Mapping the
New Commons

Charlotte Hess

hess@indiana.edu

I. Introduction

This paper is a guide to the rapidly growing area of research and activity I call "new commons." Simply put, new commons (NC) are various types of shared resources that have recently evolved or have been recognized as commons. They are commons without pre-existing rules or clear institutional arrangements. The paper introduces a map that outlines the NC resource sectors and identifies some of the salient questions that this new area of research raises. In addition, it examines the relationship between new commons and traditional common-pool resources and common property regimes.

This overview includes a survey of the physical resources, the user communities, the literature, and some of the major collective action activities. Tacking new commons over several years has demonstrated that this vast arena is inhabited by heterogeneous groups from divergent disciplines, political interests, and geographical regions that are increasingly finding the term "commons" crucial in addressing issues of social dilemmas, degradation, and sustainability of a wide variety of shared resources. The resource sectors include scientific knowledge, voluntary associations, climate change, community gardens, wikipedias, cultural treasures, plant seeds, and the electromagnetic spectrum. All of these new resource sectors and communities require rigorous study and analysis in order to better grasp the institutional nature of these beasts. This map is designed to serve as an introductory reference guide for future scholarly work.

A. Background

For the past eighteen years I have had the unique privilege of professionally surveying the international, interdisciplinary literature on the commons. To gather this information, I subscribe to publication alert services. I also search bibliographic databases such as Web of Knowledge, Lexis-Nexis, Worldcat, and Academic Search. This is not completely satisfactory, in the sense that the majority of hits are in English and are from Northern/Western publications. Several times a year, therefore, I do special online searches specifically on African, Asian, Latin American, and foreign language publications (mainly Spanish, French, Italian, and German).

In the early 1990s—when the International Association for the Study of Common Property (IASCP, now IASC—the International Association for the Study of the

1

Commons) was still in its infancy and I was just beginning my work on building a commons library—I began noticing that every once in a while I could come across a work on the commons that was outside the traditional commons sectors. Most all of the research within IASCP was centered on the sectors agriculture, fisheries, forests, grazing lands, wildlife, land tenure and use, water and irrigation systems, and village organization. Some of the works that deviated outside these sectors were Oakerson's (1978) and Waller's (1986) works on roads; Baden and Fort's (1980) and Shepsle's (1983) articles on budgets as commons; Soroos's prolific publications on the radio spectrum and global commons (1982, 1988, 1997, 2001, 2005); Hiatt's work on medical commons (1975, 1985); Illich's essay on silence as commons (1983); and Vincent Ostrom's (1968) piece on the atmospheric commons in1968. In 1995, IASCP for the first time expanded its focus to nontraditional commons with its conference theme "Reinventing the Commons." For the first time, a substantial number of papers deviated outside the natural resource sectors in the exploration of commons issues. Nevertheless, it has become (gradually) apparent that there are other literatures on the commons— separate from the IASCP corpus of works— that deserve our attention.

In 1988, legal scholar Justin Hughes wrote:

> Even in a vast wilderness, an individual should not be permitted to claim certain physical goods a property because their extraction from the common will not leave 'as good and as many' for the remaining individuals. The 'New World' prior to its colonization may have been as close to a Lockean common as human history records, yet it is easy to make a list of things which the society could not allow to be appropriated as private property: the Amazon, St. Lawrence, and Ohio Rivers, the Cumberland Pass, or the St. George's Bank fisheries.

As with Hughes, many legal scholars urge the "the common good" aspect of common property. In the early to mid-1990s, distinct new commons literatures were developing, particularly in the areas of intellectual property rights and volunteerism. Litman (1990), Boyle (1992), Merges (1996) and others began analyzing the intellectual public domain as a commons. The legal community increasingly invoked the "commons" as an argument against the expansion of intellectual property rights and increasing legal ambiguities in the advent of the online digital environment.[1]   At the same time, Brin

---

[1] See Hess 2000 and Hess and Ostrom (2003) for further discussions of this topic.

(1995), Henderson (1995), Hess (1995), Kollock and Smith (1996), and Huberman and Lukose (1997) and others began applying the language of the commons to various aspects of the Internet. In addition, Roger Lohmann's (1992) work equating the nonprofit sector with the commons was quite influential and made important inroads in understanding the collaborative nature of philanthropy.

Both outside and within the academy, there is a growing number of people today who think of commons as a movement. Dyer-Witheford (2001) presents the premise "that 'the commons' is today emerging as a crucial concept for activists and thinkers involved in myriad mobilizations around the planet." Much of this reflects the work of neighborhood communities and environmental associations. The commons "movement" is particularly visible on the web. This literature documents a new way of looking at what is shared or *should be* shared in the world around us. It focuses on collective action and the importance of understanding who shares what, how we share it, and how we sustain commons for future generations. The fastest way to tune into commons movements of all kinds is to peruse two websites devoted to new commons and collective action: Onthecommons.org[2] and Cooperation Commons.[3]

When I first began writing about this phenomenon in 2000, I referred to this literature as "nontraditional CPRs or common-pool resources." I now prefer "new commons" for two reasons. First, it indicates that there is something different about this kind of commons. Second, it challenges us to think about the general term "commons"— a term frequently applied yet rarely defined.

The difficulty in writing about new commons is its seemingly limitless diversity. New commons can be a revolutionary movement in Mexico,[4] the second enclosure movement (Boyle 2003b, Evans 2005), smartmobs (see Footnote 12; Rheingold 2002), increasingly vocal neighborhood associations, online peer production (Benkler 2004), or new types of markets (Barnes 2006). The rise of new commons signals alarmed reactions to increasing commodification, privatization, and corporatization, untamed globalization, and unresponsive governments. The new commons "movement" is charged with

---

[2] http://www.onthecommons.org
[3] http://www.cooperationcommons.com/
[4] See "The Revolution of the New Commons," http://www.inmotionmagazine.com/global/gest_int_4.html

electrical currents beckoning citizens of the world to develop new forms of self-governance, collaboration, and collective action. An online naturalist,[5] writing about "American Commons," urges readers:

> Don't trust anyone who wants to take something that we all share and profit from equally and give it to someone else to profit from exclusively. Our parks, waterways, and aquifers, our North American flora and fauna, our fresh water and fresh air (at least what's left of it) represent our shared natural heritage.

There are many different ways that new commons evolve or come into being. Some evolve from new technologies that have enabled the capture of previously uncapturable public goods, such as the Internet, genetic data, outer space, deep seas, and the electromagnetic spectrum. Protected areas can be examples of new commons. Berge (2006) describes enacted legislation in Norway that converts private land into a protected area, thus taking away private owners' freedom to use the land as they choose in order to protect the beauty and health of the landscape for the commons. Berge (2003) pointed out that "an understanding of traditional commons and how the new values to be protected are different from and interact with the old values will be important to achieve sustainability of resource use within the protected areas."

Other types of new commons are publicly shared resources that have been reconceptualized as commons, such as street trees, sidewalks, playgrounds, urban gardens, hospitals, and tourist areas. New commons also can be natural resources for which there are new uses or new institutions, such as landscapes, protected areas, the control of agricultural pests, or ocean waters used as surfing lanes.

Clearly, many of these commons sectors on the map have varying degrees of legitimacy for academic study. My aim is to document the growing use of the word commons, the many ways it has become employed, and its crucial importance in the lives of thousands, if not millions of people, who know nothing of the economic definition of "common-pool resources" nor the legal meaning of "common property." I leave it to future scholarship to evaluate the importance and legitimacy of all these new types of commons. I hope this paper makes the case that the trend toward new ways of applying the commons to contemporary sectors, communities, and issues deserves our attention.

---

[5] Mike Bergan at http://10000birds.com/the-american-commons.htm

B. The Purpose of This Paper

The purpose of this paper is threefold:

1) to identify the various new commons[6] sectors and sub-sectors and representative collective-action communities involved in new commons;

2) to survey the ways commoners, practitioners, and scholars discover and then conceptualize the commons. I call the discovery patterns "entrypoints" that can be thought of as catalysts that change one's conception of a resource as a private, government-owned, or open access resource into a *commons*. The entrypoints reveal how the notion that a particular resource or group was a commons might have arisen; and

3) to attempt a viable definition of the new commons. It briefly surveys various definitions given by some of the authors of recent literature and attempts to discern connecting threads. This is not an easy assignment, since new commons are usually not analyzed in terms of property rights or economic goods as with much of the traditional commons literature. There is no general usage for the term "commons." And, indeed, authors of the new commons take carte blanche in their use of the term. Besides the commons, what exactly is "new" in "new commons?" The last part of the paper will discuss some of the challenges of new commons research.

C. Overview of the Map (Figure 1)

The specific sectors and subsectors delineated on the map will be discussed more fully in section III. The main sectors are: cultural commons; neighborhood commons; knowledge commons; social commons; infrastructure commons; market commons; and global commons. By "sector," I mean the resource type. Most sectors and subsectors have a specific physicality to them. A few are social groups and collective action. The arbitrariness of the sectors is readily apparent. There is frequent overlap from one sector to another. Cultural commons and neighborhood commons are often intricately related and could easily be one large sector. The knowledge commons can relate to all of the sectors in some way. Having separate sectors, however, makes it easier to talk about them.

---

[6] Most of the documents selected are journal articles, published books or chapters in books, as well as some well-established websites. All of the references in the paper, as well as many more, are contained in Hess (2007) where there are usually abstracts and, when possible, URLs to the full documents.

II. Entrypoints into the New Commons

How do people arrive at the commons? What are the triggers that lead to the naming of a resource a commons? What I saw repeatedly in reviewing works on new commons were disparate meanings and uses of "the commons" as a descriptor of a resource, movement, or phenomenon. Yet, they all had a sense of "sharing" and joint ownership. Six common entrypoints are: (A.) the need to *protect* a shared resource from enclosure, privatization, or commodification; (B.) the observation or action of peer-production and mass collaboration primarily in electronic media; (C.) evidence of new types of tragedies of the commons; (D.) the desire to build civic education and commons-like thinking; and (E.) identification of new or evolving types of commons within traditional commons; and (F.)rediscovery of the commons.

A. Protecting the Commons

> From land, water and other natural resources, to media and the broadcast and digital spectrums, to scientific discovery and medical breakthroughs, and to politics itself, a broad range of the American commons is undergoing a powerful shift toward private and corporate control. (Bill Moyers 2004)

Borrowing from the 500+ year enclosure movements of northern Europe, enclosure in new commons is the gradual or sudden decrease of accessibility of a particular resource. The reasons for enclosure are many: privatization, commercialization, new legislation, increased scarcity through overconsumption, which can be brought about from new populations, natural disaster, neglect, etc. Enclosure is particularly visible where new technologies have created the ability to capture recently uncapturable public goods. This has been the case with outer space, deep seas, Antarctica, the human genome, and indigenous arts. Information technologies combined with new legislation expanding copyright and the definition of what is patentable enable the enclosure of previously openly accessible areas of information—just as barbed wire made the open range enclosable.

A strikingly large body of work around types of enclosure is the "Who owns?" literature. These are works that call into question the privatization or commodifcation of shared resources, such as academic work (McSherry 2002); America (Jacobs 1998);

biodiversity (Gepts 2004); culture (Clerc 2002; Scafidi 2005); public art (Kleiman 2005); ideas (D. Evans 2002); information (Branscomb 1994); life (Magnus 2002); native culture (M. Brown 2003); scientific data (R. Elliott 2005); the airwaves (Snider 2002); the environment (Hill and Mieners 1998); the sky (Barnes 2001); the village (Peleikis 2003); and water (Barlow and Clarke 2002). See also the website *Who Owns Native Culture?* http://www.williams.edu/go/native/index.htm .

Some of the most influential writers in the new commons have been inspired by their reactions to types of enclosures (Benkler 1999; Bollier 2001, 2002a&b; Boyle 2002, 2003a&b; Lessig 2001, 2004b; Shiva 2000, 2001, 2002; Shiva and Brand 2005; Soroos 1997). Some focus on increasing corporatization (Klein 2001; Rowe 2007). Many write about the enclosing aspects of globalization and predatory corporations—enclosure through copyright expansion, overpatenting and anticommons.

Among the many works on enclosure are those on enclosure of ideas (Boyle, 2003a&b; Lessig 2001; May 2000; Poynder 2003); of the public domain (Benkler 1999; E. Lee 2003; Pessach 2003); of culture (Lessig 2004b); of the tradition of open science (Shiva 2002; Kennedy 2001; Triggle 2004); of the academy (Bowers 2006a&b; Bollier 2002a); enclosure in libraries (Campbell 2005; Kranich 2007); enclosure of the cultural commons (McCann 2002, 2005; Kirtsoglou and Theodossopoulos 2004); and enclosure by markets (Bollier 2001; Bollier and Rowe 2006; Rowe 2007).

Understanding new commons in relation to traditional commons can help tease out the NCs institutional design. Berge (2003) pointed out that "an understanding of traditional commons and how the new values to be protected are different from and interact with the old values will be important to achieve sustainability of resource use within the protected areas."

B. Collective Action, Peer-Production, and Mass Collaboration

> . . . production is 'commons-based' when no one uses exclusive rights to organize effort or capture its value, and when cooperation is achieved through social mechanisms other than price signals or managerial directions. Large-scale instances of such cooperation are peer production. (Benkler 2004: 1,110)

Strategies to combat new enclosure may also involve collective action and building collaborative, self-governing networks. The open access movement is a reaction

to enclosure by journal prices as well as a collective action movement to actively build a knowledge commons (See Clarke 2007). It is also created by the capability of a new technology. The recently developed Science Commons—an outgrowth of Creative Commons—informs users that *the goal is to encourage stakeholders to create—through standardized licenses and other means—areas of free access and inquiry; a 'science commons' built out of private agreements, not imposed from above.*

This is also the entrypoint for many of the online mass collaboration projects such as Wikipedia, Del.icio.us, FOSS, the Public Library of Science, and digital libraries, such as the Digital Library of the Commons http://dlc.dlib.indiana.edu .

In *Smart Mobs,* Rheingold (2002) documents international examples of *mobile and pervasive technologies of cooperation [that] make new kinds of collective action possible.* This type of mass collective action illustrates unprecedented cooperation and scale in a commons. In many of the collective action commons we can detect a persistent type of *commons-like thinking:* a belief in the common good and working toward shared outcomes based on voluntary participation and reciprocity.

C. Tragedy of the Commons

> *Since 1968, when Garrett Hardin published his famous article 'Tragedy of the Commons' in the journal* Science*, there has been significant interest in understanding how to manage commons appropriately, particularly in environmental fields. An important distinction between natural resource commons and FOSS commons is that the 'tragedy' to be avoided in natural resources is over-harvesting and the potential destruction of the resource. In FOSS commons the 'tragedy' to be avoided is project abandonment and a 'dead' project. Institutions—defined as informal norms, more formalized rules, and governance structures—are mechanisms that have been shown to help overcome tragedies in some environmental commons situations.* (Schweik and English 2007)

Garrett Hardin's 1968 article "The Tragedy of the Commons" has had an enormous influence on the study of the commons and still exerts a high amount of influence. His metaphor of peasants sharing an open access field—each acting in their own self-interest, putting as many sheep to graze in the field as possible until the land is completely degraded—has taken on the level of urban folklore.[7] As Ostrom and many

---

7 The obverse of the TOC is Carol Rose's (1986) "Comedy of the Commons" thesis that some commercial property, such as roads and waterways, have infinite returns of scale—in sharing the resources, they not only can enhance the wealth of the resource users but also increase their

others have pointed out, commons are not open access; people do communicate; people are able to self-govern resources; and people can and often do act for the common good or for the good of the resource. Hardin is a pessimist when it comes to human collaboration. But the metaphor is still useful in pointing out threats to unmanaged commons and open access resources, as well as demonstrating the need for rules and participatory management of shared resources.

