

Reclaiming the Commons: Why we need to protect our public resources from private encroachment.

By David Bollier

Originally published in the Summer 2002 issue of *Boston Review*. Copyright *Boston Review*, 1993–2003. All rights reserved. For educational use only.

*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, circa 1764

One of the great questions of contemporary American political economy is, *who shall control the commons?* "The commons" refers to that vast range of resources that the American people collectively own, but which are rapidly being *enclosed*: privatized, traded in the market, and abused. The process of converting the American commons into market resources can accurately be described as *enclosure* because, like the movement to enclose common lands in eighteenth-century England, it involves the private appropriation of collectively owned resources.

Such enclosures are troubling because they disproportionately benefit the corporate class and effectively deprive ordinary citizens of access to resources that they legally or morally own. The result is a hypertrophic market that colonizes untouched natural resources and public life while eroding our democratic commonwealth.

The *commons* and *enclosure* are archaic, unfamiliar terms. But this strangeness is appropriate. We currently lack a vocabulary for identifying a wide range of abuses that harm public assets and social ecology. When such abuses are acknowledged, they tend to be viewed as isolated and episodic, rather than systematically related. A discussion of the commons and enclosure helps bring into sharp focus a dramatic but largely unexamined phenomenon of contemporary American society: the forced privatization and marketization of large swaths of shared wealth and social life. We already have a familiar and sophisticated language for talking about economic exchange, focused on market efficiency. We need to develop a similarly rich body of knowledge about the commons, in order to appreciate the value of our civic patrimony and to develop strategies that will help us fortify and extend it.

Varieties of commons

The American commons comprises a wide range of shared assets and forms of community governance. Some are tangible, while others are more abstract, political, and

cultural. The tangible assets of the commons include the vast quantities of oil, minerals, timber, grasslands, and other natural resources on public lands, as well as the broadcast airwaves and such public facilities as parks, stadiums, and civic institutions. The government is the trustee and steward of such resources, but "the people" are the real owners.

The commons also consists of intangible assets that are not as readily identified as belonging to the public. Such commons include the creative works and public knowledge not privatized under copyright law. This large expanse of cultural resources is sometimes known as the public domain or—as electronic networking increases its scope and intensity—"the information commons." In addition, our society has dozens of "cultural spaces" provided by communications media, public education, and nonprofit institutions. Another large realm of intangible assets consists of scientific and academic research, much of which is supported by the public through government funding. The character of these spaces changes dramatically when they are governed as markets rather than as commons.

No less important and vulnerable are what might be termed the "frontier commons": features of the natural world that have historically been too large, too small, or too elusive for any market regime to capture and that have often been regarded as parts of a common human heritage. Yet entrepreneurs and corporations are now developing ingenious ways to turn these natural commons into exploitable property. Several multinational companies are, for example, seeking to transport huge supplies of freshwater in Northern countries to "thirsty" regions in Saudi Arabia, Morocco, and southern California. Biotech companies are trying to gain proprietary control over agricultural seed-lines that have long been regarded as community assets—for example, by seeking patents for a common yellow bean grown widely in Mexico, as well as for basmati rice and neem plants in India. The human genome is a target of property claims and landowners fighting environmental regulations insist that they "own" wildlife and that the regulations amount to an unconstitutional "taking" by government.

A last category of threatened commons is that of so-called "gift economies." These are communities of shared values in which participants freely contribute time, energy, or property and over time receive benefits from membership in the community. The global corps of GNU/Linux software programmers is a prime example: enthusiasts volunteer their talents and in return receive useful rewards and group esteem. For the most part, no money changes hands, yet economically valuable work occurs. Gift economies are the animating force behind scientific research communities, blood donation systems, New York City's community gardens, and Alcoholics Anonymous.

What unites these highly disparate commons—from natural resources to public domain to gift economies—is their legal and moral ownership by the American people. The commons comprises not just marketable assets, but social institutions and cultural traditions that help define our common life as Americans. In virtually every case, the market *price* for a resource does not begin to capture its actual *value* to the larger community. But generally we have no rigorous way to speak about such shared assets, or

about the costs of enclosing them.

Learning to see the commons

In an age of market triumphalism and economic myopia, it is an open question whether the notion of "commonwealth"—that we are a people with shared history, common values, and control over collectively owned assets—has practical meaning. As private interests have quietly seized the American commons, we have lost sight of our heritage as a democratic commonwealth. A society in which every human transaction is increasingly mediated by the market, in which *everything* is privately owned and controlled, may come to resemble a network of medieval fiefdoms, in which every minor property-holder demands tribute for the right to cross his land or ford his streams. This balkanization is bound to impede the flow of commerce and ideas—and the sustainability of innovation and democratic culture. ²Furthermore, such extreme market dominance tends to undermine the civic trust and shared commitments required by any functioning society.

There is a growing sense that a useful tool in promoting material progress may have become a sorcerer's apprentice, at least in the United States. Do we really want market forces deciding what sorts of radically new species shall be unleashed into the ecosystem? Do we really regard the market as an adequate vehicle for expressing our democratic aspirations, as today's "market populists" urge us? When even our democratic process is seen as controlled by the highest bidders and our cultural values as the modeling clay for media, film, and computer game conglomerates, it should not be surprising that people regard the fate of the commons with apprehension.

Of course markets also generate important benefits. The question is how to achieve a more humane and productive balance between commons and markets—to set equitable and appropriate boundaries so that the market and the commons can each retain its integrity while invigorating the other. That equilibrium is now out of balance as businesses appropriate more and more available resources, including those that everyone owns and uses in common.

The creative tension between democracy and business interests is nothing new. ³Such tension helped shape the Constitution, numerous Progressive era campaigns, the labor movement, and the New Deal and Great Society initiatives. But today we live in a troubling new stage of this struggle, of unprecedented scope and ferocity. The market's role in American society has increased exponentially, reaching into nooks and crannies of daily life to an extent that was unimaginable a generation ago.

This encroachment has been ignored in part because of the legacy of the Cold War. Our hostility to communism foreclosed more honest discussions about cooperation and collective ownership as organizing principles. But we have also been imprisoned by the tenacious myth that a commons invariably results in "tragedy"—a view popularized by Garrett Hardin in his famous essay, "The Tragedy of the Commons." Drawing on the example of herders using a common meadow, Hardin describes how a scarce resource open to all comers is depleted and left to ruin. ⁴The commons falls apart because every

herder enjoys direct benefits from over-exploiting the commons, while suffering only indirect costs. Eventually, over-use destroys the resource.

