signals from Western European and U.S. broadcasters in 1948, CIA Director Walter Bedell Smith warned, “The Soviets are rapidly achieving the capability of launching all-out electromagnetic war against the non-Soviet world.”<sup>20</sup>

Fears of Soviet hegemony in the spectrum became even more pronounced as the decades of détente wore on. In 1987, writers for the Pentagon publication *Soviet Military Power* speculated that Soviet development of “a prototype short-range tactical RF [radio frequency] weapon” was close at hand.<sup>21</sup> Authors of a *Washington Post* article from the same year warned of the Soviets’ “Modern-Day Death Ray.” “The peak pulse power from RF beams,” the author alarmingly recounted, “can ‘devitalize’—that is, scramble—every living cell they pass through. At close range they can cause death; at greater range, the beams can create behavioral effects best described as ‘instant bedlam.’”<sup>22</sup>

The feared deployment of Soviet cell-scrambling technology never occurred; instead, the devitalization of an adversary’s comprehension became a top priority for post-Cold War U.S. military policymakers. “The Department of Defense knows the value of the electromagnetic spectrum. In the gulf war, the coalition’s first attacks were aimed at Iraq’s use of the spectrum, Iraq’s radars and communications,” remarked a U.S. Defense Department spokesperson in 1996 after the first invasion of Iraq. As he pointed out, “We sought to render our adversary blind, deaf and dumb by denying him access to the electromagnetic spectrum.”<sup>23</sup> The first of these three nullifications assumed greatest importance. Denying electromagnetic “sight” to opponents while enhancing the visionary capacities of one’s own forces became a strategic end unto itself. In his 2004 memoir, *American Soldier*, General Tommy Franks glowingly remarked that U.S. military dominance in the electromagnetic spectrum through technologies like global positioning systems (GPS), infrared night-vision devices, and unmanned surveillance drones “promised today’s commanders the kind of Olympian perspective that Homer had given the gods.”<sup>24</sup> This collision of the “sight machine” with the “war machine,” in the words of cultural theorist Paul Virilio, reverberated in the comments of former U.S. Secretary of Defense William J. Perry: “If I had to sum up current thinking on precision missiles and saturation weaponry in a single sentence, I’d put it like this: once you can see the target, you can expect to destroy it.”<sup>25</sup> Thus, the field of view provides the parameters for the production of disappearance. But this preoccupation with attaining the synoptic vantage point has come at the expense of relations with the local, contingent, and variable factors on the ground.<sup>26</sup> As retired Major General and Fox News Commentator Robert Scales complained to the U.S. Congress, “If I know where the enemy is, I can kill it. My problem is I can’t connect with the local population.”<sup>27</sup>

Meanwhile, local populations under occupation by U.S. forces have had mounting success at connecting with the world beyond the battlefield by using slivers of bandwidth to expand their own cognitive horizons. Lieutenant Colonel Charles K. Hardy noted in a report for the U.S. Army War College, “An opportunity was missed when the fall of Baghdad led to the lifting of the ban on satellite receivers for the civilian population. Everyone who could afford the costs of a receiver purchased a dish and black box enabling them to receive hundreds of stations, including sev-

eral hostile to us but respectable in the region — Al Jazeera and Al Arabia.”<sup>28</sup> In other words, the purveyors and consumers of counterhegemonic narratives have found ways to tunnel under the digital enclosures that the occupying power sought to reinforce.

In addition to their concerns over information refugees burrowing beneath cyber-fences, military bureaucrats are worried about foreign hordes overrunning firewalls. Using a medieval metaphor to describe a postmodern vulnerability, a writer for *Air Force Magazine* recently explained, “American adversaries cannot confront the world’s most powerful military head on, so they look to exploit chinks in the U.S. armor. Cyberspace contains many such chinks because the nation’s military power is more dependent than ever on systems based on the electromagnetic spectrum.”<sup>29</sup> Such fears acquire added dimension in the *Information Operations Roadmap*, an extraordinary rendition of the universe, which staff members from the National Security Archive at George Washington University obtained in 2006 using the Freedom of Information Act. The 74-page report, released on October 30, 2003, and signed by Secretary of Defense Donald Rumsfeld, is a field manual for the twenty-first-century enclosure of the electromagnetic Commons.<sup>30</sup> The report states that the U.S. military should aim for nothing less than to “provide a future [electronic warfare] capability sufficient to provide maximum control of the entire electromagnetic spectrum, denying, degrading, disrupting, or destroying the full spectrum of globally emerging communication systems, sensors, and weapons systems dependent on the electromagnetic spectrum.”<sup>31</sup> At numerous junctures, the report displays a paranoid style: “Networks are growing faster than we can defend them. . . . the Department will ‘fight the net’ as it would a weapons system.”<sup>32</sup> Here, the concluding remark from Richard Hofstadter’s 1964 essay, “The Paranoid Style in American Politics,” seems apt: “We are all sufferers from history, but the paranoid is a double sufferer, since he is afflicted not only by the real world, with the rest of us, but by his fantasies as well.”<sup>33</sup>