The tragedy of the commons (TOC) has been an entrypoint in almost every sector of the new commons. Daniels (2007: 518) gives a good overview of some of the applications of the TOC:

> The tragedy of the commons is increasingly used to explain diverse non-environmental problems as well, including the ability of developing countries to raise and collect taxes (Berkowitz and Li 2000); the prevalence of telemarketing (Ayres and Funk 2003); administration of the criminal justice system (Pritchard 1997); the provision of health care (Gochfeld, Burger, and Goldstein 2001); and United States drug policy (Rasmussen and Benson 1994); among others. Certainly the broad application of the theory not only grows out of Hardin's piercing insight but also out of the realization that commons are almost everywhere we look.

Indeed, we find discussions of the TOC in every new commons sector:

- *Cultural commons*: tourism (Neves-Graca 2004; Pintassilgo and Albino Silva 2007; Holden 2005); sports (Nazer 2004)
- *Infrastructure commons* (Coughlin 1994; Kramer 2005; Montanye 2001; Zdarsky, Martinovic, and Schmitt 2006)
- *Knowledge commons* (Bailey and Tierney 2002; J. R. Brown 2000; Carlsson 2001; David 2000, 2001; Eisenberg 1998; Fennell 2004; Greco and Floridi 2004; Ghosh 2007a; Gupta 1997; Hunter 2003; Mireles 2004; Schweik and English 2007; Sim, Lum, and Malone-Lee 2002; Triggle and Miller 2002; Turner 1993; Udell 2004; Wagner 2004; Rankin, Bargum and Kokko 2007)
- *Medical and Health commons* (Baquero and Campost 2003; Foster and Grundmann 2006; Lewis 2004)
- *Neighborhood commons*: urban (Lee and Webster 2006); public space (Blackmar 2006; Headington 2003; Machan 2001; McGovern 2002); law enforcement (Krebs, Sever, and Clear 1999); sidewalks (Kettles 2004); housing (West and Morris 2003)
- *Markets* (Brook 2001)
- *Global Commons* (Clancy 1998; Meyerson 1998; Park 1999; Soroos 2005)

---

sociabililty. Rose posits that there are many such comedies in contemporary life where people share resources. Rose's article has been quite influential (sited by over 250 articles in Lexis-Nexis 6-2008) but it has not spawned a whole literature like the TOC.

A more complete list of applications of the TOC can be found at Hess (2007). See also the Garrett Hardin website at http://www.garretthardinsociety.org/info/links.html.

D. Teaching the Commons

There is a smaller group that comes to the commons by a sense of duty, even urgency, to awaken the American people to the notion of our shared resources. This seems to be a particularly American theme. Korten (2004) writes that "creating a world that works for all is integral to the American Experiment." Educators such as Bowers (2006a&b) and J.R. Brown (2000) passionately argue for educational reforms that would make the renewal of the cultural and educational commons a central focus of education.

Friedland and Boyte (2000) write, "though these civic dimensions of the commons have eroded in recent decades, they survive here and there as a powerful memory. . . . Sometimes in recent years the commons understood as a civic site has proven a potent force for reform."

Rowe (2001) urges we wake up and start noticing the commons lest one day soon they be taken away. David Bollier (2002b) in *Silent Theft* urges us to reclaim "a narrative of the commons;" that we need to reevaluate what should be commodified and what should remain a commons.

In *Teaching the Commons*, Theobald (1997) argues that vital, self-governing communities rather than self-interested individuals represent the greatest hope for American democracy. He "lays out an institutional foundation that would turn the cultivation of civic virtue into an educational goal every bit as important and attainable as education for success in the economic market."

Peter Levine has written extensively on the civic commons (Levine 2002a&b, 2003, 2007a&b; Gastil and Levine 2005). A very interesting and useful text for business managers was put out by the Institute for the Future in 2005 (Saveri et al.). The authors explore emerging fields of knowledge and practice, looking for ways to think about two key business questions: "How can new insights about the dynamics of cooperation help us identify new and lucrative models for organizing production and wealth creation that leverage win–win dynamics; and How can organizations enhance their creativity and

grow potential innovation with cooperation-based strategic models?" The authors draw heavily from the commons and collective action literature of Ostrom and colleagues.

E. Identification of New or Evolving Types of Commons within Traditional Commons

Other types of new commons are new institutions within traditional commons. There have been some researchers who applied commons analysis to new types of commons resources in years past, but they were generally few and far between. Indeed, a number of the points on the new commons map are of studies that apply traditional commons analysis.[8] New commons as new institutional arrangements within traditional commons include: forests (Ghate 2000); grazing (K. Brown 2003; Williamson, Brunckhorst, and Kelly 2003; land tenure and use (Olwig 2003; Schmitz and Willott 2003); wildlife (Popper and Popper 2006). Examples include budgets (Baden and Fort 1980; Shepsle 1983); snowmobiles (Anttila and Stern 2005); policing and highways (Benson 1994; Hutchinson and O'Connor 2005); sports (Bird and Wagner 1997); landscapes (Healy 1995; Hopf 2006); roads (Oakerson 1978, Waller 1986); sidewalk vending (Kettles 2004); surfing (Rider 1998); street trees (Steed and Fisher 2007). Some of these works are by economists applying commons-analysis, game theory or experiments to study social dilemmas to shared resources other than traditional commons (Antilla and Stern 2005; Baden and Fort 1980; Bird and Wagner 1997; Kettles 2004; Rider 1998). These authors are inevitably acquainted with traditional commons theory and literature and demonstrate parallels between the old and the new.

F. Rediscovery of the Commons

This is closely akin to C. Teaching the Commons. Scott Russell Sanders (2006) has adopted the notion of the commons as our "common wealth:" *We need a story that measures wealth not by the amount of property or money in private hands but by the condition of the commons*. This writing is aimed at the general public and can have great appeal. Some of it comes dangerously close to "romancing the commons." Rowe (2002) writes "A commons has a quality of just being there. Generally the rules for use are traditional and social, as opposed to formal and legalistic…. Another attribute of a

---

[8] Drawing on the tragedy of the commons, institutional analysis, game theory, prisoner's dilemma, property rights analysis, and so forth.

commons is an absence of advertising…. The commons is a prolific source of serendipity…" Lessig often waxes romantic: "Central park is a commons: an extraordinary resource of peacefulness in the center of a city that is anything but; an escape, and refuge, that anyone can take (take, or use) without the permission of anyone else"(1999a). This is an emotional application of the commons and fits well with god, mother, and apple pie.

Certainly the above six entrypoints are not the only ways people become aware of the commons. They are observed trends in the literature thus far surveyed. I'm not aware of any studies that look as this question of entry into the commons, perhaps because traditional commons, for the most part, are pre-existing institutions. The different modes of entry may be one of the areas that distinguishes new commons from traditional.
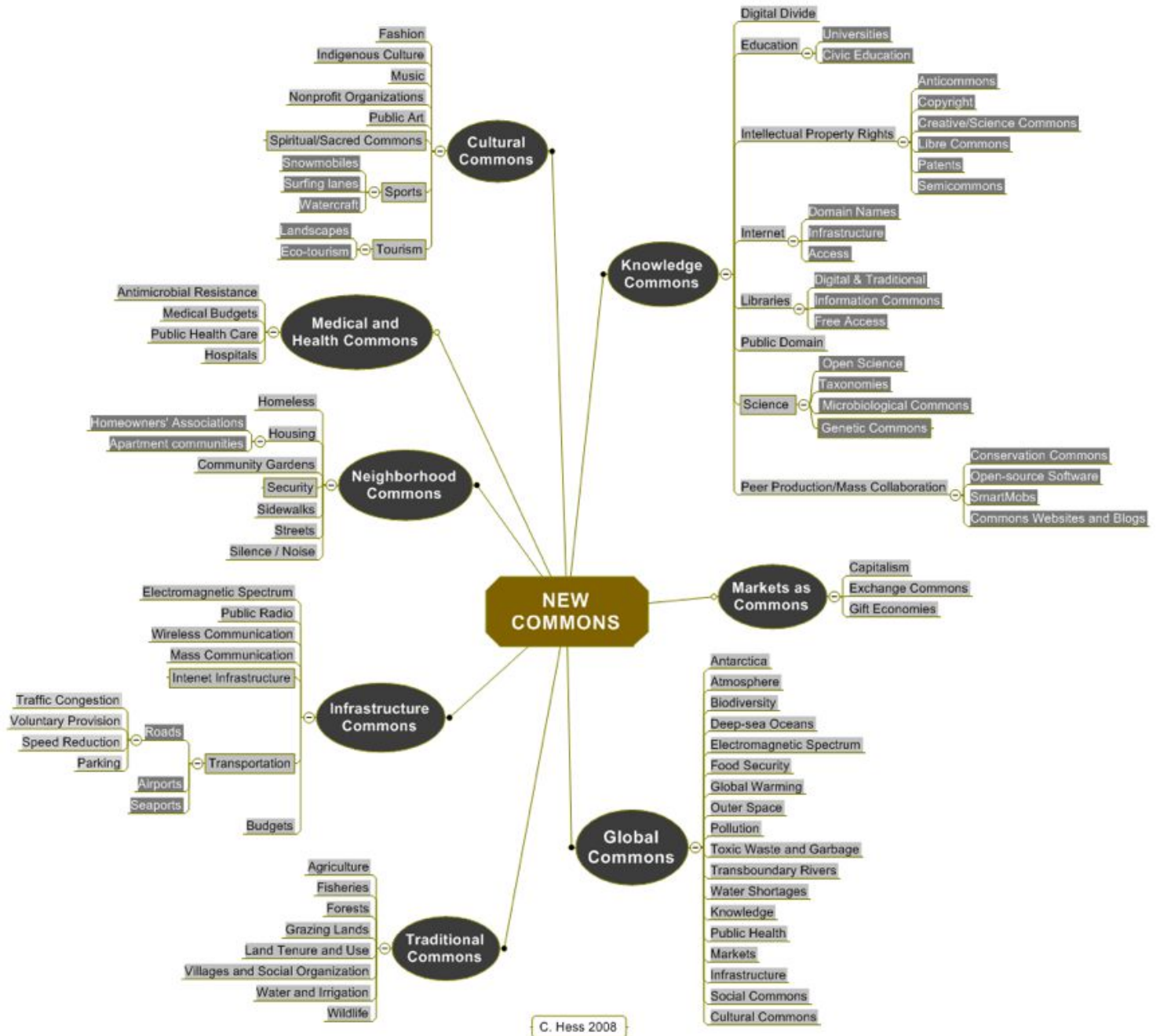
Figure 1: A Map of New Commons

Comment

      The challenge in mapping this new territory is allowing for growth, flexibility, and change—lots of change. A map may help us find our way but it also pigeonholes categories. It creates some relationships while obscuring others. It is certainly not satisfying like a geographical map where every place has its one spot. There are a myriad number of overlaps between the different commons types that are not shown (too visually overwhelming). There are many ambiguities and questionable hierarchies. Still, it has helped me inventory and make sense of these disparate subjects.

A. Cultural Commons

People are reclaiming bits of nature and of culture, and saying this is going to be public space. (Naomi Klein 2001)
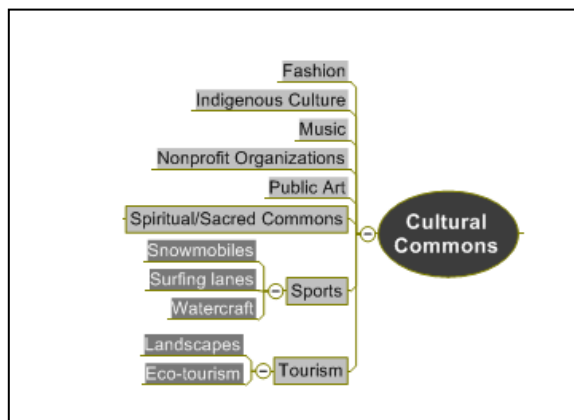

Figure 2: Cultural Commons Sector

      Much of the cultural commons literature addresses the privatization of cultural heritage and commodification of previously unownable cultural objects. Anderson and Simmons (1993)have edited a volume on the role of customs as alternatives to private property rights that can prevent the tragedy of the commons. Clerc (2002) and Scafidi (2005) write about the effects of intellectual property rights on culture. Radin (2001) and Boyle (1996) explore the implications of propertization of the human body; Benedikter (2005) takes on the privatization of Italian cultural heritage; Bollier and Racine (2005) discuss the commons of the fashion industry; McCann (2002, 2005), Prögler (1999), and Drache and Froese (2006) focus "on the key dynamics in the global cultural economy."

There is an expanding literature on threats to local and indigenous peoples (Caruthers 1998; Ifeka and Abua 2005) often by the tourism industry (Ryan and Aicken 2005; Briassoulis 2002; Kirtsoglou and Theodossopoulos 2004; Peleikis 2003), as well as the tragedy of changing or degraded landscapes (Healy 1995; O'Toole 1998). Some of the literature addresses the ability of cultural groups to form new commons around ecotourism (Holden 2005; Sharma et al. 2002; Vail and Hultkrantz 2000).

Roger Lohmann's (1989, 1992, 1995, 2001) work on nonprofit organizations and voluntary associations is the early seminal work in this area. The nonprofit literature has been noticeably influenced by his work (see Bisesi 2005).

There is much that could fall under the cultural commons sector and there are many overlaps with the neighborhood and knowledge sectors. Other topics include: creativity and art (Hyde 1983, 1998; see also Hyde's video on "the privatizing of the cultural commons."http://blogs.law.harvard.edu/mediaberkman/2007/02/13/lewis-hyde-on-cultural-commons-2/); public art (Sax 1999; Paul 2006); churches and spirituality— "sacred commons" (Linn 1999; Hart 2003; Ikerd, 2004; Levine 2003; Hart, Berry and Boff 2006), gender issues (Taylor 2003), and types of sports activities as commons (Bird and Wagner 1997; Rider 1998; Anttila 1999; Burger 2001; Anttila and Stern 2005; Roth 2006).

A study on references and themes on commons in novels or musical works would be very interesting. I know there are quite a few novels about the Enclosure Movements in Europe, but I have not collected those titles. Larry McMurtry's *Buffalo Girls* contains a section about the killing off of the buffalo commons. Well-known essayist and author Fellow IASCer, Susan Buck, sent me a reference to a commons song: Billy Bragg's "The Diggers Song" http://www.youtube.com/watch?v=stmiyeLsErw&feature=related about historical commoners in a 1910 protest.