Although Hardin's own focus was overpopulation, the metaphor soon took on a life of its own in public policy circles. In the hands of conservatives and economists, it began to serve as an all-purpose metaphor to denigrate collectively managed property and champion the efficiencies of private-property regimes. The "tragedy of the commons" narrative "invoke[s] an image of helpless individuals caught in an inexorable process of destroying their own resources," writes political scientist Elinor Ostrom. 5

This pessimism persists, in part, because the commons is frequently confused with an *open-access* regime—a free-for-all in which a resource is essentially open to everyone without restriction. An open-access regime lacks an identifiable authority and recognized property rights; the common resources are taken for sale on markets. In contrast, a real commons has a "social infrastructure" of cultural institutions, rules, and traditions, and the resources are restricted to personal (non-market) uses by members of the community. Without that infrastructure, the only operative social value is private profit for the most aggressive appropriators. 6Hardin's essay might more appropriately have been titled "The Tragedy of Open Access."

Absent from this "tragedy of the commons" argument—and related concerns about free riders—is an acknowledgment that trust, reciprocity, a history of shared commitment, and a robust community can overcome many of the alleged failures of the commons—and sometimes they do. 7While "tragic" failures of the commons and free-riding on public commodities certainly do occur, they do not represent the final word, or even an accurate generalization, about the capacity of individuals to pursue common goals.

The fact that people volunteer their time to work on community gardens, or that scientists openly share their research results with trusted colleagues, or that people post useful information on the Internet for free, seems aberrational or at least marginal in terms of conventional economic thinking. But while cooperation may not conform to the general rule of rationally self-interested behavior, the efficacy of social negotiation and cooperation can be seen in dozens of smaller-scale commons.

Finally, the commons has lived in the shadows because of the limited assumptions of conventional economics, which prefers to focus on the individual and not the collective. A market-based perspective also shows relatively little interest in "externalities" (pollution, social disruptions, costs borne by future generations), and it discounts the power of "exogenous" variables such as moral and social norms. Intangible and historical *context* is generally ignored. Our market discourse, therefore, tends to ignore such vital species of common wealth as:

- *government-owned property*, including public lands, government research and development, and information resources;
- *natural systems* such as the atmosphere, water, local ecosystems, and genetic structures

of life;

- *user-managed regimes* for conserving land, managing community gardens, developing software, and controlling access to fisheries and other natural resources;
- *gift economies*, or social networks based on gift exchange, which create economic and social values within academia, Internet communities, and geographic localities;
- *shared, inherited knowledge* such as scientific research, historical knowledge, and folk wisdom, all of which contribute to the public domain;
- *cultural traditions and norms*, which serve as a set of common moral presumptions and expectations for managing daily life.

In many cases, these resources have no officially recognized value, let alone the legal definition and protection enjoyed by private property. But commoners realize all too well that community structures and social relationships are vitally important in creating wealth, not to mention a humane society.

Modern enclosures

Market enclosures range across a wide spectrum of American life. They can be seen in the conversion of Main Street into shopping malls and in the consolidation of local organic agriculture into national food-processing enterprises. Enclosure also occurs when government-managed resources are given away to private interests and when corporations superimpose market regimes on robust social communities. Enclosure occurs when content industries try to turn the Internet into a pay-per-use vending machine; when sports teams commodify the folk culture of fans by auctioning off the naming rights to sports arenas; and when companies disrupt the openness and collegiality within scientific disciplines by privatizing research and imposing non-disclosure agreements.

What follows is the story of market enclosure in four distinct domains: federal drug research, the broadcast airwaves, the Internet and public knowledge, and childhood experience. Each of these stories has been told elsewhere. What is now essential is to see them as pieces of a larger pattern.

Free-riding on federal drug research

Drug expenditures in the United States have doubled since 1993 and are expected to double again by 2004—a troubling phenomenon that has prompted politicians to quarrel about how to make prescription drugs more affordable. ⁸Strangely, the hand-wringing over exorbitant drug prices has ignored the federal government's policy of *giving away* its most promising drug research for a fraction of its actual value. James Love, director of the Consumer Project on Technology and a leading drug-pricing activist, describes the standard pattern: "The taxpayers pay to invent a promising drug, then give a monopoly to

one company. And the company's role? To agree to sell it back to us." 9

Some of the most important drug breakthroughs of the past fifty years have been generated by the National Institutes of Health and other government-funded researchers. These include the development of drugs to treat cancer, HIV-AIDS, genetic disorders, depression, and diabetes. Public science pays the bills for the breakthroughs while private players are allowed to rush in and acquire patent monopolies that raise prices, stifle competition, and inhibit future research. 10 This longstanding arrangement in drug R&D is now replicating itself in genetic research.

When government performs the preclinical testing for a new drug—the most difficult and risky aspect of drug development—it shoulders some 65 to 70 percent of the total development costs. The key responsibility left to industry, when using federally sponsored research, is to meet the requirements of an FDA New Drug Application (NDA) before it can market the product. While this can be a costly process, it pales in comparison to the cost of the research already covered by the taxpayers.

Numerous studies have confirmed the paramount role of government research in developing medically significant drugs. A 1995 study found that eleven of the fourteen new drugs that the industry identified as the most medically significant of the past quarter century had their origins in government-sponsored work. A Senate Joint Economic Committee study of thirty-two innovative drugs introduced before 1990 found that approximately 60 percent of these drugs would not have been discovered or would have had their discoveries markedly delayed without federal funding. 11 The invaluable role of public science is reflected as well in medical patents. According to a study commissioned by the National Science Foundation, "more than 70 percent of the scientific papers cited on the front pages of U.S. industry patents [were products of] public science"—government or academia—while only 17 percent were industry sponsored. 12

A study by James Love and Ralph Nader on the government's role in developing new cancer drugs found that the federal government was involved in the preclinical development of twenty-eight of thirty-seven drugs developed since 1955. 13 For cancer drugs that reached the clinical stage of research, The National Cancer Institute (NCI) was involved in thirty-four of the thirty-seven cancer drugs developed. 14

One of the most lucrative new drugs on the market has been paclitaxel, also known as Taxol, which is used to treat breast, lung, and ovarian cancers. Using Pacific yew trees on federal lands, the NCI spent fifteen years and \$32 million to develop Taxol, before giving Bristol-Myers (now Bristol-Myers Squibb) exclusive access to the government-funded research, including raw data and new studies.