As cultural theorist Stuart Hall reminds us, “hegemonizing is hard work.”<sup>34</sup> One can see the frustrated labors of propaganda wonks on display in remarks such as: “The increasing ability of people in most parts of the globe to access international information sources makes targeting particular audiences more difficult.”<sup>35</sup> When the authors of the *Information Operations Roadmap* turn their attention to advocating the widespread deployment of “truth squads,” “humanitarian road shows,” “theater public diplomacy,” and “tactical application of loudspeakers,” Friedman’s metaphorical bomb behind every burger takes a more literal turn toward the convergence of the Golden Arches and the Gulag Archipelago.<sup>36</sup>

In their assertions about how to conduct “information warfare” through control of the electromagnetic spectrum, U.S. military technocrats constantly emphasize the role that free-market mechanisms play in facilitating their institutional ambitions. The authors of a 2010 Department of Defense memo advise: “Adopt

the view that spectrum management and the acquisition of spectrum dependent assets are business practices. Use market analysis and the evaluation of economic implications in decisions affecting the spectrum.”<sup>37</sup> Such recommendations reflect the appreciation of the economic value accorded to spectrum bandwidth by global finance capital.

This value system performed pirouettes under the spotlights on July 25, 1994, when the contestants in an extraordinary event occupied the ballroom of the Omni Shoreham Hotel in Washington, D.C. From across the hall, staff of the Federal Communications Commission choreographed a simultaneous ascending auction of the exclusive rights to signal transmission over specific electromagnetic wavelengths.<sup>38</sup> Over the next five days, corporate bidders spent \$617 million to purchase ten nationwide narrowband personal communication service (PCS) licenses for exclusive use of sections of bandwidth. Among the big “winners” was the Plano, Texas–based paging company, PageNet. As a writer for *BusinessWeek* remarked, “In January, the company began amassing a war chest with a \$300 million debt offering to supplement a \$100 million cash hoard and a \$450 million line of credit. After making that sort of preparation, PageNet was determined not to leave empty-handed. ‘We came loaded for bear,’ acknowledges President Terry L. Scott.”<sup>39</sup> Six years later, a similar spectrum auction in Britain netted £22.5 billion (\$34 billion).<sup>40</sup> The high-stakes enclosure of another sector of the spectrum was under way.

Such auctions, first used by the New Zealand government in 1990, owe much to the 1959 appeal by British economist Ronald Coase for the establishment of property rights in the radio frequencies of the electromagnetic spectrum. In his now-classic article, “The Federal Communications Commission,” Coase contended that from December 1926 onward, U.S. regulatory agencies—first the Federal Radio Commission and subsequently the Federal Communications Commission (FCC)—had mistakenly allotted a scarce resource through a cumbersome, bureaucratic allocation scheme. As Coase noted, “The problem confronting the radio industry is that signals transmitted by one person may interfere with those transmitted by another. It can be solved by delimiting the rights which various persons possess.”<sup>41</sup> He argued that a system of well-defined, sufficiently enforced, and easily tradable property rights would resolve problems of interference between parties wanting to use the same frequencies in the spectrum. This conclusion, formalized in subsequent economic studies as the “Coase Theorem,” placed implicit trust in the abilities of market mechanisms to efficiently and equitably apportion resources.<sup>42</sup>