Related concepts in the cultural commons are: *public sphere, the common heritage of humankind, the common good, cornucopia of the commons.*

B. Neighborhood Commons

> *Commons can even be thought of as the social bonds shared by a community, and can include the need for trust, cooperation and human relationships. These are the very*

foundations of what makes 'a community' rather than merely a group of individuals living in close proximity to each other. (James Arvanitakis 2006)
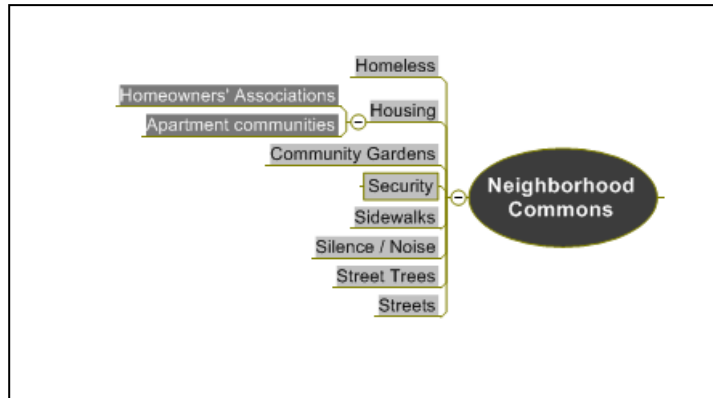

Figure 3: Neighborhood Commons Sector

Neighborhood commons[9] incorporate both urban and rural commons where people living in close proximity come together to strengthen, manage, preserve, or protect a local resource. This sector is closely related to cultural commons.

The growing number of works on shared public space is bringing awareness to a goldmine of new commons issues. Foster writes:

> *only through a rethinking of the city commons can we begin to take social capital seriously in land use policy and law. Instead of conceptualizing the city as an aggregation of private property rights, we should instead seek to identify and protect common resources and interests in the city commons through limited access rights and collaborative governance strategies that preserve and draw upon existing social networks to manage common city resources.* (S. Foster 2006: 526)

Low and Smith (2006) explore issues around the increasing enclosure of public space particularly in U.S. cities. Anand (2000) studies "commons" behavior with solid waste management in Madras, India. Clapp and Meyer (2000) analyze brownfields as urban commons. Nagle and Nagle (2007) write about "predatory planning" practices that are endangering the urban cultural commons in post-Katrina New Orleans.

Most of us are familiar with the battles between neighborhood groups and city governments over the rights to gardens grown on abandoned land. The gardens become a kind of community action commons when a government begins to sell them as private

---

[9] Onthecommons.org refers to this as "hometown commons."

property—thus creating a new kind of enclosure movement (Rogers 1995; Assadourian 2003; Saldivar-Tanaka and Krasny 2004). Karl Linn was an especially effective voice in building community gardens and neighborhood commons (Linn 1999, 2007).

Housing arrangements can be good examples of types of commons. Yang (1995) and Hawkins, Percy, and Montreal (1997) have written about homeowners' associations as commons; French and Hyatt (1997)—community associations; Choe (1993)—apartment buildings; I. Lee (1998)—residential communities; Kleit (2004)—public housing. A few have looked at playgrounds (Abu-Ghazzeh 1998; Delehanty 1992); sidewalk and street vending (Kettles 2004; Anjaria 2006); and local streets, parking, and public spaces (Epstein 2002; D. Cooper 2006). Brian Steed and Burney Fischer (2007) at Indiana University are the first to study street trees as commons.

A wide number of other subjects can fall under the heading "neighborhood commons." The effect on homeless populations by certain types of urban enclosures of the commons have been examined by Headington (2003) and Mitchell and Staeheli 2006). Iliich (1983) has written on silence as a commons and Mace, Bell, and Loomis (1999) on the effects of noise on the commons.[10] Local security issues have been written about as commons in Blackstone et al. (2007), Benson (1994), Wagenaar and Soeparman (2004), and Krebs, Sever, and Clear (1999). Jenny, Feuntes, and Mosler (2007) analyze the incentives for sharing and rule compliance in a Cuban urban commons.

Some interesting websites relating to neighborhood commons are Resource Guide for the Commons. http://www.yesmagazine.org/article.asp?ID=441 . Related areas to the neighborhood commons are: *barn-raising, community organization, deliberative democracy, public sphere, self-governance, social capital, urban commons.*

---

[10] See also: the website http://www.nonoise.org/commons.htm.
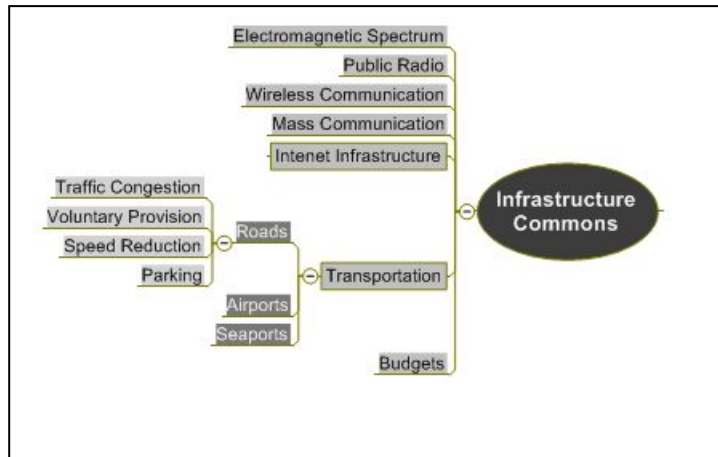
C. Infrastructure Commons

Figure 4: Infrastructure Commons Sector

This sector is inspired by Frischmann's work on infrastructure as a commons. Frischmann uses the term "infrastructure commons" to describe physical resource systems made by humans for public consumption. He includes "a list of familiar examples: (1) *transportation systems*, such as highway and road systems, railways, airline systems, and ports; (2) *communication systems*, such as telephone networks and postal services; (3) *governance systems*, such as court systems; and, (4) *basic public services and facilities*, such as schools, sewers, and water systems" (Frischmann 2007; see also Frischmann 2005a&b).

The electromagnetic spectrum is a primary example of a new commons created from the capabilities of new technologies. It is also a part of the global commons and related to the knowledge commons. Along with many other scholars, Benkler (1998) urges the regulation of *wireless transmissions as a public commons, as we today regulate our highway system and our computer networks. The choice we make among these alternatives will determine the path of development of our wireless communications infrastructure. Its social, political, and cultural implications are likely to be profound.* A small sample of the spectrum and wireless communication commons literature includes Benkler (1998, 2002b); Benjamin (2002, 2003); Brennan (1998); Brito (2007); Buck (2002); Daniels (2007); Ikeda (2002); Rheingold (2002); Snider (2002); Soroos (1982); Sur (2003); Thompson (2006); and Wellenius and Neto (2007). Werbach (2004) writes

about "supercommons"—collections of wireless devices can share spectrum effectively without exclusive rights.

Golich, writing in 1991, drew from Soroos (1982) in considering the domains of the communication commons to include satellite orbital slots and the electromagnetic spectrum. "They are unique," she wrote, "because, unlike minerals and forests, they have no physical mass. It is impossible to deplete these resources permanently or to damage them and render them useless to future users. It is, however, possible to diminish the usefulness of these spaces through overcrowding or interference. . . ." Other works on telecommunications are Aufderheide (2002); and Thümmel and Thümmel (2005). Steemers (2004) writes about the "digital cultural commons" of the BBC and public broadcasting.

Little (2005) examines the issue of public services (telecommunications, electrical power systems, gas and oil, transportation, and water supply systems as an infrastructure commons with an eye toward sustainability in the context of classic commons dilemmas.

Several have written about transportation systems as commons. Oakerson did his seminal dissertation on Kentucky coal-haul roads and the commons problem in 1978. Van Wugt did his on social dilemmas and transportation systems. Gutscher et al. (2000), Rosin (1998), and Alatoree (2004) have delved into the issue of speed reduction and street congestion as commons problems.

Internet infrastructure as a commons has been a topic of considerable importance (Huberman and Lukose 1997; Bernbom 2000; Hess 1995; Benkler 2003). Cotter and Bauldocks (2000) overlaps with the knowledge commons sector but deserves to be mentioned here. They write: "A vast amount of biodiversity information exists, but no comprehensive infrastructure is in place to provide easy access and effective use of this information. The advent of modern information technologies provides a foundation for a remedy." Their paper outlines some of the essential requirements and some challenges related to building this infrastructure.

Drawing from the traditional commons theory, Sened and Riker (1996) write about air slots as common property. Studying seaports as commons, Bowden and deJong (2006) investigate privatization of infrastructures; while Selsky and Memon (1997) study conflicts arising in urban seaport development.

Budgets can also be seen as falling under the infrastructure sector. Baden and Fort (1980) looked at the federal budget as a commons. Shepsle (1983) wrote about overspending a budget as a commons problem. Hurley and Card (1996) make a case for global physicians' budgets as a commons. Brubaker (1997) applies the tragedy of the commons to budgets.

D. Knowledge Commons

Before 1995, few thinkers saw the connection. It was around that time that we began to see a new usage of the concept of the "commons." There appears to have been a spontaneous explosion of "ah ha" moments when multiple users on the Internet one day sat up, probably in frustration, and said, "Hey! This is a shared resource!" People started to notice behaviors and conditions on the web—congestion, free riding, conflict, overuse, and "pollution"—that had long been identified with other types of commons. They began to notice that this new conduit of distributing information was neither a private nor strictly a public resource. (Hess and Ostrom 2007)
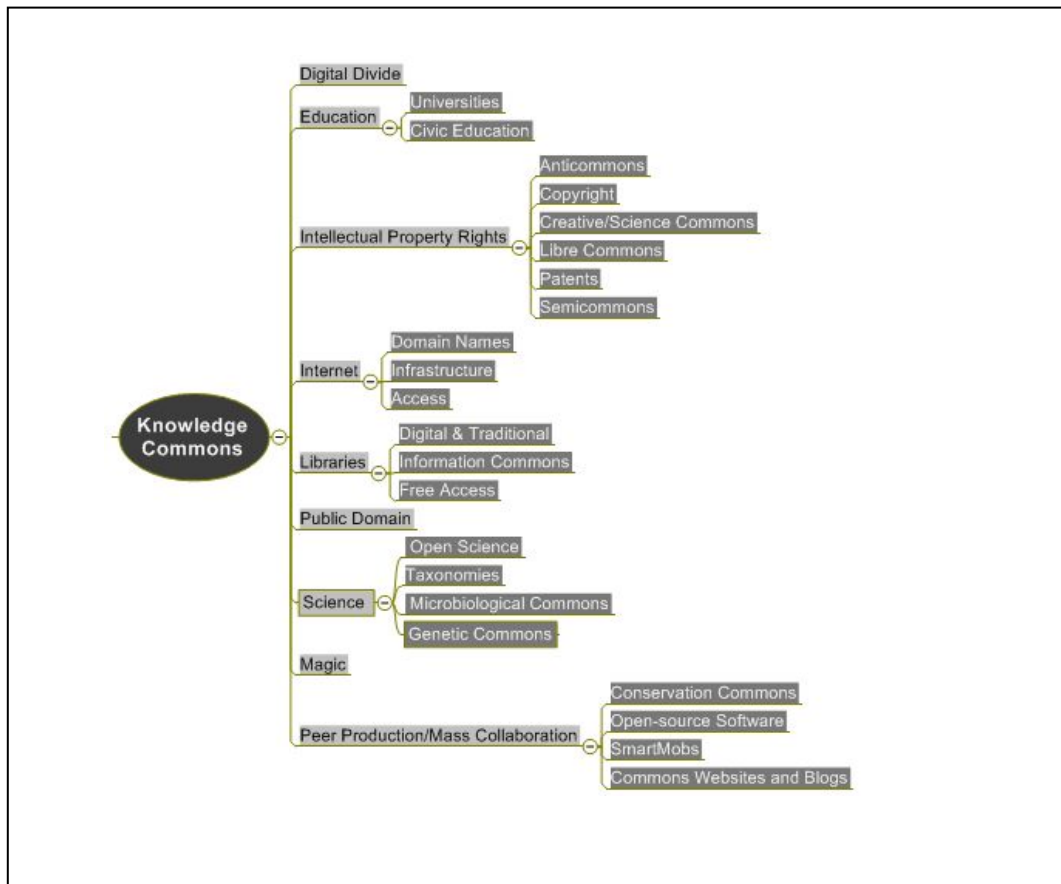

Figure 5: Knowledge Commons Sector

. . contrary to the predictions of enclosure, a flourishing commons exists in respect of information that is communicated via the Internet. The commons, however, remains a relatively under-theorized concept in political and legal theory. (Cahir 2004)

In the Knowledge Commons literature, where the Internet has freed up information, enclosure is prevalent "expansion of intellectual property rights has been remarkable. (Boyle 2003)

The knowledge commons is a vast and complex sector. Most aspects concern digital information. In many cases knowledge became a commons when it became digital. It has unique characteristics as a commons. For the most part, it is a renewable resource.

Information has often been cited as a primary example of a pure public good—nonrival and free to all. In our 2003 article, Ostrom and I made the distinction between ideas, knowledge and information artifacts (books, articles, etc.) and information facilities that store the resources (libraries, archives, databases etc.). The distinction is important when analyzing commons, whether looking at economic goods, property rights or social dilemmas. Influential voices in the information/knowledge commons arena are Bollier (2001, 2002a&b, 2004a&b, 2007) looking at gift economies and collaboration; Boyle (particularly 1996, 2002, 2003b)writing about threats from in the "second enclosure movement"; Benkler (1998, 2002a, 2004) describing and advocating commons-based peer production; and Lessig (1999, 2001) illustrating to a general audience how free culture and information are being eroded by legal restrictions on use; Ostrom and Hess (2007) and Hess and Ostrom (2006) have provided an analytical framework for analyzing the knowledge commons.

Early writers on the Internet as a commons were Brin (1995), Felsenstein (1993), Henderson (1995), Hess (1995), Kollock and Smith (1996), and Holman (1997). Rheingold wrote enthusiastically about the virtual community commons in 1993, but didn't yet name them as such. Others have written about the ability of the Internet to build or facilitate commons activities (Rainie and Kalsnes 2001; Haplin et al. 2006).

Boyle underscores the complexity of new digital commons when he writes:

The question that remains to be answered is whether the social harm we should be most concerned about is underproduction, overproduction, the tragedy of the commons, the commercialization of an electronic public sphere, the corrosive effect of information technology on privacy, or merely straightforward distributional inequity.

The idea of libraries as commons—a storehouse of democracy—has been championed by Nancy Kranich. She chose this theme during her year as president of the American Library Association in 2000 (Kranich 2003, 2007; see also Bailey and Tierney 2002; and Lougee 2007). Waters (2007) argues for preservation of the digital commons; Cox and Swarthout (2007) describe a digital library commons in practice; Krowne (2003) discusses building digital libraries using peer production.

In the past five-ten years, academic libraries in the US have begun calling their dedicated online digital service areas "information commons" (Beagle 1999; Duncan 1998). There is a separate "commons" literature dedicated to these types of shared library-computer spaces, but this literature is outside the focus of this paper.

Knowledge is also a global commons particularly in terms of provision, access, and the dilemmas of intellectual property rights. It is a global commons that needs to be accessible, equitable, and protected (Lukasik. 2000; Chan and Costa 2005; Holman and McGregor 2005; Maskus and Reichman 2005; M. Cooper 2006; Hess and Ostrom 2007b). It also includes the issues of the global digital divide (Yu 2002; Chen and Wellman 2004; Fox 2005). Armstrong and Ford (2005) is an interesting tool aimed at bridging the African digital divide.

There are many action communities that have come together to counteract forms of information enclosure. The establishment of Creative Commons (2002) http://creativecommons.org/ and more recently Science Commons http://sciencecommons.org/ has had a profound effect in increasing information in the public domain. Millions of authors through Creative Commons now agree to "some rights reserved" instead of the traditional "all rights reserved" package for copyrighted works.