Although the government requires companies to agree to a "fair pricing clause," the NCI has no clear standards to enforce. 15 The cost of manufacturing Taxol, according to Love, is about \$500 per patient for an eighteen-month treatment regimen. Bristol-Myers Squibb charges more than twenty times that amount, thus earning between \$4 million and \$5 million a day on Taxol. 16 In 1999, the drug generated an estimated \$1.7 billion in

sales for the company.

Bristol-Myers Squibb claims that it spent \$1 billion to bring Taxol to market. But in light of the federal government's significant role in discovering and developing the drug, that claim seems dubious. 17 The government did most of the drug development, the company bought the yew bark at discount prices from the government, and the NCI itself reports that Bristol-Myers Squibb was primarily selected for its expertise in marketing cancer drugs. 18 Three other drug companies were interested in bringing Taxol to market, which suggests that an exclusive license for Taxol was probably unnecessary.

We find a similar story with Xalatan, an eyedrop-administered drug for glaucoma that was initially developed at Columbia University using \$4 million from the NIH. The Pharmacia Corporation bought the patent to the drug from Columbia for no more than \$150,000 and a share of future royalties. Pharmacia claims it then spent tens of millions of dollars to bring the drug to market.

When Xalatan finally reached consumers, Pharmacia charged \$45–50 for a tiny bottle of medication that lasts six weeks. Given that the key ingredient costs only 1 percent of the revenue it generates, Xalatan represents "liquid gold" for Pharmacia. 19 In 1999, company sales of the drug amounted to \$507 million, of which Columbia University received about \$20 million in royalties. Not only does the federal government receive nothing, Xalatan (and dozens of other taxpayer-developed medications) has been removed from the commons.

The story is the same with such drugs as Prozac, Capoten (for hypertension), and a variety of HIV and AIDS-related drugs such as AZT, ddI, ddC, d4T, Ziagen and Norvir. 20 They were all developed with federally funded research, and then sold by private companies for handsome prices. That companies have charged high prices for such drugs, despite the government's primary role in shouldering R&D costs, has naturally stirred great resentment among patients.

The political power, however, clearly belongs to the pharmaceutical industry, which actually tried to eliminate "notice and comment" requirements for exclusive drug licenses in 1999. Current law allows the public to obtain basic financial information about a drug's development and sale, such as royalty rates paid on licenses, subsequent development costs, sales figures, and so forth. The government must disclose such information and allow the public to object to the approval of a company's license. Fortunately, the industry's attempt to throw a veil of secrecy over the granting of exclusive drug licenses failed—a small victory against the modern enclosure movement.

Controlling the airwaves

The loss of a public commons in broadcasting must be counted as one of the twentieth century's great civic and cultural losses. Broadcasting, after all, is an essential vehicle for social communication. The loss of the airwaves to market enclosure—initiated by legislation in 1927 and 1934, and significantly extended through sweeping deregulation

in the 1980s and 1990s—substantially expanded the role of commercial values in the evolution of our culture.

Broadcast spectrum was originally so plentiful that the government granted radio licenses to anyone upon request. But by the 1920s, the proliferation of broadcasters was producing signal interference, which prompted a debate about how to allocate control of the electromagnetic spectrum.

As RCA, General Electric, and other corporations that owned commercial radio networks sought to gain exclusive control of the airwaves, educators, organized labor, religious groups, and politicians argued that their rights to free speech in the new medium would be compromised. Accordingly, they proposed a system of common carriage, which would require broadcasters to sell airtime to any buyer at nondiscriminatory rates. Broadcasters stoutly resisted this idea, arguing that it would diminish their editorial control and commercial opportunities. 21

The conflict ended with a compromise: broadcasters would receive free use of the public's airwaves in return for providing public service. Broadcast licenses would not entail ownership or property rights over the airwaves, and licenses could be terminated for a breach of civic responsibilities. 22

The idea was that broadcasters would serve as "public trustees" of the airwaves. "It is as if people of a community should own a station and turn it over to the best man in sight with this injunction: 'Manage this station in our interest,'" declared the Federal Radio Commission. 23 The Supreme Court later elaborated that a licensee must "share his frequency with others and conduct himself as a proxy or fiduciary with obligations to present those views and voices which are representative of his community and which would otherwise, by necessity, be barred from the airwaves." 24

Unfortunately, the public's end of the bargain has been more of a useful fiction than a meaningful dividend. From the start, Congress gave no particular definition to the "public interest, convenience and necessity." Some scholars considered the "public interest" standard to be an expedient gesture to make the government's licensing powers constitutional. After all, the federal government was assigning preferential free speech rights to some people—broadcasters—over others.

In the 1960s and 1970s, Congress and the FCC enacted a number of specific requirements to help assure political and public access to the airwaves. Candidates for federal office were granted the right to buy airtime to reply to their opponents. The public was given nominal access to the airwaves through the Fairness Doctrine. And FCC guidelines stipulated that stations provide diverse programming, children's programming, and local public affairs programming.

In practice, however, most of these attempts to enforce a muscular standard of public trusteeship on broadcasters failed. Standards were vague, enforcement was irregular and legalistic, and political pressures on the FCC to coddle broadcasters were constant. 25

Over the past sixty-eight years, fewer than a half dozen licenses have been revoked. The political power of the broadcasting industry and the profits to be reaped from broadcast advertising ensure that public service is a low priority in Congress and on the airwaves.

The industry consolidation authorized by the Telecommunications Act of 1996 has made broadcasters even less willing to pursue public service goals. A series of deregulatory moves in the 1990s eviscerated the practical meaning of the "public trust" in broadcasting, and made virtually *any* sort of programming synonymous with the public interest. 26 (Some broadcasters have claimed in formal submissions to the FCC that *The Jetsons* constitutes "educational programming." 27

Of course, television has its moments; never before has there been as much high-end news, arts, and public affairs programming—at least on cable television. But cable subscribers pay for these services, and they are not available to all Americans. Broadcast television was developed to serve all Americans, largely because station owners use the public's airwaves for free. The question is, what are broadcasters giving the American people in return?

By the early 1990s, a regulatory regime that originally cast broadcasters as conscientious stewards of the public interest had effectively granted them outright ownership of the spectrum. Since then, programming has become a race to the bottom—with leering talk shows, tabloid news, salacious dramas, and incessant station promos—and the fiction of broadcasters serving as civic trustees has grown embarrassingly thin.