The Coase Theorem found potent expression in May 1995. That month, the Progress and Freedom Foundation, a conservative think-tank tied to former Speaker of the House of Representatives Newt Gingrich, published a report called *The Telecom Revolution: An American Opportunity*. Coase’s conclusions about privatization of the electromagnetic spectrum featured prominently in a section called “The Replacement Alternative: A Property Rights Approach to the Spectrum.”<sup>43</sup> The

report's authors advocated the establishment of "a new Office of Communications (the 'OC') to be located within an existing Executive Branch agency," which would be charged with "overseeing the mass privatization of spectrum to the American people through a sequenced, phased-in auction process" and "coordinating a non-interference standard to govern the private sector's use of spectrum."<sup>44</sup> In 2001 a Cato Institute report followed suit, in which its author, a member of the Bush-Cheney FCC Transition Advisory Team, argued, "Just as America has a full-fledged private property rights regime for real estate, so too should wireless spectrum properties be accorded the full protection of the law."<sup>45</sup> One could hardly find a more cogent expression of *antiregulation* through *metaregulation*.<sup>46</sup>

But appropriations carried out by the enabling state in the name of flexible accumulation sometimes run amok when a logjam of competing discourses constricts neoliberal ambitions. In the atmosphere of anxiety that followed the September 11 attacks, the USA PATRIOT Act received negligible congressional scrutiny before being spirited into law by President George W. Bush on October 26, 2001. The legislation, clumsily titled the "Uniting and Strengthening America by Providing Appropriate Tools Required to Intercept and Obstruct Terrorism Act," curtailed civil liberties through an unmatched expansion of government surveillance powers, which increased state access to citizens' personal records and eroded congressional and public oversight of executive powers. Yet the act produced several contradictory outcomes for an administration so wholeheartedly committed to the neoliberal project.<sup>47</sup> One was to hinder international financial transactions across digital space. Title III of the legislation, the International Money Laundering Abatement and Financial Anti-Terrorist Act, pressured financial institutions, under threat of unwieldy fines, to monitor suspicious transactions involving foreign nationals and global corporations. As *The Financial Times* pointed out, this legal regime imposed an unprecedented array of constraints on the transnational movement of capital, especially through online portals.<sup>48</sup> Likewise, the editors of the *Economist* complained, "Should [banks] fail to toe the line, the Patriot Act essentially cuts off foreign institutions from business relations with America. That provision 'scared the living daylights out of the rest of the world,' says a security consultant. 'They realised that without dollar accounts they were sitting ducks.'"<sup>49</sup> This was not the "friction-free capitalism" that Bill Gates had envisioned for the Internet.<sup>50</sup> Once again, the uncontrolled abstractions of neoliberal theory returned to haunt the proponents of spectrum enclosure.

Specters materialize in the most unexpected zones of the neoliberal landscape. Even the unambiguously material devices that mediate our connections to increasingly privatized estates in the electromagnetic spectrum may harbor apparitions of use-value that unsettle the authority of exchange value. In August 2008, a British customer ordered a new 3G iPhone and was startled to discover that his gadget's iTunes catalog already contained several photographs of a female assembly line



worker at Taiwan-based contractor Foxconn's Shenzhen factory in southern China. Images of the young woman, clad in a pale pink factory-issued jumpsuit and making a peace sign with her raised hand, became an instant Internet sensation after the mystified iPhone owner posted them on an Apple technology chat site. As expressions of concern about her working conditions, age, and job safety flooded online discussion forums, the mysterious aura of the high-tech commodity momentarily lost its luster. The chasm between the product and the social relations of its production had—if only momentarily—closed.<sup>51</sup> The transformative potential of episodes such as this can be overestimated, but such encounters unmistakably demonstrate the fragility of attempts to divorce “cyberspace” from the tangible world of material flows and human labors.<sup>52</sup> As French social theorist Henri Lefebvre poignantly suggested, “In and by means of space, the work may shine through the product, use value may gain the upper hand over exchange value: appropriation, turning the world upon its head, may (virtually) achieve dominion over domination, as the imaginary and the utopian incorporate (or are incorporated into) the real.”<sup>53</sup>

Such inversions of perspective can expose the farcical arguments that mimic their tragic predecessors. Much ink has been spilled over ecologist Garret Hardin's notion of the “Tragedy of the Commons.”<sup>54</sup> Hardin's use of overgrazing in a common pasture to conceptualize the dilemmas that arise from the competition among individuals to outdo each other in exploiting publicly accessible, unregulated resources revives classical liberal assumptions about rational self-interest. His tragic ecology also fails to acknowledge actually existing processes by which communities as diverse as Bolivian peasants and Maine lobster fishermen democratically manage collectively shared resources.<sup>55</sup> Instead of reaching Hardin's conclusion that “freedom in a commons brings ruin to all,” scholars and activists have increasingly recovered the Commons as both a conceptualization and realization of space that brings a wealth of benefits to its participants.<sup>56</sup> Making an argument for treating the electromagnetic spectrum as a Commons, Harvard law professor Yochai Benkler has pointed out, “In identifying the potential play for tragedy of the commons concerns in wireless communications it is important to remember the heuristic limitations of treating ‘spectrum’ as a resource. Spectrum is not a thing, like a pasture, that can be eliminated by overgrazing or needs constant upkeep. To be precise, if one wishes to treat spectrum as a resource, one must recognize that it is a perfectly renewable resource that is an input into the value sought to be maximized—the capacity of users to send and receive communications.”<sup>57</sup>