The open source movement, particularly Free/libre Open Source Software (FOSS) is an important type of new commons (see Lessig 1999, 2006; Schweik 2005, 2007; Yu 2007; van Wendel de Joode 2003; van Wendel de Joode et al. 2003; O'Mahoney 2003; Halbert 2003a; Sawhney 2003; Dorman 2002; Opderbeck 2004; Rao, Wiseman, and Dalkir 2004; May 2006). The two primary foci are peer production and collective action initiatives. Interestingly, the founder of the open source movement, Richard Stallman has renounced Creative Commons for not being open enough. A new movement was recently

been established by the Libre Society called Libre Commons http://www.libresociety.org which offers a set of licenses that "reject the legalistic and 'culture as resource' position of the Creative Commons and instead hope to develop a concept of the creative multitude through political action and ethical practices" (Berry and Moss 2006).

Commons dilemmas on the Internet is the subject of a number of works: email spam (Melville, Stevens, Plice and Pavlov 2006); congestion (Huberman and Lukose 1997; Bernbom 2000); trust (Rheingold 1993; Kollock and Smith 1996).

Some of the writers on the open access and self-archiving movement who consider the movement and/or free content as commons are Poynder (2003), Cahir (2004), Hunter (2005); Toly2005; Geist (2007), and Suber (2007).

As mentioned earlier, the law literature on intellectual property rights and the knowledge commons is extensive. There is a large corpus of works on the expansion of intellectual property rights and/or copyright (Travis 2000; Litman 2001: Boyle 2002; Gadgil 2002; Cohen 2006; Darch 2001; Halvert 2003; Campbell 2005; Ghosh 2007; Loren 2007; Pasquale 2006; Reese 1995; Vaidhyanathan 2001; Van Alstyne 2003; Tavani 2004, 2005; Mitchell 2005). Some are specifically dedicated to the issue of the "copyleft" movement (Ciffolilli 2004; Hill 1999; Nimus 2006). Cohen (2000) and Vaidhyanathan (2004) have written influential works on Fair Use after the Digital Millennium Copyright Act of 1998. Some focus on increased enclosures from the European Database Directive (David 2000; Boyle 2004). See Runge and Defrancesco (2006) for a good background on historical enclosures and their relevance for intellectual property rights.

Litman wrote about the intellectual public domain as a commons in 1990:

> The historical development of the public domain began as a straightforward problem in statutory construction and proceeded through ad hoc articulation in series of cases decided under successive statutes. Traditional explanations of the public domain have failed to justify the cases on principled grounds. When the public domain is viewed as a commons that rescues us from our choice to grant fuzzy and overlapping property rights in unascertainable material, however, some of the apparent contradictions in lines of cases become more transparent

Interest in the intellectual public domain was re-awakened with the Conference on the Public Domain, Duke 2001. James Boyle's edited issue of *Law and*

Contemporary Problems 11(2003) is a seminal volume on intellectual property rights, the knowledge commons, and the intellectual public domain. Other publications on the intellectual public domain as a commons are Benkler (1999); Boyle (2002, 2003b); Cohen (2006); Dalrymple (2003); Guibault and Hugenholtz (2006); Haas (2001); Halbert (2003b); Lange (2003); Rai and Boyle (2007); Shaw (2006), and Aoki, Boyle, and Jenkins (2006).

The issues around patents constitute another large part of the knowledge commons, and the science commons subsector (Adelman 2005; Mireles 2004; Powledge 2003; Murray and Stern 2005; Shiva and Brand 2005; Horowitz and Moehring 2004; Janger 2003). The science commons includes the tradition of open science, microbiological commons, nanotechnology, genetic resources and the genomic commons; anticommons; and supercommons. Issues include enclosure, collective action, biopiracy, and overpatenting, sharing taxonomies, grid computing, and collaboratories. There is a startling large literature on anticommons since Heller's 1998 article.[12] An anticommons occurs when there are too many owners holding rights of exclusion, so that the resource is prone to underuse which results in a tragedy of the anticommons (Heller and Eisenberg 1998; Hunter 2003; Janger 2003; Mireles 2004; Sim, Lum, and Malone-Lee 2002; Vanneste et al. 2006).

A different kind of science that has been written about as a commons is the science of magic. Loshing (2007) analyzes the knowledge of magic as a common-pool resource with a highly developed set of rules and norms.

The concept of the "semicommons" has been found useful by a number of scholars after Henry E. Smith's (2000) article arguing that semicommons exist "where property rights are not only a mix of common and private rights, but both are significant and can interact" (Loren 2007).

Another group of works center on the threats and possible enclosure of the open science tradition (Dysen 1999; Eisenberg and Nelson 2002; Kennedy 2001; Merges 1996; Nelson 2003, 2004; David 2004; Shulman 2002; Rai 1999, 2001; Reichman and Uhlir

---

[11] http://www.law.duke.edu/journals/journaltoc?journal=lcp&toc=lcptoc66winterspring2003.htm

[12] A search of *Lexis-Nexis* shows two articles on the anticommons before 1998 and 828 articles between 1998 and 2008 (6-12-08).

2003; Dalrymple 2003; Vaidhyanathan 2001, 2002; Uhlir 2003, 2006; Dedeurwaerdere 2005; Kyläheiko 2005; Cook-Deegan 2007). An issue of the *International Social Science Journal* (June 2006) was devoted to the microbiological commons (Cook-Deegan and Dedeurwaerdere; Polsky; Srinivas; Hess and Ostrom; and Dawyndt, Dedeurwaerdere, and Swings). A sixth article in the issue by Daniel, Himmelreich, and Dedeurwaerdere addresses problems of sharing taxonomies and other forms of information on micro-organisms. Donald Kennedy, editor of Science magazine devotes a large section to the commons in his edited volume on the state of the planet (Kennedy 2006: 101-125). A noteworthy international collaborative project by an IUCN consortium of supporters of open access to scientific information has been the Conservation Commons http://www.conservationcommons.org/. It is committed to encouraging "organizations and individuals alike to ensure open access to data, information, expertise and knowledge related to the conservation of biodiversity."

The testimonial to the importance of understanding the global gene pool as a commons is the Porto Alegre Treaty to Share the Genetic Commons. In 2002, Biotech activists from more than 50 nations gave their support for a treaty "which would establish the earth's gene pool as a global commons. Non-governmental organizations' (NGOs) leaders say they will challenge government and corporate claims on patents on life in every country. The treaty is the first globally coordinated campaign among biotech activists, and already has the support of over 250 organizations." (See http://www.ukabc.org/genetic_commons_treaty.htm). Much of the work on genetic (or genomic) commons has to do with enclosures or enclosure threats through corporate patents (Sedjo 1992; Athanasiou and Darnovsky 2002; Aoki 2003; Safrin 2004; Barker 2003; Barnett 2000; Falcon and Fowler 2002; Faye 2004; Helfer 2005; Scharper and Cunningham 2006); the pharmaceutical industry (Rai 2006, 2007); and biosafety (Jepson 2002).

The antithesis of enclosure threats to the knowledge commons is the remarkable growth of mass collaboration and peer production. Yochai Benkler is the leading voice in the study of peer production (Benkler 2004; Benkler and Nissenbaum 2006). He argues that scientific publication is increasingly using commons-based strategies for more global

and equitable distribution to information-poor populations of the world (Benkler 2005:

14). In his influential article "Coase's Penguin," he explains:

> while free software is highly visible, it is in fact only one example of a much broader
> social-economic phenomenon. I suggest that we are seeing is the broad and deep
> emergence of a new, third mode of production in the digitally networked environment. I
> call this mode 'commons-based peer-production,' to distinguish it from the property- and
> contract-based models of firms and markets. Its central characteristic is that groups of
> individuals successfully collaborate on large-scale projects following a diverse cluster of
> motivational drives and social signals, rather than either market prices or managerial
> commands. (Benkler 2002)

Benkler's work is placed in the knowledge commons but it also has an important

place in the market commons sector. Benkler's *Wealth of Networks* is a seminal book on

mass collaboration and networks. He writes: As collaboration among far-flung

individuals becomes more commons, the idea of doing things that require cooperation

with others becomes much more attainable, and the range of projects individuals can

choose as their own therefore qualitatively increases" (Benkler 2006: 9).

Also making a major contribution to the understanding of peer production is

Michel Bauwens. See Bauwen 2005 and his site: P2P Foundation:

http://blog.p2pfoundation.net/?p=470 which is dedicated to "Research, Documenting and

Promoting Peer to Peer Practices. And anyone doing research on networks should also

look at the work of Barry Wellman (2005 and at

http://www.chass.utoronto.ca/~wellman/vita/index.html) .

Early studies of online knowledge commons were those done on virtual

communities by Rheingold (1993) and Kollock and Smith (1996). The subsectors in

depicted in the map are groups where people physically or virtually come together to

accomplish some purpose (Uzawa 2005; Purdy 2007; Coombe and Herman 2004).

Rheingold's Smartmobs[13] are types of social commons. Many scientific collaboratories

and grid computing projects are commons-based.

---

[13] "Smart mobs emerge when communication and computing technologies amplify human talents for
cooperation. . . . The people who make up smart mobs cooperate in ways never before possible because
they carry devices that possess both communication and computing capabilities. Their mobile devices
connect them with other information devices in the environment as well as with other people's telephones.
Dirt-cheap microprocessors embedded in everything from box tops to shoes are beginning to permeate
furniture, buildings, neighborhoods, products with invisible intercommunicating smartifacts. See
http://www.smartmobs.com/

Some of the most active *de facto* commons today are online mass collaborators who work together contributing to information resources such as arXiv.org, the Digital Library of the Commons, Wikipedia and wikis, FLICKR; or bookmarking sharing sites, such as del.ici.ous. Tapscott and Williams's bestselling book *Wikinomics* on mass collaboration is inadvertently on the new commons.

An emerging area of study is focusing on "stigmergy" or "stigmergic collaboration" by those interested in the biological connection to commons-like behavior. Most notable is Australian Mark Elliott who made it the subject of his dissertation. He writes:

> "Stigmergic collaboration provides a hypothesis as to how the collaborative process could jump from being untenable with numbers above 25 people, towards becoming a new driver in global society with numbers well over 25,000. The term is from French Biologist's Pierre-Paul Grasse's research on termites in the 50's and "has been applied to the self-organisation of ants, artificial life, swarm intelligence and more recently, the Internet itself."

See Elliott's blogs Stigmergic Collaboration http://stigmergiccollaboration.blogspot.com/ and Mass Collaboration http://masscollaboration.blogspot.com/

Related terms: *collaboratories; collective intelligence, flashmobs; grid computing; non-market forms of crowdsourcing.*

Education is a rapidly growing area of commons development. A number of scholars have written about the commodification and corporatization of higher education in the past few years (Argyres and Liebeskind 1998; Boal 1998; Hess 1998; Bollier 2002; Brown 2000; Hall 2001; Strathern 2004; Williams 2005); others are focused on actively building a global education commons through civic education (Crosby 1999; McMurtry 2001; Hepburn 2004; Huber 2005; Kirp 2004; Arvanitakis 2006; Bowers2006; Levine 2007). Hellstrom (2003) addresses the problem of governance in the academic virtual commons.

As with libraries and their "information commons, education is now a field abundant with "commons." The Digital Learning Commons (DLC), for instance, "is a nonprofit organization working to improve access to educational opportunities and learning resources by providing high-quality educational materials, online courses, and technology tools to all students and teachers in Washington State."

http://www.learningcommons.org/. **ccLearn** was recently established by Creative Commons to enable the full potential of the Internet to support open learning and open educational resources (OER). Its mission is to minimize barriers to sharing and reuse of educational materials—legal barriers, technical barriers, and social barriers. http://learn.creativecommons.org/. The Open Education Resources (OER) Commons is a "global teaching and learning network of free-to-use resources—from K-12 lesson plans to college courseware—for you to use, tag, rate, and review." http://www.oercommons.org/ (see also Atkins, Brown, and Hammond 2007). The Academic Commons is a community of faculty, academic technologists, librarians, administrators, and other academic professionals who help create a comprehensive web resource focused on liberal arts education. http://www.academiccommons.org/. The Education Commons is a virtual community of academic systems users, designers and systems implementers sharing knowledge, experiences and best practices. The goal of the community is to create an open and transparent system of communication between diverse groups committed to advancing the state of education worldwide. It's meant to be a virtual commons, where sharing and participation are key. http://www.educationcommons.org/commons/index.html

There are thousands of education commons-related initiatives from all parts of the globe that are visible on the web. Further study will be needed to separate the wheat from the chaff.
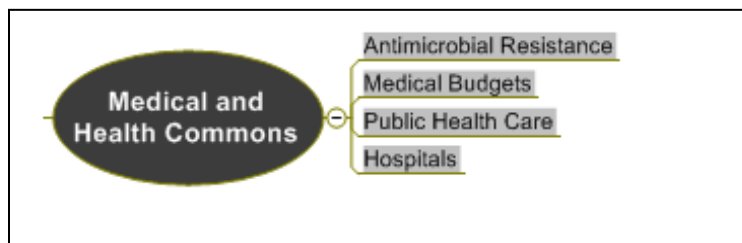
E. Medical and Health Commons

Figure 6: Medical and Health Commons

The ethics of health care system reform are best viewed as parallel to clinical ethics. The individual good of patient care is a microcosm of the social good of reform. By writing clinical ethics "large" we may help construct a new American "health care Commons," matching public good and private interests. (d'Oronzio)

The early works on the medical commons were written by H.H. Hiatt: Protecting the Medical Commons: Who is Responsible? (1975) and Will Disease Prevention Spare the Medical Commons. 1985. In both cases, Hiatt drew from Hardin's tragedy metaphor (see Wehrwein 1998).

"Commons" is very hard to search in the medical field. A search in Medline Plus for "commons" will bring up all that is "common" starting with the "common cold." "Common pool" pulls up "water safety;" "Common property" results in skin conditions! Health and medical care are growing commons issues (Smith-Nonini 2006; Beetstra et al. 2002; Gochfeld, Burger, Goldstein 2001; Kaufman et al. 2006; Saltman and Bergman 2005; Cassel and Brennan 2007; Jütting 2004; Nambiar 1996). Many of these works focus on collective action initiatives—the need to build new commons systems and networks. Kapczynski, et al. (2005) suggest a system of open licensing to assuage global health inequality. Chandrakanth et al. (2002) represent the work concerned with the conservation and protection of indigenous medicinal plants.

Cassel and Brennan (2518) write:

> Physicians cannot afford to ignore the profound logic of the link between care for individual patients and the costs of the care. The more care costs, the more likely many individuals will be without good insurance, and research clearly shows their health will suffer. It is impossible to avoid the fact that physicians live and work in a medical commons and bear responsibility for it.

Medical budgets are included in the Infrastructure sector. Interesting works on the commons and the use of antimicrobials are Levin (2001); Horowitz (2003); and Baquero and Campos (2003).