Broadcasters now consider even the most basic sorts of public service, such as in-depth coverage of political elections, too expensive a burden. Issue coverage of the 2000 presidential race on the nightly news declined by 27 percent from 1996 levels, and two of the four major networks chose not to air the 2000 presidential debates live. In the month before the 2000 "Super Tuesday" primaries, the national networks and their local affiliates aired just thirty-six seconds a night of candidates addressing issues. 28 Fewer than 7 percent of the nation's 1,300 stations agreed to attempt to provide five minutes a night of candidate-centered discourse in the thirty days before the election. Even fewer stations met that goal. 29 Only 0.3 percent of total commercial time in twenty-four broadcast markets during a typical two-week period in 1990 was devoted to local public affairs programming. 30

Airtime has become so lucrative that broadcasters simply will not surrender it for purposes that do not generate maximum revenue. TV stations sold between \$600 million and \$1 billion in paid political advertising in the 2000 election season—more than six times the political ad revenues collected in 1972. Much of this windfall came from old-fashioned price-gouging. The Alliance for Better Campaigns found that "local television stations across the country systematically gouged candidates in the closing months of the 2000 campaign, jacking up the price of their ads to levels that were far above the lowest candidate rates listed on the stations' own rate cards. They did so despite a thirty-year-old federal law designed to protect candidates from such demand-driven price spikes." 31

The enclosure of the public's airwaves was extended with the broadcast industry's successful appropriation of another six-megahertz slice of spectrum for digital television. In the early 1990s, broadcasters lobbied Congress to give them new spectrum so that free over-the-air television could develop high-definition television (HDTV) to compete with cable and satellite television. The idea was that better video and sound quality, along with many more channels, would usher in the next generation of TV. As part of the Telecommunications Act of 1996, Congress agreed. It gave existing broadcasters a large new slice of spectrum space—with an estimated value of \$70 billion—for free, with no additional public-interest obligations. 32 As Senator John McCain pointed out, "[i]t is one of the great ripoffs in American history.... They used to rob trains in the Old West, now we rob spectrum." 33 Moreover, Congress allowed broadcasters to hang on to both portions of their spectrum— analog and digital—until 2006, or until 85 percent of American households had digital TVs, whichever came later.

It could be a long wait. By 2000, TV manufacturers had sold only 50,000 digital TV sets, at \$5000 or more apiece, broadcasters were providing little high-definition video programming, and the industry was effectively stalled by this Catch-22. The HDTV market is not developing very quickly, nor are broadcasters especially aggressive about moving ahead with HDTV. (Congress conveniently did not *require* the spectrum to be used for HDTV.) In October 2000, FCC Chairman William Kennard likened the situation to each broadcaster having two rent-controlled apartments on Manhattan's Upper East Side, with one left empty. To force a more productive use of the public's assets, he proposed a "spectrum squatter's fee" that would "escalate yearly, [starting in 2006] until broadcasters complete their transition to digital and return the analog spectrum to the American people." 34

Meanwhile, broadcasters' lockup of this valuable bit of spectrum could seriously affect the nation's long-term economic competitiveness. The U.S. wireless industry, one of the most robust sectors of the economy, is clamoring for spectrum space in order to develop new markets and catch up with European and Japanese technology. But the congressional giveaway of digital spectrum now precludes such a move, and a political firestorm would ensue if Congress were to try to reclaim spectrum from broadcasters.

Privatizing public knowledge

It is no exaggeration to say that there has never been a commons as big, robust and socially creative as the Internet. Since its emergence as a popular communications medium in the mid-1990s, the Internet has unleashed a remarkable explosion of knowledge, commerce, and virtual community on a global scale.

Much of this growth has stemmed from the commercial development of the Internet platform since 1994, particularly with the emergence of the World Wide Web. But this unprecedented boom in public communications owes a critical debt to the system's open, end-to-end technical architecture. By allowing the "intelligence" of the network to be placed at the user level—in applications rather than in the network itself—the Internet has enabled individual creativity to emerge and flourish in unprecedented ways. Millions

upon millions of decentralized users can interact in an open and stable public space, which itself has the structural capacity to grow and accommodate previously unimaginable innovations such as the Web, streaming audio and video, and wireless appliances.

With so much focus recently on electronic commerce, we tend to forget that the Internet started out as a government-sponsored project that only developed and flourished through its gift-exchange ethos. Much as Silicon Valley financial pundits may like to claim the Internet as the brainchild of Bill Gates, Larry Ellison, and other entrepreneurs, the Internet's success has at least as much to do with its structural architecture as a commons and its incubation in the (non-market) academic milieu.

The commercialization of the Internet since the mid-1990s certainly helped to extend the infrastructure rapidly to millions of new users. But it also set in motion new commercial forces that may also threaten the Internet's vitality. The dark side of the digital revolution can be seen in the aggressive efforts of businesses to enclose the cyber-commons by erecting new proprietary barriers of control over infrastructure, information, and users.

In terms of the Internet infrastructure, attempts to impose proprietary standards on key hardware and software protocols used by the Internet are intensifying. Privately owned standards can constitute a kind of monopoly power in the e-marketplace. So far, Internet standards have functioned as a common resource, accessible to and modifiable by all users. But in a number of areas—instant messaging, the new Windows XP/.Net platform and eBooks—individual companies are seeking to capture the standards and effectively "own" the information commons. ³⁵ Worse, vendors of e-books are seeking to use contract restrictions and encryption systems to prohibit users from re-selling or sharing digital content, or buying it anonymously. In some cases, e-books may be available for only a specified number of readings or period of time. ³⁶

Media consolidation is another way that companies are enclosing the information commons. With a handful of companies jockeying to gain control over access to the Internet via cable broadband services, the Internet itself may remain a commons while *access* to it could be controlled by oligopolies—a substantial contrast to the 1990s when there were over 4,000 Internet service providers. This consolidation of access is reducing diversity of expression and Internet vitality. Companies such as AOL Time Warner are striving to corral Internet users into "walled gardens" of proprietary content and to discourage them from venturing out on to the larger Internet. Content that generates revenues for service providers may soon enjoy preferential treatment—through selective access to user-friendly software and transmission.

Finally, the Internet commons is threatened by a new governance structure that aspires to privatize control over domain names. Ostensibly a technical matter, control of domain names is a highly political issue that affects free expression, privacy, and national sovereignty.