Arguments in favor of a spectrum Commons abound. Legal scholar Stuart Buck has noted, “A commons in the spectrum could offer several benefits, including greater freedom to experiment with local variations on spectrum usage, a greater incentive to develop technologies for spectrum sharing (such as spread spectrum radios or ultra-wide-band technology), and a greater harnessing of widely-dispersed information about spectrum usage.”<sup>58</sup> At the grassroots level, the Association for Pro-

gressive Communications has campaigned for spectrum access as a worldwide public good that is fundamental to basic struggles for social justice. The group's charter statement asserts, "The internet serves as a global public infrastructure. This infrastructure must be widely distributed and support sufficient bandwidth, which will enable people everywhere to utilize its potential for raising their voices, improving their lives and expressing their creativity. People have the right to well-distributed national Internet backbone that is connected to the international network."<sup>59</sup> Such rights of equal spectrum access are at stake in the battle over "net neutrality," a stance of opposition to attempts by Internet service providers and governments to regulate content, sites, platforms, and equipment used in communication via the Internet. From Twitter to YouTube, Indymedia to WikiLeaks, new spaces generated within the electromagnetic spectrum have served as influential avenues of social change. Despite these encouraging examples, a persistent gulf between those in contact with digital technologies (e.g., computers, mobile phones, and Internet servers) and those without access to such information portals hinders the emergence of a viable, worldwide spectrum Commons.<sup>60</sup>

Commons in the electromagnetic spectrum and elsewhere are extant and possible spaces that foster freedoms other than exploitative agency. With many sleights of the invisible hand, neoliberals have redefined customary use of these shared resources as theft.<sup>61</sup> The fight to preserve democratic access to the Commons amounts to a struggle to rescue "customs" from its condescending relegation to a juncture of interrogation and interception and refill the concept with meaning as an occasion of connection and a location of solidarity. Before all that is atmospheric congeals as property, it is crucial for us to reassert these customs in common.<sup>62</sup>

## Notes

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1. The origins of this oft-quoted condemnation of the English enclosure movement are elusive, yet its rhymed couplets have been widely circulated for centuries. For an example of its appearance in the American West during the late nineteenth century, see Ezra S. Carr, *The Patrons of Husbandry on the Pacific Coast* (San Francisco, CA: A. L. Bancroft, 1875), 291.
2. Karl Marx, *Capital: A Critique of Political Economy*, vol. 1, trans. Ben Fowkes (1867; repr., Harmondsworth, UK: Penguin, 1976), 875. For more on the British experience of enclosure, see J. L. Hammond and Barbara Hammond, *The Village Labourer* (1911; London: Longmans, 1966); E. P. Thompson, *The Making of the English Working Class* (Harmondsworth, UK: Penguin, 1963); Christopher Hill, *The World Turned Upside Down: Radical Ideas during the English Revolution* (London: Temple Smith, 1972); and Jane Humphries, "Enclosure, Common Rights, and Women: The Proletarianization of Families in the Late Eighteenth and Early Nineteenth Centuries," *Journal of Economic History* 50