F. Market Commons

I do not expect to see the fruits of any of these initiatives in my lifetime—but my grandson may—as our societies evolve toward planetary ecological awareness and we remember the difference between common money and the wealth of the commons. (Henderson 1998)

Former Interior Secretary Walter Hickel once explained: "If you steal $10 from a man's wallet, you're likely to get into a fight. But if you steal billions from the commons, co-owned by him and his descendants, he may not even notice. (Bollier 2004a)
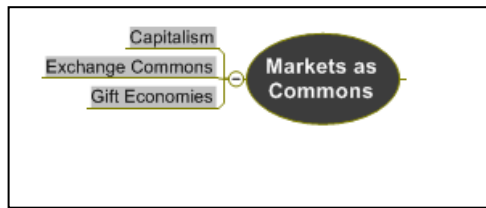
Figure 7: Market Commons Sector

Sandel 2005 writes "Are there some things that should not be bought and sold, and if so, why?" This is not far from the question Daly and Cobb asked in 1989 when they proposed an alternative approach to neoclassical economics, one with more humanism and an ethical basis. Bollier has written prolifically about the importance of gift economies, citing the tradition of open science; open source software, donating blood, and community gardens as good examples of the gift economy in action (Bollier 2002b). Nonini also places the intellectual commons within the realm of the gift economy stating that it is imperative that this commons be understood as a a non-commodified social arrangement (Nonini2006b:205)."

I have already mentioned Benkler's commons-based peer production. His work on this subject could have just as well been put into this sector (see also Cooper 2006). Purdy (2007: 1107) provides a good quick summary of Benkler's work on networked information economy: "Benkler's work (2003a) argues that digital technology has changed the capital structure of the production of culture and ideas in ways that create new opportunities to organize some economic activity by appeals to flourishing rather than prosperity."

Peter Barnes is a public entrepreneur who advocates revising our form of global, corporate capitalism to begin incorporating the commons. In *Who Owns the Sky* (2001), he proposes a "sky trust" to require companies to bid at auction for the right to release their carbon emissions into the atmosphere. In his 2006 work *Capitalism 3.0: A Guide to Reclaiming the Commons* has a more radical proposal of rewriting the basics of capitalism:

> The key difference between versions 2.0 [current system] and 3.0 is the inclusion in the latter of a set of institutions I call the commons sector. Instead of having only one engine—that is, the corporate-dominated private sector—our improved economic system would run on two: one geared to maximizing private profit, the other to preserving and enhancing common wealth (p.xiv).

Well-known author, Bill McKibben, also calls a renewal of commons in his new book called *Deep Economy*. "But commons that have been weakened can be strengthened again' indeed, there are signs of life in many places. In India, for example, the Navdanya ('Nine Seeds') movement protects local varieties of rice and other staples by cataloguing them, declaring them common property, and setting up locally owned seed banks." (p.199-200) McKibben takes issue with the ubiquitous notion that economic growth is the same as economic success and imagines a new type of economy that focuses on the health of local communities.

There are also some socialist critiques of the current market system calling for the inclusion of commons (Dyer-Witheford 2001; McCarthy 2005). Others too see "the elitist economic agenda" (Korten 2004) as antithetical to the good of the commons. Frost and Morner (2005) write about "corporate commons."

G. Global Commons

> *Sustainable use of the planet requires that humankind do nothing that seriously depletes and/or damages both natural capital and ecosystem services. In a less populated world, the need for a sustainability ethic was not as great as now. However, humankind now lives in a crowded world, so that leaving a habitable planet for future generations of humans and those of other species is problematic.* (Cairns 2003)

Figure 8: Global Commons Sector

Global commons are the oldest and most established "new commons". There is a large body of literature on the global commons and the foci are broad—from climate change to international treaties to transboundary conflicts. For instance, a search on "global commons" in the *Comprehensive Bibliography of the Commons* (Hess 2007) results in 4183 hits. I am just going to give a very brief overview of this vast terrain in this paper.

Some of the early works on global commons are those by Christy and Scott (1965) looking at competition for the fisheries of the high seas which "are the common wealth of the world community;" Boot (1974) examining global commons and population and economic inequity; Bromley and Cochrane (1994) discussing global commons policy. Soroos has been researching and writing on the global commons for over thirty years. Oran Young is a leading scholar on global governance and international regimes. Buck (1998) is a respected commons scholar who has written one of the best introductions to the global commons. Other general works surveying global commons are Cleveland (1990); Dasgupta, Maler and Vercelli (1997); Bromley and Cochrane (2004); McGinnis and Ostrom (1996); Young (1999); Baudot (2001); Barkin and Shambaugh (1999); Karlsson (1997); Bernstein (2002); Byrne and Glover (2002); Cairns (2003, 2006); Vogler (2000); and Joyner (2001); Nonini (2006a).

Some of the diverse aspects covered in this sector are:

- Economics of global commons (Dasgupta, Maler, and Vercelli 1997; Dyer-Witheford 2001; Dodds 2005)
- Property rights (Anderson and Grewell 1999; Rose 1999; Powledge 2001; Liang 2003)
- Biodiversity (Mudiwa 2002; Gepts 2004; Berkes 2007)
- Deep-seas (Bräuninger and König 2000)
- Governance of the global commons (Young 1997, 1999; C. Hall 1998; Henderson 1998; Ostrom et al. 1999; Ostrom 2002-2003; Thompson 2000; Congleton 2001; Joyner 1998; McGinnis and Ostrom 1996; Randeria 2003; Sand 2004; Vogler 2005; Folke 2007)

- Climate change (Barkin and Shambaugh 1999; Agarwal, Narain, and Sharma 2002; Tietenberg 2003; Engel and Saleska 2005)

- Antarctica and the Arctic (Zorn 1984; Sandell 1995; Corti 2002; Doubleday 1996; Gudgel 2006)

- Atmosphere (Harrison and Matson 2001; Barnes 2001)

- Global social diversity and interconnectedness (Parks, Keen, Keen and Daloz 1996;

- Hershock 2006)

- Protecting the environment as a global commons (Boda 2003, 2006; Tietenberg 2003; Anderson and Grewell 1999; Warren 2001; Pardo, Echavarren, and Alemán 2003; Dodds 2005; Ringel 2006; Uzawa 2007)

- Sustainability (Cairns 2006; Byrne and Glover 2002)

- Globalization (Norgaard 1995; Baudot 2001; Turner and Brownhill 2002; Cairns 2003; Sumner 2005; von Weizsäcker, Ulrich, Young, and Finger 2005; Depew 2006)

- Outer space (Merges and Reynolds 1997; Scheffran 2005; Joyner 2001)

- Commercial space (Sietzen 2001)

- Global genetic commons ((Rifkin 2002)

- Global inequality (Meyer 1995)

- Knowledge as a global commons (Stigliz 1999, Onsrud, Camara, Campbell, and Chakravarthy 2004)

IV. Challenges of Studying New Commons

There are two main assignments in defining new commons: (1) defining the term "commons." There is no agreement on what this term means, especially from one discipline to the next; and (2) articulating what the "new" in "new commons" is, in order to understand how new commons differ from traditional commons

A. What are *Commons*?

The term "commons" is full of ambiguity and rarely defined. Most traditional commons research has focused on common-pool resources, common property, or the tragedy of the commons. Ostrom's (1990) *Governing the Commons* focuses on common-pool resources—resources that are subtractable and difficult to exclude. Ostrom also emphasizes the importance of distinguishing between common-pool resources and common property. Common property is a formal or informal legal regime that allocates various forms of rights to a group. Schlager and Ostrom illustrate that there can be different types of rights involved in commons property: access, extraction, management, exclusion, and alienation rights. The types of rights are determined not only by the regime but by the nature of the resource. Creative Commons offers a suite of rights authors may choose as copyright agreements. Hess and Ostrom (2006) identify seven types of rights in the digital knowledge commons. Hardin's (1968) "Tragedy of the Commons" conceives of a commons as an unregulated, open-access pasture—quite the opposite of real-life institutional arrangement in shared pastures.

In the new commons literature, the distinction between common-pool resources and common property regimes is rarely discussed. The commons is a more general term, not a specific economic good or type of property regime. Many writers use the term "commons" without defining it at all (such as Rainie and Kalsnes 2001; Kaufman et al. 2006; Theobald 1997).

Traditional commons have some system (formal or informal) of property rights and many are not openly accessible to the public at large. A forest community can own (or use, or manage) a forest that they close off the public. It is their commons. If a company wants to buy the forest to burn it for agricultural land then the threat becomes an issue to a much larger community. The burning of the Amazon is a global commons issue not only because its effect is transboundary but because the health of the earth is the common heritage of humankind.

Consider the following page of definitions of "commons":

To say "the commons" is to evoke a puzzled pause. You mean the government? The common people? That park in Boston? In politics and the media, the concept of the commons might as well not exist. Yet the commons is more basic than both government

and market. It is the vast realm that is the shared heritage of all of us that we typically use without toll or price. The atmosphere and oceans, languages and cultures, the stores of human knowledge and wisdom, the informal support systems of community, the peace and quiet that we crave, the genetic building blocks of life—these are all aspects of the commons. (Rowe 2001)

a social regime for managing shared resources and forging a community of shared values and purpose. Unlike markets, which rely upon price as the sole dimension of value, a commons is organized around a richer blend of human needs—for identity, community, fame, and honor—which are indivisible and inalienable, as well as more 'tangible' rewards." Clippinger and Bollier (2005)

"The commons: There's a part of our world, here and now, that we all get to enjoy without the permission of any." (Lessig 1999)

People must exhibit mutual trust, habits and skills of collaboration, and
public spirit in order to sustain such a common resource against the tendency
of individuals to abuse it. (Levine. 2001 p. 206)

The American Folklife Center's Coal River Folklife Project (1992-99) douments "traditional uses of the mountains in Southern West Virginia's Big Coal River Valley. Functioning as a *de facto* commons, the mountains have supported a way of life that for many generations has entailed hunting, gathering, and subsistence gardening, as well as coal mining and timbering. The online collection includes extensive interviews on native." (Library of Congress) http://memory.loc.gov/ammem/collections/tending/

Commons are public lands that are often used for recreational activities and are generally assumed to be free of soil contamination. However, in old industrial cities, urban commons may have accumulated heavy metal burdens from airborne contamination (Petersen, Jennings, and Ma 2006)

The American commons include tangible assets such as public forests and minerals, intangible wealth such as copyrights and patents, critical infrastructure such as the Internet and government research, and cultural resources such as the broadcast airwaves and public spaces. Bollier *Silent Theft http://www.silenttheft.com/intro.htm*

The commons was where people could share common stories, common experiences, common aspirations, and common problems. In earlier American history, it also a 'the learning center of that day' for civic practices and values...(Friedland and Boyte 2000)

 'who makes the decisions and in whose interests.' And further, 'common is a resource (be it physical, spatial, conceptual) that is managed by the community, for the community. The contentious question then becomes 'who is the community'. The answer invariably depends on the resource in question. (Hepburn 2005)

These authors have no unified definition of the commons but there are some family resemblances in their usage of the term. The understanding that the commons is the "shared heritage of us all" is fundamental to much of the new commons literature.

Even with many neighborhood commons ("that park in Boston") one can often read a commitment to future generations, to communities beyond our local sphere, to working for both the local and the global common good.

The threats of enclosure have roused many to protecting the commons. Along with that comes the understanding that resources that were once safe as public goods not require vigilance and even participatory management in order to safeguard them for the future. For some, the commons is a birthright. Others, recognize the role of personal responsibility in the sustainability of the commons.

Certainly, the definition of the commons varies with the type of resource at hand. When Benkler describes scientists who produce the commons-based peer-production way[14] they are probably not doing so because of the common heritage of humankind. But rather because they benefit from it, there are good incentives, and they are contributing to the global knowledge pool.

Commons is inherently a positive term yet, as Peter Levine points out "a commons is also highly imperfect." People can abuse and neglect their commons. As Petersen, Jennings, and Ma point out above, a polluted parcel of land does not stop being a commons because it's polluted. The literature, however, illustrates that most people approach the commons as a positive resource. The negative behaviors in a commons, such as free riding or noncompliance, are considered "commons problems" or social dilemmas (Ostrom 1990a; Anderson and Simmons 1993).

The term "commons" can be useful for a number of reasons. Unlike a term such as "environment," it conveys more immediately a physical resource-human being connection. With "environment," people often visualize flora and fauna detached from human existence. This is despite that fact that research has repeatedly demonstrated that environmental problems cannot be solved without addressing the people problems – the needs of those who live by, manage, use, or harvest those resources. With the term "commons," on the other hand, one automatically thinks of people. People sharing. People sharing a resource.

Former IASC president, Erling Berge,wrote in 2004:

---

[14]"Production is 'commons-based' when no one uses exclusive rights to organize effort or capture its value, and when cooperation is achieved through social mechanisms other than price signals or managerial directions. Large-scale instances of such cooperation are 'peer production.'" (Benker 2004)

In my view "commons" refers to a basic concept with a strong core speaking to and being understandable for most people, but without clear conceptual boundaries. While most people will be able to point to a commons they readily recognise, any two persons from different institutional contexts may have to discuss at some length to agree on similarities and differences in the classification of their favourite commons. It would seem reasonable to call it a fuzzy concept.

A few years later the International Association for the Study of Common Property (IASCP) did, indeed, change its name to the International Association for the Study of the Commons (IASC). The reasoning was that "commons" is a more inclusive term, encompassing both common-pool resources and well as common property regimes (see Hess and Meinzen-Dick 2006). Increasing numbers of people are interested in a more general sense of commons and with shared resources usually outside of market or government systems. The new commons literature focuses on collective action, voluntary associations, and collaboration. While property rights and the nature of the good may still important, there is a growing emphasis on questions of governance, participatory processes, and trust; and there is a groundswell of interest in shared values and moral responsibility.

To sum up, in the NC literature, some commons are free and sometimes not. They are a birthright and the common heritage of humankind (the atmosphere and the oceans) but they are also local playgrounds or a condominium. They may be rival (roads, health care) or they may be nonrivalrous (public art, knowledge). They may be exhaustive (oil, biodiversity) or replenishable (gardens). They may be replaceable (hospital) or irreplaceable (landscapes). They may be global, local, or somewhere in between. And, commons, like common-pool resources (economic goods), may have any combination of property rights. Using Clippinger and Bollier's (2005) phrase, this new interest certainly looks like a "renaissance of the commons."

My proposed definition of a commons is: *A commons is a resource shared by a group where the resource is vulnerable to enclosure, overuse and social dilemmas. Unlike a public good, it requires management and protection in order to sustain it*.

B. What is "New" in New Commons?

The map also tells us that the "new" in new commons does not necessarily mean newly evolved or created through new technologies. They may be resources that, particularly because of some kind of encroachment or threat of enclosure, have been newly conceptualized as a commons. This is the case with cultural and neighborhood commons.

New commons, in contrast to traditional common-pool resources or common property regimes such as forests, fisheries, irrigation systems, and grazing lands, are often uncharted territories. Successful traditional commons have customary (formal or informal) rules regulating the use and management of the resource. In some cases, local and national governments recognize a local commons rules and laws; in others, it is a constant struggle to be recognized.

Traditional commons have a history. The history is of human-resource interaction. The resource has an ecological history. The user community has a history of demographic change or stability. And the interaction has a history of natural and human events that include adaptation of rules pertaining to the use of that resource.

"New" has meaning in two distinct ways: (1) It is in contrast to traditional (established) commons. Ostrom's design principles (1990) and the characteristics of long-enduring traditional commons do not necessarily apply to new commons. Some are newly created through new technologies. Such is the case with digital commons. (2) "New" is an important adjective, a signal of the recent emergence of the awareness of the commons. "New" evokes a sense of awakening, of reclaiming lost or threatened crucial resources. This is the "new" in many neighborhood commons. However, whether "commons" is just a current buzzword or a lasting social phenomenon will only be known with the passage of time.