For example, dozens of sites use "sucks" in their domain name, as in

"walmartsucks.com." Should companies be allowed to use trademark laws to shut down web sites that criticize them? Should commercial enterprises have first claim to own domain names with common words or place names? A corporate consortium recently tried to shut down a nonprofit site called canada2.com; Etoy.com, an online retailer, attempted to shut down an online artists' forum, eToy.org; and Madonna succeeded in shutting down a madonna.com pornography site.

In 1993, just as the Internet was beginning to experience significant growth, the National Science Foundation gave away one of the most important equity assets of the Internet, the right to manage most domain name registrations. Without even a competitive bidding process, the NSF gave a private company, Network Solutions Inc. (NSI), exclusive control over sales of domain names to the public. It should not be surprising that NSI used its monopoly control to charge exorbitant registration fees for the .com suffix and other valuable domain names. Bought a few years later for \$3.9 million by a company called SAIC, NSI's market capitalization later soared to \$2.5 billion as Internet usage took off. Not only did the company reap a huge windfall from its control of a public asset, it used its monopoly power to lobby Congress and the executive branch (unsuccessfully) to prevent the creation of any domain-name registration rivals. In the classic dynamics of enclosure, NSI also commodified the resource it had captured—millions of web names and related data—by selling it to marketers, resulting in new privacy invasions and advertising intrusions. 37

Today, selling web domain names represents a revenue stream of up to \$875 million a year, based on the 25 million addresses currently registered at a standard rental price of \$35 per year.

Beyond this financial giveaway, however, are larger issues of legitimacy and due process in governing the Internet commons. The Internet is a powerful communications platform created by the U.S. government, so the governance of speech on the Internet raises serious questions about the First Amendment and democracy. In 1998, however, the government washed its hands of this issue by creating a private-sector, not-for-profit corporation to administer the Internet name and number system. The new organization, the Internet Corporation for Assigned Names and Numbers (ICANN), was charged with managing the domain name system and encouraging competition in domain name registration.

For an organization that elects fewer than half its board members from the general public, and which will likely never have any meaningful consumer representation, such powers raise serious questions of legitimacy. With no clear legal limits to its authority, dubious democratic safeguards, and a board skewed to represent e-commerce interests, ICANN is a perfect governance vehicle for transforming the Internet commons into a privatized commercial infrastructure.

Private control of the Internet infrastructure is not the only risk to the information commons. Unprecedented expansions of copyright law are starting to lock up "public knowledge" that has long been open and accessible to everyone. Under a 1998 law that

extended the term of copyright law for another twenty years, tens of thousands of works from the 1920s that were due to enter the public domain—including Mickey Mouse, works by Robert Frost and Sherwood Anderson, the musical *Show Boat* and the novel *The Great Gatsby* — were kept in private hands. In the years to come, Americans will pay millions of dollars for cultural works that rightfully belong to them already.

Content industries are also taking aggressive technological and legal steps to acquire "perfect control" over their works, essentially overriding copyright law. Copyright's primary purpose is to serve the public and, in the words of Congress, "to facilitate the flow of ideas in the interest of learning." The primary objective of our copyright laws is not to reward the author, Congress has declared, "but rather to *secure for the public* the benefits from the creations of authors." 38 Copyright protection is granted to authors chiefly to fulfill that purpose. 39 Traditionally, the public has enjoyed "fair use" rights to share, excerpt, and copy portions of a creative work for personal or educational purposes. But with the rise of "digital rights management" software that encrypts electronic texts, the public's stake in copyright law is swept aside by technologies designed to favor sellers.

Passage of the Digital Millennium Copyright Act (DMCA) in 1998 served to give statutory sanction for the abrogation of the "cultural bargain" of copyright. Historically, the public has granted copyright owners monopoly rights for their works and in return received ownership of those works after a limited term — as well as access, or fair use rights, in the meantime. Now the public's end of the bargain is essentially being superseded by "shrink-wrap" licenses that dictate one-sided contract terms, encryption technologies that prevent users from accessing content, and legal prohibitions such as the DMCA, which authorize prosecution of anyone who circumvents these systems.

Unfortunately, the enclosure of public knowledge is a highly abstract and incremental process; it is not easy to observe and understand. But it deserves far more attention. At stake is nothing less than the free expression, capacity to innovate, and free flow of information that lies at the heart of our democratic culture.

Branding children

"There's been a shift in the predominant way our society thinks of children," argues Gary Ruskin, director of Commercial Alert, an advocacy group that fights an array of commercial excesses in American life. "Not long ago we considered children vulnerable beings to be nurtured. However, today, we increasingly see kids through an economic lens. In our business culture, children are viewed as an economic resource to be exploited, just like bauxite or timber." 40

Having discovered that children are one of the most under-exploited market segments, marketers in the 1990s developed all sorts of ingenious ways to persuade impressionable youngsters to become avid consumers. Marketers have identified a "primary market" (the \$24.4 billion a year that kids directly spend), an "influence market" (the \$300 billion of adult spending that kids directly or indirectly influence), and a "future" market (the

lifelong spending that kids will do based on brand loyalties they develop while young).
41

"Branding kids for life," is how Mike Searles, the president of Kids-R-Us, sees it. "If you own this child at an early age, you can own this child for years to come....Companies are saying, 'Hey, I want to own the kid younger and younger.'" 42 Businesses were once satisfied with market share; today's companies realize that the real payoffs come from owning *mind share* —the personal attitudes and loyalties of children. 43

This motivation to insinuate brand names in the formation of children's identities has brought commercials into every imaginable aspect of a child's daily life. Video games plug Pepsi and McDonald's. McDonald's has produced children's "entertainment" videos as *Mac and Me*, and *McTreasure Island*, a crude adaptation of Robert Louis Stevenson's *Treasure Island*. Content and advertising are now inextricable, and have generated elaborate new techniques of crypto-marketing. *Back to the Future II* integrated more than two dozen brand-name products into the story, and *Space Jam*, a star vehicle for basketball star Michael Jordan, himself a brand-name, set a new benchmark for the shameless fusion of entertainment and advertising. 44

Commercial tie-ins between movies and toys have existed since Mickey Mouse was first licensed in 1934. But commercial substitutes, most notably Disney films, have virtually replaced the folk characters of classic literature. Cross-media promotion now spans a spectrum that includes film, toys, video games, fast-food restaurants, action figures, and books. With an average weekly diet of forty hours of media per week and 20,000 commercials per year, American children are caught up in a ubiquitous web of commercialism. 45

Public schools are an obvious target for innovative marketers. Where else can they find such a large, age-specific cohort of children in one place, as mandated by law? Because outright advertising would be blatantly unacceptable in a public institution dedicated to learning, marketers have developed a variety of clever subterfuges.