- (March 1990): 17–42. For a discussion of the North American analogue to this process, see Eric T. Freyfogle, “The Enclosure of America,” Illinois Public Law Research Paper No. 07–10 (October 26, 2007), [papers.ssrn.com/sol3/papers.cfm?abstract\\_id=%201024846](http://papers.ssrn.com/sol3/papers.cfm?abstract_id=%201024846).
3. James Boyle, *The Public Domain: Enclosing the Commons of the Mind* (New Haven, CT: Yale University Press, 2008); David Bollier, *Silent Theft: The Private Plunder of Our Common Wealth* (New York: Routledge, 2002); and Alexander K. Haas, “The Wellcome Trust’s Disclosures of Gene Sequence Data into the Public Domain and the Potential for Propriety Rights in the Human Genome,” *Berkeley Technology Law Journal* 16 (2001): 145–64. In 1993, the Georgia-based company Space Marketing proposed launching a one-square-kilometer illuminated Mylar-sheet board into Earth’s orbit. The “Space Billboard” was to serve as a platform for advertisements and would have been roughly the same apparent size and brightness as the moon. The risk of impacts from space debris and a lack of funding sidetracked the project. For more on this episode, see Karl Grossman, “Disgrace into Space,” *Ecologist*, March 2001, 34–39.
  4. For examples of recent scholarship on the history of neoliberalism, see Philip Mirowski and Dieter Plehwe, eds., *The Road from Mont Pèlerin: The Making of the Neoliberal Thought Collective* (Cambridge, MA: Harvard University Press, 2009); Nik Heyen, *Neoliberal Environments: False Promises and Unnatural Consequences* (New York: Routledge, 2007); David Harvey, *A Brief History of Neoliberalism* (New York: Oxford University Press, 2005); and Susan George, “A Short History of Neoliberalism: Twenty Years of Elite Economics and Emerging Opportunities for Structural Change,” in *Global Finance: New Thinking on Regulating Speculative Capital Markets*, eds. Walden Bello, Nicola Bullard, and Kamal Malhotra (New York: Zed Books, 2000), 27–35.
  5. Hertz’s findings, *Untersuchung über die Ausbreitung der elektrischen Kraft*, appeared in English as Heinrich Hertz, *Electric Waves: Being Researches on the Propagation of Electric Action with Finite Velocity Through Space* (New York: Dover, 1893). An abbreviation of his surname, Hz, represents the number of radiowave cycles that pass a fixed point within one second. GHz stands for gigaHertz, equivalent to 1 billion Hz. I have borrowed the notion of *abstract space* from Henri Lefebvre, *The Production of Space*, trans. Donald Nicholson-Smith (Cambridge, MA: Blackwell, 1991), 49. The quote is from Alex Lo, “Last Rites for the Washington Consensus,” *The South China Morning Post*, June 5, 2008.
  6. British philosopher Gilbert Ryle used the phrase “the ghost in the machine” to critique the mind-body dualism of René Descartes’ philosophy. See Gilbert Ryle, *The Concept of Mind* (London: Hutchinson, 1949). Arthur Koestler subsequently appropriated the expression for the title for his 1967 book *The Ghost in the Machine* (London: Hutchinson) in which he chronicled humanity’s increasingly self-destructive tendencies, culminating in the devastating power of a nuclear age. Here, I invert the meaning of this phrase to suggest the haunting appearance of unforeseen use values that subaltern groups derive from technologies of domination and control.
  7. This approach draws upon a range of innovative works, such as Trevor Paglen, *Blank Spots on the Map: The Dark Geography of the Pentagon’s Secret World* (New York: Dutton, 2009).
  8. For a representative statement of this period of “global Keynesianism” see The Brandt Commission, North-South, A Programme for Survival: Report of the Independent Commission on International Development Issues (Cambridge, MA: MIT Press, 1980).
  9. Jamie Peck and Adam Tickell, “Neoliberalizing Space,” in *Spaces of Neoliberalism: Urban Restructuring in North America and Western Europe*, eds. Neil Brenner and Nik Theodore (Oxford, UK: Blackwell, 2002), 37.