The recent identification of all types of resources as commons belies the important need to see solutions beyond the government-private paradigm. It calls for new or renewed processes of participatory self-governance, particularly of local communities. Some of the new commons literature calls for "reclaiming" the commons. In Bollier's important book (2002b) on American commons (public forests, minerals, knowledge, the Internet, broadcast airwaves, and public spaces) he exclaims "we as citizens *own* these

commons (my emphasis)" (Bollier 2002: 2-3). Later on, he writes that "common sense tells us that wildlife, genes, and the atmosphere cannot really be owned…" (ibid: 60). This is the enigma with many types of commons: we "own" what we can't own. One solution to the puzzle is that we own in the sense they are the common heritage of humankind. We are "owners'" in the sense of needing to participate in the protection of them. We don't own them in the sense that no one should own them – i.e. they should not be privatized.

Surveying the wide variety of new commons, there are a number of observations that can be made:

- Collaboration and cooperation are particularly vibrant in the knowledge and neighborhood commons
- Many new commons are on a much larger, often global scale; at the same time there is a growing sense of commons on a local level
- There is often a larger vision of responsibility—"beyond our own back yard." It is the upside of globalization that there is a greater consciousness of geographically remote communities. Even neighborhood commons that may be focused solely on local issues, often have an eye on the impact of present decisions on future generations
- Sustainability is an ubiquitous issue. There is often a vision of effective management for the preservation and sustainability of a resource
- Equity is often an important consideration in new commons
- The concept of "gift economy" is becoming more familiar
- Commons resource users are often aware of their interdependence
- Unlike public goods, the commons is vulnerable to failure through encroachment, privatization, commercialization, congestion, scarcity, degradation.
- Appropriate rules are necessary to govern the resource.

Why are so many people calling upon the commons? We are seeing a growing number of people discovering what individuals working together, developing self-governing skills, can accomplish independently of governments, corporations, or private

owners. Understanding the commons leads to awareness of the need for participation and collective action in order to protect and sustain our valuable shared resources. People need to know that the "tragedy of the commons" is not inevitable; that there are comedies of the commons all around us.

V. Conclusion

My aim with this paper has been to document the work on new commons that I have been tracking for the past fifteen years. This is a rich and challenging new area of research and one that leads to many interesting questions. The new commons map identifies seven main sectors and numerous subsectors. Some new commons are created as the threats of privatization and enclosure change. One of the reasons for the development of new commons is that new ways of caputring a resource can radically change the nature of that resource from a pure public good to a common pool resource, or more generally to a commons where the resource needs to be monitored, protected, and managed by a group in order to sustain it.

New commons can also evolve from institutional changes within traditional commons, such as the case with protected areas. Online collective action and mass collaboration make possible the building of new commons, such as with wikipedias and shared websites as well open source software projects.

This paper also discusses the challenges of defining "commons" as well as "new commons" and suggests a possible definition. It also proposes future areas of research: how people come to understand or recognize that a resource is a commons—that is, the entrypoints into the commons. Many contemporary commons are not just academic areas of study but also movements aimed at changing the way people think and behave. The idea of the commons provides an alternative to the private-public (government) dichotomy. Its focus is on communities working together in self-governing ways in order to protect resources from enclosure or to build new openly-shared resources.

References

Abu-Ghazzeh, Tawfiq. 1998. "Children's Use of the Street as a Playground in Abu-Nuseir, Jordan." *Environment and Behavior* 30(6):799-831.

Adelman, David E. 2005. "A Fallacy of the Commons in Biotech Patent Policy." *Berkeley Technology Law Journal* 20(2):985-1030.

Agarwal, Anil, Sunita Narain, and Anju Sharma. 2002. "The Global Commons and Environmental Justice: Climate Change." Pp. 171-202. In *Environmental Justice: Discourses in International Political Economy.* Byrne, J., L. Glover, and C. Martinez, eds.New Bunswick, NJ: Transaction.

Alatorre, Claudio. 2004. "Inequidad Social y Transporte Urbano: La Saturación de un Recurso de Uso Común." Presented at the Tenth Conference of the International Association for the Study of Common Property, Oaxaca, Mexico, Aug. 9-13, 2004. http://dlc.dlib.indiana.edu/archive/00001525/

Anand, P. B. 2000. "Co-Operation and the Urban Environment: An Exploration." *Journal of Development Studies* 36(5):30-58.

Anderson, Terry L., and J. Bishop Grewell. 1999. "Property Rights Solutions for the Global Commons: Bottom-Up or Bottom-Down?" *Duke Environmental Law and Policy Forum* X(1):73-102.

Anderson, Terry L., and Randy T. Simmons, eds. 1993. *The Political Economy of Customs and Culture: Informal Solutions to the Commons Problem*. Lanham, MD: Rowman & Littlefield.

Anjaria, J. S. 2006. "Street Hawkers and Public Space in Mumbai." *Economic and Political Weekly* 41(21):2140-2146.

Anttila, Sten. 1999. "The Snowmobile Issues as a Commons Dilemma: A Problem of Concept Formation." Östersund, Sweden: Fjällforskningsinstitutet.

Anttila, Sten, and Charlotta Stern. 2005. "The Voluntary Provision of Snowmobile Trails on Private Land in Sweden." *Rationality and Society* 17(4):453-474.

Aoki, Keith. 2003. "Weeds, Seeds & Deeds: Recent Skirmishes in the Seed Wars; a paper for the Traditional Knowledge, Intellectual Property, and Indigenous Culture Symposium." *Cardozo Journal of International and Comparative Law* 11(2):247-331.

Aoki, Keith, James Boyle, and Jennifer Jenkins. 2006. *Bound by Law? Tales from the Public Domain*. Durham, NC: Duke Center for the Study of the Public Domain. http://www.law.duke.edu/cspd/comics/digital.html

Argyres, Nicholas S., and Julia Porter Liebeskind. 1998. "Privatizing the Intellectual Commons: Universities and the Commercialization of Biotechnology." *Journal of Economic Behavior and Organization* 35(4):427-454.

Armstrong, Chris & Heather Ford. 2005. "The African Digital Commons: A Participant's Guide," http://www.commons-sense.org/pages/encyclopedia.htm

Arvanitakis, James. 2006. "Education as a Commons: Or Why We Should all Share in the Picnic of Knowledge." http://www.mercury.org.au/Education%20as%20a%20commons%20-%20James%20Arvanitakis.pdf

Assadourian, Eric. 2003. "Cultivating the Butterfly Effect: The Growing Value of Gardens." *World Watch* 16(1):28-35. http://www.risc.org.uk/readingroom/EP161Dz.pdf

Athanasiou, Tom, and Marcy Darnovsky. 2002. "The Genome as Commons: Through all the Trials and Tribulations of Human History What Binds us in the End is Our Common Humanity." WorldWatch (July/August).

Atkins, Daniel E., John Seely Brown, and Allen L. Hammond. 2007. "A Review of the Open Educational Resources (OER) Movement: Achievements, Challenges, and New Opportunities." (February) Report to The William and Flora Hewlett Foundation. http://hewlett.org/NR/rdonlyres/5D2E3386-3974-4314-8F67-5C2F22EC4F9B/0/AReviewoftheOpenEducationalResourcesOERMovement_BlogLink.pdf

Aufderheide, P. 2002. "Competition and Commons: The Public Interest In and After the AOL-Time Warner Merger." *Journal of Broadcasting and Electronic Media* 46(4):515-531. Preprint: http://arxiv.org/html/cs.CY/0109048

Ayres, Ian and Matthew Funk 2003. "Marketing Privacy." *Yale Journal on Regulation* 20. 77-137.

Baden, John, and Rodney D. Fort. 1980. "The Federal Budget as a Common Pool Resource: The Development of a Predatory Bureaucracy." In Earth Day Reconsidered. Washington, DC: The Heritage Foundation.

Bailey, R., and B. Tierney. 2002. "Information Commons Redux: Concept, Evolution, and Transcending the Tragedy of the Commons." *Journal of Academic Librarianship* 28(5):277-286.

Baquero, F., and J. Campos. 2003. "The Tragedy of the Commons in Antimicrobial Chemotherapy." *Rev Esp Quimioter* Mar. 16(1):11-13.

Barker, J. H. 2003. "Common-Pool Resources and Population Genomics in Iceland, Estonia, and Tonga." Medicine, Health Care and Philosophy 6(2):133-144.

Barkin, J. Samuel, and George E. Shambaugh, eds. 1999. *Anarchy and the Environment: The International Relations of Common Pool Resources*. New York: State University of New York Press.

Barlow, M., and T. Clarke. 2002. "Who Owns Water?: Privatization Must be Stopped, and Water Declared the Common Property of All." *Nation* 275(7):11-15.

Barnes, Peter. 2001. *Who Owns the Sky? Our Common Assets and the Future of Capitalism*. Washington: Island Press.

Barnes, Peter. 2006. *Capitalism 3.0: A Guide to Reclaiming the Commons*. San Francisco: Berrett-Koehler.

Barnett, Jonathan M. 2000. "Cultivating the Genetic Commons: Imperfect Patent Protection and the Network Model of Innovation." The San Diego Law Review 37(4):987-1067.

Baudot, Jacques, ed. 2001. *Building a World Community: Globalisation and the Common Good*. Seattle: University of Washington Press.

Bauwens, Michel. 2005. "The Political Economy of Peer Production." *CTheory* (December) http://www.ctheory.net/articles.aspx?id=499

Beagle, Donald. 1999. "Conceptualizing an Information Commons." *Journal of Academic Librarianship* 25(2):82-89.

Beetstra, Stephen, Daniel Derksen, Marguerite Ro, Wayne Powell, Donald E. Fry, and Arthur Kaufman 2002. "A 'Health Commons' Approach to Oral Health for Low-Income Populations in a Rural State." *American Journal of Public Health* 92(1). http://www.ajph.org/cgi/reprint/92/1/12.pdf

Benedikter, Roland. 2005. "Privatization of Italian Cultural Heritage." In *Limits to Privatization: How to Avoid too Much of a Good Thing*. E. U. von Weizsäcker, O. R. Young, and M. Finger, eds. Sterling, VA: Earthscan.

Benjamin, S. M. 2002. "The Logic of Scarcity: Idle Spectrum as a First Amendment Violation." *Duke Law Journal* 52(1):1-111. http://dlc.dlib.indiana.edu/archive/00002377/

Benjamin, S. M. 2003. "Spectrum Abundance and the Choice between Private and Public Control." *New York University Law Review* 78(6):2007-2102. http://www.law.nyu.edu/journals/lawreview/issues/vol78/no6/NYU602.pdf

Benkler, Yochai. 1998. "Overcoming Agoraphobia: Building the Commons of the Digitally Networked Environment." *Harvard Journal of Law and Technology* 11(2):287-400. http://www.benkler.org/agoraphobia.pdf

Benkler, Yochai. 1999. "Free as the Air to Common Use: First Amendment Constraints on Enclosure of the Public Domain." *New York University Law Review* 74:354-446. http://papers.ssrn.com/sol3/papers.cfm?abstract_id=168609

Benkler, Yochai. 2002a. "Coase's Penguin, or, Linux and The Nature of the Firm." Yale Law Review 112 (December) 369. http://www.benkler.org/CoasesPenguin.html

Benkler, Yochai. 2002b. "Some Economics of Wireless Communications." *Harvard Journal of Law and Technology* 16(1):25-83.

Benkler, Yochai. 2003a. "Freedom in the Commons: Towards a Political Economy of Information." *Duke Law Journal* 52(6):1245-1276. http://www.law.duke.edu/shell/cite.pl?52+Duke+L.+J.+1245

Benkler, Yochai. 2003b. "The Political Economy of Commons." *Upgrade: The European Journal for the Informatics Professional* 4(3):6-9. http://www.benkler.org/Upgrade-Novatica%20Commons.pdf

Benkler, Yochai. 2004. "Commons-Based Strategies and the Problems of Patents." *Science* 305(5687):1110-1111.

Benkler, Yochai, and Helen Nissenbaum. 2006. "Commons-based Peer Production and Virtue." The Journal of Political Philosophy 14(4):394-419. http://www.nyu.edu/projects/nissenbaum/papers/jopp_235.pdf

Benson, Bruce L. 1994. "Are Public Goods Really Common Pools: Considerations of the Evolution of Policing and Highways in England." Economic Inquiry 32:249-271.

Berge, Erling. 2003. "Commons: Old and New: On Environmental Goods and Services in the Theory of Commons." In *Commons: Old and New*. E. Berge and L. Carlsson, eds. Trondheim, Norway: Norwegian University of Science and Technology. (ISS Rapport, no. 70). http://dlc.dlib.indiana.edu/documents/dir0/00/00/12/30/index.html

Berge, Erling. 2006. "Protected Areas and Traditional Commons: Values and Institutions." *Norsk Geografisk Tidsskrift* 60(1):65-76.

Berkes, Fikret. 2007. "Community-Based Conservation in a Globalized World." *PNAS: Proceedings of the National Academy of Sciences* 104, 39: 15188-15193

Berkowitz, Daniel & Wei Li. 2000. Tax Rights in Transition Economies: A Tragedy of the Commons? 76 *Journal of Public Economy*. 369, 370–71.

Bernstein, Johannah. 2002. "The Global Commons: Key Concepts and Institutions." In *Our Future With(Out) Water? The Sustainable Management of Common Pool Resources*. LEAD International, ed. London: Leadership for Environment and Development (LEAD) International.

Berry, David M. and Giles Moss. 2006. "The Politics of the Libre Commons." *First Monday*,11, 9 (September). http://firstmonday.org/issues/issue11_9/berry/index.html

Bird, Edward J., and Gert G. Wagner. 1997. "Sport as a Common Property Resource: A Solution to the Dilemmas of Doping." The Journal of Conflict Resolution 41(6):749-766.

Bisesi, Michael.2005. "Review of *Conversations on Philanthropy: An Interdisciplinary Series of Reflections and Research; Volume 1: Conceptual Foundations*; Edited by Lenore T. Ealy*." The International Journal of Not-for-Profit Law* 7(3). http://www.icnl.org/knowledge/ijnl/vol7iss3/rev_1.htm

Blackmar, Elizabeth. 2006. "Appropriating "the Commons": The Tragedy of Property Rights Discourse." In *The Politics of Public Space*. S. Low and N. Smith, eds. New York: Taylor & Francis.

Blackstone, Erwin A., Andrew J. Buck, Simon Hakim, and Uriel Spiegel. 2007. "The Disturbance Model and Congestion in Emergency Response." *Manchester School* 75(1):104-121.

Boal, Iain A. 1998. "The Campus and the Commons." *Common Property Resource Digest* 46:1-
4. http://www.iascp.org/E-CPR/cpr46.pdf

Boda, Zsolt. 2003. "Global Environmental Commons and the Need for Ethics." *Society and
Economy* 25(2):213-224.

Boda, Zsolt. 2006. "Respecting the Commons." In *Business within Limits: Deep Ecology and
Buddhist Economics*. New York: Peter Lang.

Bollier, David. 2001. *Public Assets, Private Profits Reclaiming the American Commons in an Age
of Market Enclosure*. Washington, DC: New America Foundation.
http://www.bollier.org/pdf/PA_Report.pdf

Bollier, David. 2002a. "The Enclosure of the Academic Commons." *Academe* 88(5).
http://www.aaup.org/publications/Academe/2002/02so/02sobol.htm

Bollier, David. 2002b. *Silent Theft: The Private Plunder of our Common Wealth*. New York:
Routledge.