One of the most ambitious projects to turn public education into an advertising venue has been Channel One, the pseudo-news program for teenagers founded by Chris Whittle in 1989. By "donating" satellite dishes, VCRs, and TV sets for every classroom in participating schools, Channel One wins the right to show a daily twelve-minute video program containing two minutes of ads. Through this novel strategy, the company has created a whole new marketing platform geared to a captive audience of nearly 8 million teenage students in 12,000 public and private schools. 46

An equally ingenious scheme was hatched by ZapMe!, a company that offered a package of free computers, software, and Internet access to schools in exchange for the right to show online advertising to students. They also tracked children's every move on the Web, correlating the results with age, gender, zip code, and other identifying information. Despite this systematic invasion of students' privacy, some 5,000 financially beleaguered school districts signed up with ZapMe! in 1999 to receive some \$90,000 of equipment.

While some schools used the rationalization that kids are already exposed to plenty of advertising—why quibble about a little bit more?—others objected to public education being so crudely commandeered for commercial purposes. Due largely to agitation by Gary Ruskin's Commercial Alert and prominent congressional critics, ZapMe! abandoned its free equipment giveaways in November 2000, effectively scuttling the venture.

But such failures are unusual in the annals of corporate marketing via the public schools. Dozens of companies distribute "educational" materials that give generous space to corporate logos and political propaganda. Shell Oil waxes eloquent about the virtues of the internal combustion engine, and Exxon congratulates itself for its role in restoring the ecology of Prince William Sound (while omitting mention of its role in the Exxon Valdez oil spill). 47 Textbook publishers have used brand-name products in math books, supposedly to make the examples more relevant to students.

Fortunately, public concern about commercialization in the schools is growing, and has prompted the U.S. General Accounting Office to conduct a survey of how well states and local school boards protect students from marketers. The answer: not very well. Only nineteen states have any statutes or regulations that deal with school-related commercial activities, and in fourteen of those states the restrictions do not address the full range of marketing strategies being pursued in schools. 48

Protecting the commons

A reckoning of what belongs to the American people is a first step to recovering control of common assets and protecting them for public purposes. When we argue for the American commons, we assert the right to public control over public resources, without necessarily triggering the familiar dichotomy of free markets ("good") versus regulation ("bad"). Too often, attacks on regulatory shortcomings have been used to justify a return to the era when business wasn't regulated at all. Talking about the commons in American life can help the public recognize its distinct interests as well as policy options that include, but go beyond, traditional regulatory regimes.

Moreover, the idea of the commons helps us identify and describe the common values that lie beyond the marketplace. By insisting that citizenship trumps ownership, we can begin to develop a more textured appreciation for the importance of civic commitment, democratic norms, social equity, cultural and aesthetic concerns, and ecological needs. A language of the commons helps restore humanistic, democratic concerns to their proper place in public policy-making.

The significance of the commons is not only moral but also pragmatic. Any sort of creative endeavor requires space for experimentation and new construction—for the *freedom* to try new things. Market enclosure typically serves to regiment and control such freedom. While we need markets, we also need room for the visionary ideas, accidental discoveries, and embryonic notions that germinate into real breakthroughs, if only they have the space to grow.

The challenge that recurs is how to retain the surplus value generated within a commons. How can members of a commons prevent the appropriation of community-generated value by proprietary interests? Below are some of the more promising legal strategies and institutional mechanisms for achieving these goals.

Stakeholder trusts

One of the more imaginative and effective ways that government can revitalize the commons is through stakeholder trusts that give all citizens a personal stake in public assets. The idea is to give individual citizens identifiable economic stakes so that they can reap personal dividends from certain public assets. Linking property and citizenship in this way may help foster social equity. Alternatively, stakeholder trusts can elect to use their funds for important public purposes—conservation of land, public education, and so on—rather than distributing those funds to individual citizens.

Perhaps the most successful stakeholder trust has been the Alaska Permanent Fund, a state-run investment savings account that pays equal annual dividends to every Alaskan citizen. Created in 1976 by a voter-approved amendment to the state's constitution, the Alaska Permanent Fund is a public trust for oil revenues from drilling on the state's North Slope. With some \$27 billion in assets, the fund is one of the hundred largest investment funds in the world. In 1999, it generated \$1 billion in dividends for the state's residents, or about \$1,770 per person. 49

The Alaska Permanent Fund has inspired proposals for a "Sky Trust," an idea developed by social entrepreneur Peter Barnes to give all Americans a stake in the "scarcity rents" that polluters would pay for being allowed to release carbon emissions into the atmosphere. 50

Instead of allowing the government to give away emission permits to polluters, the Sky Trust proposal would set-up auctions in which companies *buy* a limited number of emission permits. This process would probably elevate prices for gasoline and other products that use burnable carbon. But it would also be a means to force companies to begin to shoulder the actual costs of their pollution, a change which global warming makes imperative. Furthermore, the Sky Trust would be a means of offsetting the higher fossil fuel prices that consumers would face as a result of the auctions. All citizens would receive dividends from the Sky Trust, derived from the revenues raised by the auction of emission permits.

"The formula driving the [Sky Trust] machine," writes Peter Barnes, "is, *from* all according to their use of the sky, *to* all according to their equal ownership of it. Those who burn more carbon will pay more than those who burn less. And, since every American receives the same dividend, households will come out ahead if they conserve, but lose money if they don't. This isn't only fair; it's precisely the incentive needed to reduce pollution." 51

Innovations in private law

The GNU General Public License is a contractual provision for software that has preserved programming code as part of an electronic commons. 52 Sometimes called "copyleft," the GPL stipulates that anyone can use the code and improve it, but no one can then "take it private" through copyright or patent law. This solves the problem of free riders and assures that the commons can retain the benefits it generates. Inspired spinoffs of the GPL are now being explored in a variety of areas, most notably the Creative Commons project that plans to issue legal licenses for placing works in the public domain.