10. For regional differences in the implementation of neoliberal agendas, see Neil Brenner and Nik Theodore, "Cities and the Geographies of Actually Existing Neoliberalism," *Antipode* 34 (2002): 349–79.
11. John Williamson, "What Washington Means by Policy Reform," in *Latin American Adjustment: How Much Has Happened?* ed. John Williamson (Washington, D.C.: Institute for International Economics, 1990), 7–20; and Saskia Sassen, *Losing Control? Sovereignty in an Age of Globalization* (New York: Columbia University Press, 1996).
12. A sampling of the scholarship on this topic can be found in Éric Toussaint and Damien Millet, *Debt, the IMF, and the World Bank: Sixty Questions, Sixty Answers*, trans. Judith Abdel Gadir, et al. (New York: Monthly Review Press, 2010); Michael Goldman, *Imperial Nature: The World Bank and Social Justice Struggles in the Age of Globalization* (New Haven, CT: Yale University Press, 2006); and Noam Chomsky and Edward S. Herman, *The Washington Connection and Third World Fascism*, vol. 1 of *The Political Economy of Human Rights* (Boston: South End Press, 1979).
13. Jean A. Briggs, "A Political Miracle," *Forbes*, May 11, 1992, 108.
14. Thomas Friedman, *The Lexus and the Olive Tree* (rev. ed.; New York: Farrar, Straus and Giroux, 2000), 443–44.
15. Paul Bremmer, as quoted in David Harvey, *The New Imperialism* (Oxford, U.K.: Oxford University Press, 2005), 214–15. For a detailed analysis of the connection between neoliberal geopolitics and the U.S. government's rationale for "Operation Iraqi Freedom," see Susan Roberts, Anna Secor, and Matthew Sparke, "Neoliberal Geopolitics," *Antipode* 35 (2003): 886–97. Referring to the U.S.-led privatization of Iraq's resources, Peter Linebaugh has noted in these pages, "To Marx's letters of blood and fire we must now add the bomb and the drone as means of expropriation." See Peter Linebaugh, "Enclosures from the Bottom Up," *Radical History Review*, no. 108 (2010): 25.
16. Carl von Clausewitz, *On War*, eds. and trans. Michael Howard and Peter Paret (1832; Princeton, NJ: Princeton University Press, 1976), 76.
17. Martin C. Libicki, *What Is Information Warfare?* (Washington, D.C.: Institute for National Strategic Studies, National Defense University, 1995), ix; John Rothrock, "Information Warfare: Time for Some Constructive Skepticism?" in *In Athena's Camp: Preparing for Conflict in the Information Age*, eds. John Arquilla and David F. Ronfeldt (Santa Monica, CA: RAND Corporation, 1997), 217; George J. Stein, "Information Warfare," *Airpower Journal* 9 (1995): 311–39; and Owen E. Jensen, "Information Warfare: Principles of Third-Wave War," *Airpower Journal* 8 (1994): 35–43.
18. Earl S. Takeguchi and William J. Wooley, "Spectrum Management," in *The First Information War: The Story of Communications, Computers, and Intelligence Systems in the Persian Gulf War*, ed. Alan D. Campen (Fairfax, VA: AFCEA International Press, 1992), 155. For more on the staging of propaganda events on the battlefield, see Peter Maass, "The Toppling: How the Media Inflated a Minor Moment in a Long War," *New Yorker*, January 10, 2011, [www.newyorker.com/reporting/2011/01/10/110110fa\\_fact\\_maass](http://www.newyorker.com/reporting/2011/01/10/110110fa_fact_maass). Thanks to my colleague Jennifer Fronc for bringing this article to my attention.
19. In 1924, two years prior to the creation of the Federal Radio Commission, Admiral W.L. Rodgers had unsuccessfully argued in favor of a nationalized broadcasting monopoly through which the United States Navy would provide low-cost news transmission. As Rodgers put it, "How can radio be better utilized so as to give news of public interest without such exclusive reliance on the press?" Ithiel de Sola Pool, *Technologies of Freedom: On Free Speech in an Electronic Age* (Cambridge, MA: Belknap Press, 1983), 111.