Bollier, David. 2004a. "Who Owns the Sky? Reviving the Commons." *In These Times*. (Feb. 27)
http://www.inthesetimes.com/comments.php?id=631_0_1_0_C

Bollier, David. 2004b. "Why We Must Talk About the Information Commons." *Law Library
Journal* 96(2):267-282.
http://www.newamerica.net/publications/policy/why_we_must_talk_about_the_informati
on_commons

Bollier, David. 2007. "The Growth of the Commons Paradigm." In *Understanding Knowledge as
a Commons: From Theory to Practice*. C. Hess and E. Ostrom, eds. Cambridge,
Massachusetts: MIT Press.

Bollier, David, and Laurie Racine. 2005. "Ready to Share: Creativity in Fashion and Digital
Culture." The Norman Lear Center, USC Annenberg.
http://www.learcenter.org/pdf/RTSBollierRacine.pdf

Bollier, David, and Jonathan Rowe. 2006. "The Commons Rising." Tamales Bay Institute, Point
Reyes Station, CA. http://community-wealth.org/_pdfs/articles-
publications/commons/report-bollier-rowe.pdf

Boot, John C. G. 1974. *Common Globe or Global Commons; Population Regulation and Income
Distribution.* New York, M. Dekker.

Bowden, N., and M. deJong. 2006. "Privatisation of Seaport Infrastructures: A Framework for
Understanding the Transfer of Property Rights." *International Journal of Critical
Infrastructures* 2(2/3):294-317.

Bowers, Chet A. 2006a. *Renewing the Commons: University Reform in an Era of Weakened
Democracy and Environmental Crisis*. Ecojustice Press.
http://dlc.dlib.indiana.edu/archive/00001799/

Bowers, Chet A. 2006b. *Transforming Environmental Education: Making the Cultural and Environmental Commons the Focus of Educational Reform*. Ecojustice Press. http://dlc.dlib.indiana.edu/archive/00001798/

Boyle, James. 1992. "A Theory of Law and Information: Copyright, Spleens, Blackmail, and Insider Trading." *California Law Review* 80:1413-1540. http://www.law.duke.edu/boylesite/law&info.htm

Boyle, James. 1996. *Shamans, Software, and Spleens: Law and the Construction of the Information Society*. Cambridge, MA: Harvard University Press.

Boyle, James. 2002. "Fencing Off Ideas: Enclosure and the Disappearance of the Public Domain." *Daedalus* 131(2):13-25. http://james-boyle.com/daedalus.pdf

Boyle, James. 2003a. "Enclosing the Genome: What Squabbles over Genetic Patents Could Teach Us." *Advances in Genetics* 50:97-122. http://www.law.duke.edu/boylesite/low/genome.pdf

Boyle, James. 2003b. "The Second Enclosure Movement and the Construction of the Public Domain." *Law and Contemporary Problems*, vol. 66, nos. 1 & 2. http://www.law.duke.edu/pd/papers/boyle.pdf

Boyle, James. 2004. "A Natural Experiment: Do We Want 'Faith-based' IP Policy?" *Financial Times* Online (November 22) http://www.law.duke.edu/boylesite/experiment.html

Brand, Ruth. 2005. "The Basmati Patent." In *Limits to Privatization: How to Avoid too Much of a Good Thing*. Ernst Ulrich von Weizsäcker, Oran R. Young, and Matthias Finger, eds. Sterling, VA: Earthscan.

Branscomb, Anne W. 1994. *Who Owns Information?: From Privacy to Public Access*. New York: Basic Books.

Bräuninger, Thomas, and Thomas König. 2000. "Making Rules for Governing Global Commons: The Case of Deep-Sea Mining." *The Journal of Conflict Resolution* 44(5):604-629. http://www.uni-konstanz.de/struktur/zwn/pub/br_rules.pdf

Brennan, Timothy J. 1998. "The Spectrum as Commons: Tomorrow's Vision, Not Today's Prescription." *The Journal of Law and Economics* XLI(2):791-803.

Briassoulis, Helen. 2002. "Sustainable Tourism and the Question of the Commons." *Annals of Tourism Research* 29(4):1065-1085.

Brin, David. 1995. "The Internet as a Commons." *Information Technology and Libraries* 14(4):240-242.

Brito, Jerry. 2007. "The Spectrum Commons in Theory and Practice." *Stanford Technology Law Review* (February): 1-93, http://stlr.stanford.edu/pdf/brito-commons.pdf

Bromley, Daniel W., and Jeffrey A. Cochrane. 1994. "Understanding the Global Commons." EPAT/MUCIA Research & Training, University of Wisconsin, Madison, WI. (Working Paper, no. 13). http://aae.wisc.edu/pubs/misc/docs/em13.pdf

Brook, D. 2001. "The Ongoing Tragedy of the Commons." *Social Science Journal* 38(4):611-616.

Brown, James Robert. 2000. "Privatizing the University: The New Tragedy of the Commons." *Science* 290:1701-1702.

Brown, Katrina Myrvang. 2003. "New Challenges for Old Commons: the implications of rural change for crofting common grazings." In *Commons: Old and New*. E. Berge and L. Carlsson, eds. Trondheim, Norway: Norwegian University of Science and Technology. (ISS Rapport, no. 70). http://dlc.dlib.indiana.edu/documents/dir0/00/00/12/30/index.html

Brown, Michael F. 2003. *Who Owns Native Culture?* Cambridge, MA: Harvard University Press.

Brubaker, Earl R. 1997. "The Tragedy of the Public Budgetary Commons." *Independent Review* 1(3):353-371.

Buck, Stuart. 2002. "Replacing Spectrum Auctions with a Spectrum Commons." *Stanford Technology Law Journal* 2. http://stlr.stanford.edu/STLR/Articles/02_STLR_2

Buck, Susan J. 1998. *The Global Commons: An Introduction*. Covelo, CA: Island Press.

Burger, Joanna. 2001. "Multiuse Coastal Commons: Personal Watercraft, Conflicts, and Resolutions." In *Protecting the Commons: A Framework for Resource Management in the Americas.* J. Burger et al., eds. Washington, DC: Island.

Byrne, John, and Leigh Glover. 2002. "A Common Future or Towards a Future Commons: Globalization and Sustainable Development Since UNCED." *International Review for Environmental Strategies* 3(1):5-25.

Cahir, John. 2004. "The Withering Away of Property Rights." *Oxford Journal of Legal Studies* 24(4):619-641.

Cairns, John. 2003. "The Unmanaged Commons: A Major Challenge for Sustainability Ethics." *The Social Contract,* 136-145.

Cairns, John. 2006. *"*Sustainability and the Global Commons." *Asian Journal of Experimental. Sciences.* 20, 2: 217-224.

Campbell, James. 2005. "Reactions to the Enclosure of the Information Commons: 2000-2004." *Bulletin of the American Society for Information Science and Technology* 32(1):11-15. http://www.asis.org/Bulletin/Oct-05/campbell.html

Carlsson, B. 2001. "The Tragedy of the Commons: Arms Race within Peer-to-Peer Tools." *Lecture Notes in Computer Science* 2203:119-133.

Caruthers, Claudia. 1998. "International Cultural Property: Another Tragedy of the Commons." *Pacific Rim Law & Policy Journal 7*: 143-169.

Cassel, Christine, and Troyen E. Brennan. 2007. "Managing Medical Resources: Return to the Commons?" *Journal of the American Medical Association* 297, 22: 2518-2521

Chan, Leslie, and Sely Costa. 2005. "Participation in the Global Knowledge Commons: Challenges and Opportunities for Research Dissemination in Developing Countries." *New Library World* 106(3/4):141-163. http://eprints.rclis.org/archive/00002611/

Chandrakanth, M. G., A. Ravishankar, Rangesh Parmesh, and M. S. Suneetha. 2002. "Medicinal Plants Revisited: An Institutional Inquiry in the Common Property Resource Regime." In *Institutionalizing Common Pool Resources*. D. K. Marothia, ed. New Delhi: Concept.

Chen, Wenhong and Barry Wellman. 2004."Charting Digital Divides: Comparing Socioeconomic, Gender, Life Stage, and Rural-Urban Internet Access and Use in Five Countries in *Transforming Enterprise*, ed. by Dutton, W., B, Kahin, R. O'Callaghan, and A. Wyckoff, Cambridge MA: MIT Press, 2004. http://www.chass.utoronto.ca/~wellman/publications/

Choe, Jaesong. 1993. "The Organization of Urban Common-Property Institutions: The Case of Apartment Communities in Seoul." (Ph.D. Dissertation, Indiana University, 1993).

Christy, Francis T. and Anthony Scott. 1965. *The Common Wealth in Ocean Fisheries: Some Problems of Growth and Economic Allocation*. Baltimore: Johns Hopkins Press.

Ciffolilli, Andrea. 2004. "The Economics of Open Source Hijacking and the Declining Quality of Digital Information Resources: A Case for Copyleft." *First Monday* 9(9). http://www.firstmonday.org/issues/issue9_9/ciffolilli/index.html

Clancy, Erin A. 1998. "The Tragedy of the Global Commons." *Indiana Journal of Global Legal Studies* 5:601-620.

Clapp, Tara Lynne, and Peter B. Meyer. 2000. "Brownfields and the Urban Commons: Common Property Frameworks in Urban Environmental Quality. Center for Environmental Policy and Management, Kentucky Institute for Enviironment and Sustainable Development, University of Louisville. Working Paper, 2000. http://cepm.louisville.edu/Pubs_WPapers/PDF_Docs/commons.pdf

Clarke, Roger. 2007 "Business Models to Support Content Commons." SCRIPT-ed Special Issue on 'Creating Commons' 4,1 (2007) 59-71 http://www.law.ed.ac.uk/ahrc/script-ed/vol4-1/clarke.asp

Clerc, Susan J. 2002. "Who Owns Our Culture? The Battle Over the Internet, Copyright, Media Fandom, and Everyday Uses of the Cultural Commons." Ph.D. Dissertation, Bowling Green State University, 2002.

Cleveland, Harlan.1990. *The Global Commons: Policy for the Planet.* Lanham, MD: University Press of America.

Clippinger, John, and David Bollier. 2005. "A Renaissance of the Commons: How the New Sciences and Internet are Framing a New Global Identity and Order." *In CODE: Collaborative Ownership and the Digital Economy.* R. A. Ghosh, ed. Cambridge, MA: Massachusetts Institute of Technology. http://cyber.law.harvard.edu/people/RenaissCommon12.07.03.pdf

Cohen, Julie. 2000. "Call It the Digital Millennium *Censorship* Act: Unfair Use." *The New Republic Online*:265-293. http://www.tnr.com/cyberspace/cohen052300.html

Cohen, Julie E. 2006. "Copyright, Commodification, and Culture: Locating the Public Domain." In *The Future of the Public Domain*. L. Guibault and P. B. Hugenholtz, eds. http://www.law.georgetown.edu/faculty/jec/locatingPD.pdf

Congleton, Roger. 2001. "Governing the Global Environmental Commons: The Political Economy of international Environmental Treaties and Institutions." In *International Environmental Economics: A Survey of the Issues*. G. G. Schulze and H. W. Ursprung, eds. New York: Oxford University Press.

Cook-Deegan, Robert. 2007. "The Science Commons in Health Research: Structure, Function, and Value." *The Journal of Technology Transfer* 32(3):133-156.

Cook-Deegan, Robert, and Tom Dedeurwaerdere. 2006. "The Science Commons in Life Science Research: Structure, Function, and Value of Access to Genetic Diversity." *International Social Science Journal* 58 (2): 299 (June). Preprint: http://www.spatial.maine.edu/icfs/Life%20Sciences%20.pdf

Coombe, Rosemary J., and Andrew Herman. 2004. "Rhetorical Virtues: Property, Speech, and the Commons on the World-Wide Web." *Anthropological Quarterly* 77(3):559-574.

Cooper, Davina. 2006. "'Sometimes a Community and Sometimes a Battlefield': from the Comedic Public Sphere to the Commons of Speakers' Corner." *Environment and Planning D: Society and Space* 24(5):753-775.

Cooper, Mark. 2006. "Access to the Knowledge Commons in the Digital Age." *Consumer Policy Review* 16(3):105-116.

Corti, Gianfranco. 2002. "All Commons are Local: The Antarctic Treaty System as a Regional Model for Effective Environmental Management." In *Transboundary Environmental Negotiation: New Approaches to Global Cooperation*. L. Susskind, W. Moomaw, and K. Gallagher, eds. San Francisco, CA: Jossey-Bass.

Coughlin, Joseph F. 1994. "The Tragedy of the Concrete Commons: Defining Traffic Congestion as a Public Problem." In *The Politics of Problem Definition: Shaping the Policy Agenda*. D. A. Rochefort and R. W. Bobb, eds. Lawrence, KS: University Press of Kansas

Cox, James C., and J. Todd Swarthout. 2007. "EconPort: Creating and Maintaining a Knowledge Commons." In *Understanding Knowledge as a Commons: From Theory to Practice*. C. Hess and E. Ostrom, eds. Cambridge, Massachusetts: MIT Press. http://excen.gsu.edu/workingpapers/GSU_EXCEN_working_paper_2006-06.pdf

Crosby, Barbara C. 1999. *Leadership in the Global Commons: Building Transnational Citizenship*. Thousand Oaks, CA: Sage.

Dalrymple, Dana. 2003. "Scientific Knowledge as a Global Public Good: Contributions to Innovation and the Economy." In *The Role of Scientific and Technical Data and Information in the Public Domain: Proceedings of a Symposium*. J. M. Esanu and P. F.

Uhlir, eds. Washington, DC: National Academies Press.
http://www.nap.edu/openbook/030908850X/html/35.html#pagetop

Daly, Herman, and John B. Cobb. 1989. *For the Common Good: Redirecting the Economy toward Community, the Environment, and a Sustainable Future*. Boston: Beacon Press.

Daniels, Brigham. 2007. "Emerging Commons and Tragic Institutions." *Environmental Law* 37:515-571.

Darch, Colin. 2001. "'The Best Ideas are Common Property': Copyright and Contract Law in a Changing Information Environment." *Innovation* 23:1-12.

Dasgupta, Partha, Karl-Goran Maler, and Alessandro Vercelli, eds. 1997. *The Economics of Transnational Commons*. New York: Clarendon Press.

David, Paul A. 2000. "The Digital Technology Boomerang: New Intellectual Property Rights Threaten Global 'Open Science'." Department of Economics, Stanford University, Stanford, CA. http://www-econ.stanford.edu/faculty/workp/swp00016.pdf

David, Paul A. 2001. "A Tragedy of the Public Knowledge 'Commons'? Global Science, Intellectual Property and the Digital Technology Boomerang." MERIT-Infonomics Research Memorandum Series 2001-003. http://edata.ub.unimaas.nl/www-edocs/loader/file.asp?id=208

David, Paul A. 2004. "Can 'Open Science' Be Protected from the Evolving Regime of IPR Protections?" *Journal of Institutional and Theoretical Economics* 160(1):9-34. http://siepr.stanford.edu/papers/pdf/02-42.pdf

Dawyndt, Peter, Tom Dedeurwaerdere, and Jean Swings. 2006. "Contributions of Bioinformatics and Intellectual Property Rights in Sharing Biological Information."*International Social Science Journal* 188 249-258.

Dedeurwaerdere, Tom. 2005. "Institutional Economics of Sharing Biological Information." *Les Carnets du Centre de Philosophie du Droit* 116:1-24.