Local commons for finite resources

There is a growing awareness that local commons provide feasible alternatives to traditional regulatory approaches. Michael M'Gonigle, a cofounder of Greenpeace, has proposed government chartering of regional or local "ecosystem trusts" to get local stakeholders to come together and manage natural resources in sustainable ways. If such a legal vehicle existed, he writes, "native and non-native fishers, tourist operators and local forestry operations would have a reason to talk. After all, if something could be worked out among members of the community, they *could* act—and the government would be *required* to support them. And what could be the objection if ecosystem sustainability and community health terms are set out in the provincial trust charter, thus ensuring that local action protected the 'public interest'?" 53

Preserving the information commons

If the information commons is going to survive and flourish, it is vitally important to roll back the Digital Millennium Copyright Act (which threatens the public's fair-use rights in digital content), the Copyright Term Extension Act (which extends copyright terms by twenty years), and the Trademark Anti-Dilution Act (which gives brand names legal protections at the expense of free expression). New initiatives must also be launched to ensure that the public gets a fair return on private use of its airwaves, that media concentration does not stifle diversity of expression or access to the Internet, and that technical standards for the Internet do not become tools for new monopoly powers.

The synergy of commons and markets

The rise of generic drugs, whose ingredients are commonly available to everyone, has created a new kind of market based on a commons that complements a traditional market based on proprietary knowledge. It allows consumers to buy drugs at 25 to 50 percent less than the brand-name equivalents, while encouraging proprietary companies to develop vital new drugs rather than simply profit from the existing array of health products. Just as common standards for telephony and computers forced innovation after the AT&T and IBM monopolies were dismantled, so common standards, rigorously enforced by government, can invigorate marketplace competition.

The value of taxpayers' resources

It's time to stop granting private entities free access to and use of public resources. Although this idea is conceptually simple, it presents a large political challenge. In case after case, this reckless privatization of public resources has resulted in demonstrable harm to taxpayers, consumers, and the environment. While these costs are well-documented, political resistance to meaningful reform continues in Washington, aggravated by our corrupt system of campaign financing. But press exposure and citizen mobilization can go a long way toward reclaiming the public assets that our government is mismanaging.

Reclaiming our common wealth

The idea that human beings share a moral and civic inheritance that cannot be alienated, commodified, or sold is part of an American tradition that has its roots in the Declaration of Independence. Americans have a long tradition of creating innovative vehicles to ensure a fair return to the public on resources they collectively own. This tradition has galvanized conservationists, land reformers, and advocates of municipal ownership of transport, water, and energy systems. It motivated the architects of urban planning, the TVA, garden cities, and the land-grant colleges that produced world-class universities in Ithaca, Urbana, Madison, Minneapolis, and Berkeley. It inspired the health, safety, and environmental programs of the 1960s and 1970s, the Land and Water Conservation Fund, the Alaska Permanent Fund, and the public rollout of the Internet.

It is time to revive this tradition of innovation in the stewardship of public resources and to recognize its appropriate role in the economy and civil society of the twenty-first century. The silent theft of our shared assets and civic inheritance need not continue. But first we must recognize the commons as such, name it, and understand the rich possibilities for reclaiming our common wealth. □

David Bollier is author of *Silent Theft: The Private Plunder of Our Common Wealth* and co-founder of Public Knowledge, a public-interest advocacy group.

*This essay is based on material included in David Bollier, *Silent Theft: The Private Plunder of Our Common Wealth* (New York: Routledge, 2002).

¹There is a small corps of paid GNU/Linux programmers in academia and corporations.

²See Lawrence Lessig, *The Future of Ideas: The Fate of the Commons in a Connected World* (New York: Random House, 2001).

³The constitutional dimensions of this theme in Jennifer Nedelsky, *Private Property and the Limits of American Constitutionalism: The Madisonian Framework and Its Legacy*

(Chicago: University of Chicago Press, 1990).

4Garrett Hardin, "The Tragedy of the Commons," *Science* 162 (1968): 1243–8.

5Elinor Ostrom, *Governing the Commons: The Evolution of Institutions for Collective Action* (Cambridge: Cambridge University Press, 1991), 12.

6The Ecologist, *Whose Common Future? Reclaiming the Commons* (Philadelphia: New Society Publishers, 1993), 13.

7Ostrom, *Governing the Commons*, 12. Ostrom adds: "The key to my argument is that some individuals have broken out of the trap inherent in the commons dilemma, whereas others continue remorselessly trapped into destroying their own resources. This leads me to ask what differences exist between those who have broken the shackles of a common dilemma and those who have not. The differences may have to do with factors *internal* to a given group. The participants may simply have no capacity to communicate with one another, no way to develop trust, and no sense that they must share a common future."

8Jeff Gerth and Sheryl Gay Stolberg, "Medicine Merchants: Birth of a Blockbuster; Drug Firms Reap Profits on Tax-Based Research," *The New York Times*, 23 April 2000, A1.

9James Love and Ralph Nader, "Looting the Medicine Chest," *The Progressive*, February 1993, 26–8.

10 See Merrill Goozner, "Patenting Life," *The American Prospect*, 18 December 2000, 23–5.

11 Cited in Ian Cockburn and Rebecca Henderson, "Private-Public Interaction and the Productivity of Pharmaceutical Research," *Journal of Industrial Economics* 46 (1998).

12 CHI Research, Inc., "Industry Technology Has Strong Roots in Public Science," *CHI's Research Newsletter*, March 1997, < www.chiresearch.com/nltv1.htm . > [30 May 2002].

13 James Love and Ralph Nader, *Federally Funded Pharmaceutical Inventions*, testimony given before the U.S. Senate Special Committee on Aging, 103rd Cong., 1st sess., 24 February 1993, 7.

14 *Ibid.*, 3.

15 Daniel Newman, "The Great Taxol Giveaway," *Multinational Monitor*, May 1992, 17–21.

16 According to James Love, Bristol-Myers Squibb "quoted \$6.09 per milligram as the Red Book average wholesale price for Taxol" on September 19, 2000, while "a generic producer reported that his costs of making Taxol were \$.07 per milligram." See Consumer Project on Technology, *Disputes involving Paclitaxel*,

<<http://www.cptech.org/ip/health/taxol>> ; [30 May 2002].

17 See Consumer Project on Technology, < <http://www.cptech.org/ip/health/taxol> ; [1 July 2002].

18 This account draws on Nader and Love, "Looting the Medicine Chest," and Merrill Goozner, "The Price Isn't Right," *The American Prospect*, 11 September 2000, 25–9. See also, Newman, "The Great Taxol Giveaway."