20. Thomas E. Will, *Telecommunications Structure and Management in the Executive Branch of Government, 1900–1970* (Boulder, CO: Westview Press, 1978), 58.
21. Douglas Pasternak, “Wonder Weapons: The Pentagon’s Quest for Nonlethal Arms is Amazing. But Is It Smart?” *U.S. News & World Report*, July 7, 1997, 40.
22. Chuck de Caro, “WEA 1/4PMS; The Modern-Day Death Ray,” *Washington Post*, June 21, 1987.
23. Emmett Paige Jr., remarks at the Armed Forces Communications Electronics Association Spectrum Management Symposium, Washington, DC, July 10, 1996, “Electromagnetic Spectrum: Key to Success in Future Conflicts,” *Defense Issues* vol. 11, no. 83, [www.defense.gov/speeches/speech.aspx?speechid=983](http://www.defense.gov/speeches/speech.aspx?speechid=983).
24. Tommy Franks, *American Soldier*, with Malcolm McConnell (New York: Regan Books, 2004), 175.
25. Quoted in Paul Virilio, *War and Cinema: The Logistics of Perception*, trans. Patrick Camiller (New York: Verso, 1989), 4.
26. For specific examples of this tradeoff, see James C. Scott, *Seeing Like a State: How Certain Schemes to Improve the Human Condition Have Failed* (New Haven, CT: Yale University Press, 1998).
27. Quoted in Noah Schachtman, “How Technology Almost Lost the War: In Iraq, the Critical Networks are Social—Not Electronic,” *Wired*, November 27, 2007, [www.wired.com/print/politics/security/magazine/15-12/ff\\_futurewar](http://www.wired.com/print/politics/security/magazine/15-12/ff_futurewar).
28. Charles K. Hardy, *Information Operations as an Element of National Power: A Practitioner’s Perspective on Why the United States Can’t Get It Right* (Carlisle Barracks, PA: U.S. Army War College, 2005), 15.
29. Hampton Stephens, “War in the Third Domain,” *Air Force Magazine*, April 2007, 60.
30. U.S. Department of Defense, *Information Operations Roadmap* (Washington, DC: Department of Defense, 2003). The report is available online from the BBC News Web site, [news.bbc.co.uk/2/hi/americas/4655196.stm](http://news.bbc.co.uk/2/hi/americas/4655196.stm) (accessed March 5, 2011).
31. *Ibid.*, 61.
32. *Ibid.*, 44–45.
33. Richard Hofstadter, “The Paranoid Style in American Politics,” *Harper’s*, November 1964, 77–86.
34. Quoted in George Lipsitz, “The Struggle for Hegemony,” *Journal of American History* 75 (1988): 146.
35. U.S. Department of Defense, *Information Operations Roadmap*, 26.
36. *Ibid.*, 71.
37. U.S. Department of Defense, *Joint Spectrum Vision 2010* (Washington, DC: U.S. Department of Defense, 2010), 12.
38. As economists use the term, a “simultaneous ascending auction” is “a multiple unit auction in which all of the objects are up for sale simultaneously using an English auction–like format in which the prices of the objects are increased by the bidders until a stopping criteria is [*sic*] reached.” See Charles R. Plott and Timothy C. Salmon, “The Simultaneous, Ascending Auction: Dynamics of Price Adjustment in Experiments and in the UK3G Spectrum Auction,” *Journal of Economic Behavior & Organization* 53 (2004): 354. For a comprehensive history of the U.S. government’s role in licensing and regulating access to the electromagnetic spectrum, see Hugh Richard Slotten, *Radio and Television Regulation: Broadcast Technology in the United States, 1920–1960* (Baltimore, MD: Johns Hopkins University Press, 2000).

39. Dean Foust and Mark Lewyn, "These Airwaves are Hotter than Anyone Thought," *BusinessWeek*, August 15, 1994, 34.
40. John McMillan, *Reinventing the Bazaar: A Natural History of Markets* (New York: W. W. Norton, 2002), 80; and James Case, *Competition: The Birth of a New Science* (New York: Hill and Wang, 2007), 141.
41. Ronald H. Coase, "The Federal Communications Commission," *Journal of Law and Economics* 2 (1959): 34.
42. In 1991, Coase won the Nobel Prize in Economic Sciences "for his discovery and clarification of the significance of transaction costs and property rights for the institutional structure and functioning of the economy." See Nobel Media, "Press Release," October 15, 1991, [nobelprize.org/nobel\\_prizes/economics/laureates/1991/press.html](http://nobelprize.org/nobel_prizes/economics/laureates/1991/press.html).
43. George A. Keyworth et al., *The Telecom Revolution: An American Opportunity* (Washington, D.C.: Progress and Freedom Foundation, 1995), 62.
44. *Ibid.*, 3.
45. Adam D. Thierer, "A 10-Point Agenda for Comprehensive Telecom Reform," *Cato Institute Briefing Papers*, no. 63, May 8, 2001, 6.
46. Mark S. Fowler, Ronald Reagan's Federal Communications Commission chairperson from 1981 to 1987, gave neoliberal approaches to spectrum deregulation a significant boost. In 1981, Fowler told an interviewer from *Reason* magazine, "The television is just another appliance—it's a toaster with pictures. . . . We've got to look beyond the conventional wisdom that we must somehow regulate this box, we must single it out." Fowler, as quoted in Toby Miller, *Cultural Citizenship: Cosmopolitanism, Consumerism, and Television in a Neoliberal Age* (Philadelphia: Temple University Press, 2007), 13.
47. For a summary of these infringements, see the American Civil Liberties Union, "Surveillance Under the USA PATRIOT Act," December 10, 2010, [www.aclu.org/national-security/surveillance-under-usa-patriot-act](http://www.aclu.org/national-security/surveillance-under-usa-patriot-act).
48. Ellen Kelleher, "The Law that Outlawed Banks," *The Financial Times*, July 9, 2004. Title III was not without precedent. It built upon earlier legislation, such as the 1986 Money Laundering Control Act and the 1970 Bank Secrecy Act.
49. The Editors, "Looking in the Wrong Places: Hindering Flows across International Financial Networks Is Costly and Does Not Stop Terrorists' Primary Activity," *Economist*, October 20, 2005. Also see Loretta Napoleoni, *Terrorism and the Economy: How the War on Terror is Bankrupting the World* (New York: Seven Stories Press, 2010), 76.
50. Bill Gates, as quoted by Jack L. Goldsmith and Tim Wu, *Who Controls the Internet? Illusions of a Borderless World* (New York: Oxford University Press, 2006), 57.
51. Robert Andrews, "iPhone Girl finds Fame and Fear on the Production Line," *Washington Post*, August 28, 2008; and Min Lee, "Mystery 'iPhone Girl' generates intrigue," *Globe and Mail*, August 27, 2008.
52. It is tempting to romanticize cyberspace as a domain of latent freedoms, yet such possibilities depend upon resolutely material means of access to this realm. Thanks to my colleague, Dawn Peterson, for her articulation of this crucial point.
53. Lefebvre, *The Production of Space*, 348.
54. Garret Hardin, "The Tragedy of the Commons," *Science* 162 (1968): 1243–48.
55. For extensive critiques of Hardin's concept, see David Feeny et al., "The Tragedy of the Commons: Twenty-Two Years Later," *Human Ecology* 18 (1990): 1–19. For an account of the successful Bolivian social movement to reclaim public water supplies from enclosure by multinational corporations in 2000, see Oscar Olivera, *¡Cochabamba! Water War in Bolivia*, with Tom Lewis (Cambridge, MA: South End Press, 2004). On the management of Maine's