19 An extensive account of Xalatan's development can be found in Gerth and Stolberg, "Medicine Merchants."

20 Consumer Project on Technology, "Additional notes on government role in the development of HIV/AIDS drugs," < <http://www.cptech.org/ip/health/aids/gov-role.html> ; see also James P. Love, *Pharmaceutical Drug Pricing*, testimony given before the U.S. Senate Committee on Government Affairs, 103rd Cong., 2nd sess., 27 July 1994.

21 An excellent history of this struggle over the public's airwaves is Robert W. McChesney, *Telecommunications, Mass Media and Democracy: The Battle for Control of U.S. Broadcasting, 1928–1935* (New York: Oxford University Press, 1995).

22 Office of Communication of United Church of Christ v. FCC, 359 F. 2d 994 (D.C. Cir. 1966), 1003.

23 *Shaeffer Radio Co.* (FRC, 1930), quoted in John W. Willis, "The Federal Radio Commission and the Public Service Responsibility of Broadcast Licensees," *Federal Communications Bar Journal* 5 (1950): 14.

24 *Red Lion Broadcasting Co. v. FCC*, 395 U.S. 367 (1969), 389.

25 See Barry Cole and Mal Oettinger, *Reluctant Regulators: The FCC and the Broadcast Audience* (Reading, Mass.: Addison-Wesley Company, 1978).

26 Under the Telecommunications Act of 1996, licensing periods for TV were extended from five years to eight years, the bar for FCC non-renewal of a license was raised, the ability of third parties to challenge license renewals was restricted, and station ownership limits were relaxed. In a separate action, the Fairness Doctrine was formally rescinded.

27 Newton N. Minow and Craig L. LaMay, *Abandoned in the Wasteland: Children, Television and the First Amendment* (New York: Hill & Wang, 1996).

28 Alliance for Better Campaigns, "Broadcast Television and Campaign 2000: Millions from Ads, Seconds for Discourse," < <http://bettercampaigns.org/reports/display.php?ReportID=7>> ; [30 May 2002].

29 Paul Taylor, Alliance for Better Campaigns, testimony before the Federal

Communications Commission, 16 October 2000.

30 Benton Foundation, *Market Conditions and Public Affairs Programming*, 27 March 2000, <<http://www.Benton.org/Television/lpa.pdf>> ; [30 May 2002].

31 Alliance for Better Campaigns, "Gouging Democracy: How the Television Industry Profiteered on Campaign 2000," 6 March 2001, <<http://www.bettercampaigns.org/reports>> ; [31 May 2002].

32 Congress forfeited any political leverage in dictating public interest requirements for digital broadcasters, leaving that task to a federal advisory panel, The Gore Commission, which was politically divided and whose recommendations were a mishmash of modest proposals that have gone nowhere. See National Telecommunications and Information Administration, *Charting the Digital Broadcasting Future: Final Report of the Advisory Committee on Public Interest Obligations of Digital Television Broadcasters*, 18 December 1998, <<http://www.ntia.doc.gov/pubintadvcom/piacreport.htm>> [31 May 2002].

33 Christopher Stern, "Mixed Signals: Broadcasters' Promise of a Digital TV Age Has Not Been Met, And Now Congress Is Having Second Thoughts About Its Role," *Washington Post*, 17 December 2000, H1.

34 William Safire, "Spectrum Squatters," *The New York Times*, 9 October 2000, A21.

35 David Bollier and Tim Watts, "Saving the Information Commons: A New Public Interest Agenda in Digital Media," (Washington, D.C.: New America Foundation and Public Knowledge, 2002), 26–32.

36 Clifford Lynch, "The Battle to Define the Future of the Book in the Digital World," *First Monday* 6 (2001), <<http://firstmonday.org/issues/issue66/lynch/index.html> ; [1 July 2002].

37 Thomas E. Weber, "Network Solutions Sells Marketers Its Web Database," *The Wall Street Journal*, 16 February 2001, B1.

38 U.S. House, *Berne Convention Implementation Act of 1988*, 100th Cong., 2nd sess., 1988, H. Rept. 609, 23.

39 An excellent review of the history of copyright law and its current biases can be found in L. Ray Patterson and Stanley W. Lindberg, *The Nature of Copyright: A Law of Users' Rights* (Athens, Ga.: University of Georgia Press, 1991).

40 Gary Ruskin, "Why They Whine: How Corporations Prey on Our Children," *Mothering Magazine*, November/ December 1999.

41 James U. McNeal, "Tapping the Three Kids' Markets," *American Demographics*,

April 1998.

42 Brian Bennett, "Uniforms Aid Student Performance, Academics: Not Only Do Uniforms Eliminate Status Wars, They Help Students Concentrate on Schoolwork," *The Los Angeles Times*, 10 December 1989, A2.

43 See Bruce Horovitz, "Targeting the Kindermarket: Family-friendly retailers try to attract parents, build loyalty." *USA Today*, 3 March 2000, A1.

44 Joseph Pereira, "Kids' Advertisers Play Hide-and-Seek, Concealing Commercials in Every Cranny," *The Wall Street Journal*, 30 April 1990, B1.

45 Janet Maslin, "Like the Toy? See the Movie," *The New York Times*, 17 December 1989, B1.

46 Constance L. Hays, "Channel One's Mixed Grades in Schools," *The New York Times*, 5 December 1999, C1.

47 Steven Manning, "Students for Sale," *The Nation*, 27 September 1999, 17.

48 U.S. General Accounting Office, "Commercial Activities in Schools," [GAO/HEHS-00-156], 14 September 2000, < <http://www.gao.gov/new.items/he00156.pdf> ; [30 May 2002].

49 For more information on the Alaska Permanent Fund Corporation, see < <http://www.apfc.org> ; [30 May 2002].

50 For a full exposition of the Sky Trust proposal, see Peter Barnes, *Who Owns the Sky? Our Common Assets and the Future of Capitalism* (Washington, D.C.: Island Press, 2001). The Corporation for Enterprise Development in Washington, D.C., is also involved in producing analyses and studies in support of the Sky Trust proposal.

51 Peter Barnes and Rafe Pomerance, *Pie in the Sky: The Battle for Atmospheric Scarcity Rents* (Washington, D.C.: Corporation for Enterprise Development, 2000), 9.

52 The GPL was developed by the GNU Project, < <http://www.gnu.org> ;, which is the brainchild of software programmer Richard Stallman, founder of the Free Software Foundation.

53 Michael M'Gonigle, "Where There's a Way," *Yes!*, Summer 2001, 30. For more on "ecosystem-based community forestry," see < <http://www.forestsandcommunities.org> ; [30 May 2002].