- lobster fishery as a commons, see James Acheson, *Capturing the Commons: Devising Institutions to Manage the Maine Lobster Industry* (Hanover, NH: University Press of New England, 2003).
56. Hardin, "The Tragedy of the Commons," 1243.
  57. Yochai Benkler, "Overcoming Agoraphobia: Building the Commons in a Digitally Networked Environment," *Harvard Journal of Law and Technology* 11 (1998): 356.
  58. Stuart Buck, "Replacing Spectrum Auctions with a Spectrum Commons," *Stanford Technology Law Review* 2 (2002), [stlr.stanford.edu/2002/08/replacing-spectrum-auctions-with-a-spectrum-commons/](http://stlr.stanford.edu/2002/08/replacing-spectrum-auctions-with-a-spectrum-commons/). For further arguments in favor of a spectrum Commons, see David Bollier, *Viral Spiral: How the Commoners Built a Digital Republic of Their Own* (New York: New Press, 2008); and Lawrence Lessig, *The Future of Ideas: The Fate of the Commons in a Connected World* (New York: Random House, 2001).
  59. Association for Progressive Communications, "APC Internet Rights Charter," November 2006, [www.apc.org/en/pubs/about-apc/apc-internet-rights-charter](http://www.apc.org/en/pubs/about-apc/apc-internet-rights-charter).
  60. More on net neutrality can be found in Tim Wu, *The Master Switch: The Rise and Fall of Information Empires* (New York: Alfred A. Knopf, 2010). The precedents for net neutrality have deep historical roots. One could, in fact, trace these to the Pacific Telegraph Act of 1860, which stated that "messages received from any individual, company, or corporation, or from any telegraph lines connecting with this line at either of its termini, shall be impartially transmitted in the order of their reception, excepting that the dispatches of the government shall have priority." *Pacific Telegraph Act of 1860*, 36th Congress, 1st Session, Chapter 137, June 16, 1860.
  61. Michel Foucault commented on the emergence of a discourse of discipline and punishment, which accompanied an earlier phase of capitalist enclosure: "The illegality of rights, which often meant the survival of the most deprived, tended, with the new status of property, to become an illegality of property. It then had to be punished." Michel Foucault, *Discipline and Punish: The Birth of the Prison*, trans. Alan Sheridan (New York: Vintage Books, 1995), 85.
  62. E. P. Thompson, *Customs in Common* (New York: W. W. Norton, 1991).