Delehanty, Randolph Stephen. 1992. "San Francisco Parks and Playgrounds, 1839 to 1990: The History of a Public Good in One North American City (Volumes I and II)." Ph.D. Dissertation, Harvard University, 1992.

Depew, Brian. 2006. "Sustainability and the Civil Commons: Rural Communities in the Age of Globalization." *Rural Sociology* 71(3):540-543.

Dodds, Walter K. 2005. "The Commons, Game Theory, and Aspects of Human Nature that May Allow Conservation of Global Resources." *Environmental Values* 14(4):411-425.

Dorman, David. 2002. "Open Source Software and the Intellectual Commons." *American Libraries* 33(11):51-55.

d'Oronzio J. C. 1994. "What is the Good of Health Care System Reform?" *New Jersey Medicine* 91(7):451-455.

Doubleday, Nancy. 1996. "Commons Concerns in Search of Uncommon Solutions: Arctic Contaminants, Catalyst of Change." *Science of the Total Environment (Amsterdam)* 186(1-2):169-179.

Drache, Daniel, and Marc Froese. 2006. "Globalisation, World Trade and the Cultural Commons: Identity, Citizenship and Pluralism." *New Political Economy* 11(3):361-382.

Duncan, James M. 1998. "The Information Commons: A Model for (Physical) Digital Resources Centers." *Bulletin of the Medical Library Association* 86(4):576-582.

Dyer-Witheford, N. 2001. "Nintendo Capitalism: Enclosures and Insurgencies, Virtual and Terrestrial." *Canadian Journal of Development Studies* 22(SI):965-996.

Dyson, Freeman J. 1999. *The Sun, the Genome, and the Internet: Tools of Scientific Revolutions*. New York: Oxford University Press.

Eisenberg, Rebecca S., and Richard R. Nelson. 2002. "Public vs. Proprietary Science: A Fruitful Tension?" *Daedalus* 131(2):89-101.

Elliott, Mark Alan. 2007. Stigmergic Collaboration: A Theoretical Framework for Mass Collaboration. Ph.D. Dissertation, Centre for Ideas, Victorian College of the Arts, University of Melbourne. http://dlc.dlib.indiana.edu/archive/00002651/

Elliott, Roger. 2005. "Who Owns the Scientific Data? The Impact of Intellectual Property Rights on the Scientific Publication Chain." *Learned Publishing* 18(2):91-94.

Engel, Kirsten H., and Scott R. Saleska. 2005. "Subglobal Regulation of the Global Commons: The Case of Climate Change." *Ecology Law Quarterly* 32:183.

Epstein, Richard A. 2002. "The Allocation of the Commons: Parking on Public Roads." *Journal of Legal Studies* 31(2):S515-S544.

Evans, D. S. 2002. "Who Owns Ideas? Copy Fights Provides a Provocative and Balanced Introduction to the Brewing Global Battle over Intellectual Property Rights." *Foreign Affairs* 81(6):160-166.

Evans, Peter. 2005. "The New Commons vs. the Second Enclosure Movement: Comments on an Emerging Agenda for Development Research." *Studies in Comparative International Development* 40(2):85-94. http://socrates.berkeley.edu/~tboas/evans.pdf

Falcon, W. P., and C. Fowler 2002. "Carving Up the Commons: Emergence of a New International Regime for Germplasm Development and Transfer." *Food Policy* 27(3):197-222.

Faye, David J. 2004. "Biorespecting, Genetic Patenting and Indigenous Populations: Challenges Under a Restructured Information Commons." *Journal of World Intellectual Property* 7(3):401-428.

Felsenstein, Lee. 1993. "The Commons of Information." *Dr. Dobbs' Journal*. http://opencollector.org/history/homebrew/commons.html

Fennell, Lee Anne. 2004. "Common Interest Tragedies." *Northwestern University Law Review* 907(98).

Folke, Carl. 2007. "Social-Ecological Systems and Adaptive Governance of the Commons." *Ecological Research* 22(1):14-15

Foster, Kevin R. and Hajo Grundmann. 2006 "Do We Need to Put Society First? The Potential for Tragedy in Antimicrobial Resistance." *PLoS Med*. (February) 3(2): e29.

Foster, Sheila R. 2006. "The City as an Ecological Space: Social Capital and Urban Land Use." *Notre Dame Law Review* 82(2):527-582.

Fox, Eleanor M. 2005. "Can Antitrust Policy Protect the Global Commons from the Excesses of IPRs?" In *International Public Goods and Transfer of Technology under a Globalized Intellectual Property Regime*. K. E. Maskus and J. H. Reichman, eds. New York, NY: Cambridge University Press.

French, Susan F., and Wayne S. Hyatt. 1997. *Community Association Law: Cases and Materials on Common Interest Communities*. Durham, NC: Carolina Academic Press.

Friedland, Lew, and Harry Boyte. 2000. "The New Information Commons: Community Information Partnerships and Civic Change." Center for Democracy and Citizenship, Minneapolis, MN.
http://www.publicwork.org/pdf/workingpapers/New%20information%20commons.pdf

Frischmann, Brett M. 2005a. "An Economic Theory of Infrastructure and Commons Management." *Minnesota Law Review* 89(4):917-1030.
http://law.bepress.com/cgi/viewcontent.cgi?article=2998&context=expresso

Frischmann, Brett M. 2005b. "Infrastructure Commons." *Michigan State Law Review* 89(4):121-136. http://www.msu.edu/~michstlr/Symposium_2005/Frischmann.pdf

Frischmann, Brett M. 2007. Infrastructure Commons in Economic Perspective." *First Monday* 12,6(June). http://firstmonday.org/issues/issue12_6/frischmann/index.html

Frost, Jetta, and Michele Morner 2005. "Corporate Commons: Sustaining Competitiveness through Public Goods in Multidivisional Firms." *International Journal of Learning and Change* 1(1):28-45.

Gadgil, Madhav. 2002. "Recognizing and Rewarding Common Pool Knowledge Resources." In *Institutionalizing Common Pool Resources*. D. K. Marothia, ed. New Delhi: Concept.

Gastil, John and Peter Levine, eds. 2005. *Deliberative Democracy Handbook.* San Francisco: Jossey-Bass.

Geist, Michael 2007. "Open Access: Reshaping Rules of Research." *The Star* (Feb. 26).
http://www.thestar.com/article/185609

Gepts, Paul. 2004. "Who Owns Biodiversity, and How Should the Owners Be Compensated?" *Plant Physiology* 134(4):1295-1307.

Ghate, Rucha. 2000. "Joint Forest Management: Constituting New Commons." Presented at the Eighth Conference of the International Association for the Study of Common Property, Bloomington, Indiana, USA, May 31-June 4, 2000. http://dlc.dlib.indiana.edu/archive/00000264/00/ghater041500.pdf

Ghosh, Shubha. 2007a. "The Fable of the Commons: Exclusivity and the Construction of Intellectual Property Markets." *University of California Davis Law Review* 40(3):855-890. http://lawreview.law.ucdavis.edu/articles/Vol40/Issue3/DavisVol40No3_Ghosh.pdf

Ghosh, Shubha. 2007b. "How to Build a Commons: Is Intellectual Property Constrictive, Facilitating, or Irrelevant?" In *Understanding Knowledge as a Commons: From Theory to Practice*. C. Hess and E. Ostrom, eds. Cambridge, Massachusetts: MIT Press.

Gochfeld, Michael, Joanna Burger, and Bernard D. Goldstein. 2001. "Medical Care as a Commons." In *Protecting the Commons: A Framework for Resource Management in the Americas*. J. Burger et al., eds. Washington, DC: Island Press.

Golich, Vicki L. 1991. "A Multilateral Negotiations Challenge: International Management of the Communications Commons." *Journal of Applied Behavioral Science* 27(2):228-250.

Greco, Gian Maria, and Luciano Floridi. 2004. "The Tragedy of the Digital Commons." *Ethics and Information Technology* 6(2):73-81.

Gudgel, John E. 2006. "E-Governance in Antarctica: Internet Technology's Role in Administering a Global Commons." *IEEE Internet Computing* 10(6):64-68. http://csdl.computer.org/dl/mags/ic/2006/06/w6064.pdf

Guibault, Lucie, and, P. Bernt Hugenholtz, eds. 2006. *The Future of the Public Domain: Identifying the Commons in Information Law*, Kluwer Law International

Gupta, Alok et al. 1997. "Streamlining the Digital Economy: How to Avert a Tragedy of the Commons." *IEEE Internet Computing* 1(6):38-46.

Gutscher, Heinz, Carmen Keller, and Hans-Joachim Mosler. 2000. "Roads as New Common Pool Resources, Speed Reduction as a Public Good—Two Case Studies in Organizing Large-Scale Collective Action." Presented at the Eighth Conference of the International Association for the Study of Common Property, Bloomington, Indiana, USA, May 31-June 4, 2000. http://dlc.dlib.indiana.edu/documents/dir0/00/00/02/68/index.html

Haas, Alexander K. 2001. "Intellectual Property B. Patent 3. Patentability b) Genome Data: The Wellcome Trust's Disclosures of Gene Sequence Data into the Public Domain & the Potential for Proprietary Rights in the Human Genome." *Berkeley Technology Law Journal* 16:145.

Halbert, Debora. 2003a. "The Open Source Alternative: Shrink-Wrap, Open Source and Copyright." *E Law* 10(4). http://www.murdoch.edu.au/elaw/issues/v10n4/halbert104.html

Halbert, Debora. 2003b. "Theorizing the Public Domain: Copyright and the Development of a Cultural Commons." *Studies in Law, Politics, and Society* 29(1):3-36.

Hall, Bronwyn H. 2001. "University-Industry Research Partnerships and Intellectual Property." Presented at the NSF-CISTP Workshop, Washington, DC, October 2001. http://emlab.berkeley.edu/users/bhhall/papers/BHH%20IP-Univ-Ind.pdf

Hall, Charles. 1998. "Institutional Solutions for Governing the Global Commons: Design Factors and Effectiveness." *Journal of Environment and Development* 7(2):86-137.

Haplin, P. N., et al. 2006. "OBIS-SEAMAP: Developing a Biogeographic Research Data Commons for the Ecological Studies of Marine Mammals, Seabirds, and Sea Turtles." *Marine Ecology-Progress Series* 316:239-246. http://www.int-res.com/articles/meps_oa/m316p239.pdf

Hardin, Garrett. 1968. "The Tragedy of the Commons." *Science* 162:1243-1248. http://www.garretthardinsociety.org/articles/art_tragedy_of_the_commons.html

Harrison, John, and Pamela Matson. 2001. "The Atmospheric Commons." In *Protecting the Commons: A Framework for Resource Management in the Americas*. J. Burger et al., eds. Washington, DC: Island. http://eprints.ecs.soton.ac.uk/13309/

Hart, John. 2003. "Sustaining a Sacramental Commons." *Dialog: A Journal of Theology* 42(3):235-241.

Hart, John, Thomas Berry, and Leonardo Boff. 2006. *Sacramental Commons: Christian Ecological Ethics*. Rowman & Littlefield (Nature's Meaning).

Hawkins, Brett W., Stephen L. Percy, and Steven R. Montreal. 1997. "Residential Community Associations and the American Intergovernmental System." *Publius* 27(3):61-74. http://publius.oxfordjournals.org/cgi/reprint/27/3/61.pdf

Headington, Lisa. 2003. "The Other Tragedy of the Commons: Redevelopment of Denver's South Platte River and the Homeless." Ph.D. Dissertation, University of Colorado.

Healy, Robert G. 1995. "The 'Common Pool' Problem in Tourism Landscapes." *Annals of Tourism Research* 21(3):596-611.

Helfer, Laurence R. 2005. "Using Intellectual Property Rights to Preserve the Global Genetic Commons: The International Treaty on Plant Genetic Resources for Food and Agriculture." In *International Public Goods and Transfer of Technology under a Globalized Intellectual Property Regime*. K. E. Maskus and J. H. Reichman New York, NY: Cambridge University Press. Preprint http://www-old.law.vanderbilt.edu/faculty/pubs/helfler-using%20intellectual%20property%20rights.pdf

Heller, Michael A. 1998. "The Tragedy of the Anticommons: Property in the Transition from Marx to Markets." *Harvard Law Review* 111(3):622-688. http://www.wdi.umich.edu/files/Publications/WorkingPapers/wp40.pdf

Heller, Michael A., and Rebecca S. Eisenberg 1998. "Can Patents Deter Innovation? The Anticommons in Biomedical Research." *Science* 280(5364):698-701. http://papers.ssrn.com/sol3/papers.cfm?abstract_id=121288

Hellstrom, Tomas. 2003. "Governing the Virtual Academic Commons." *Research Policy* 32(3):391-401.

Henderson, Hazel. 1995. "New Markets, and New Commons: Opportunities in the Global Casino." *Futures* 27(2):112-124.

Henderson, Hazel. 1998. "Defending the Global Commons :Having Fun Supporting the United Nations." *Whole Earth* (Fall) http://www.wholeearthmag.com/ArticleBin/176.html

Hepburn, Gary. 2004. "Seeking an Educational Commons: The Promise of Open Source Development Models." *First Monday: Peer-Reviewed Journal on the Internet* 9(8). http://www.firstmonday.org/issues/issue9_8/hepburn/index.html

Hershock, Peter D. 2006. "Diversity as Commons: International Relations beyond Competition and Cooperation." In *Buddhism in the Public Sphere: Reorienting Global Interdependence*. By P.D. Hershok. NY: Routledge.

Hess, Charlotte. 1995. "The Virtual CPR: The Internet as a Local and Global Common Pool Resource." Presented at "Reinventing the Commons," the fifth annual conference of the International Association for the Study of Common Property, May 24-28, 1995, Bodoe, Norway. http://dlc.dlib.indiana.edu/archive/00002236/

Hess, Charlotte. 1998. "Capturing the Campus Commons." *Common Property Resource Digest* 46:9-11. http://www.indiana.edu/~iascp/boal.htm

Hess, Charlotte. 2000. "Is There Anything New Under the Sun? A Discussion and Survey of Studies on New Commons and the Internet." Presented at the Eighth Conference of the International Association for the Study of Common Property, Bloomington, Indiana, USA, May 31-June 4, 2000. http://dlc.dlib.indiana.edu/documents/dir0/00/00/05/12/index.html

Hess, Charlotte. 2007. *The Comprehensive Bibliography of the Commons.* The Digital Library of the Commons. http://dlc.dlib.indiana.edu/cpr/index.php

Hess, Charlotte, and Ruth Meinzen-Dick. 2006. "The Name Change; or, What Happened to the 'P'?" *The Commons Digest* 2:1-4. http://www.iascp.org/E-CPR/cd02.pdf

Hess, Charlotte, and Elinor Ostrom. 2003. "Ideas, Artifacts, and Facilities: Information as a Common-Pool Resource." *Law and Contemporary Problems* 66(1-2):111-146. http://www.law.duke.edu/journals/66LCPHess

Hess, Charlotte, and Elinor Ostrom. 2006. "A Framework for Analysing the Microbiological Commons." *International Social Science Journal* 58(188):335-349.

Hess, Charlotte, and Elinor Ostrom. 2007a. "An Overview of the Knowledge Commons." In *Understanding Knowledge as a Commons: From Theory to Practice*. C. Hess and E. Ostrom, eds. Cambridge, MA: MIT Press. http://mitpress.mit.edu/books/chapters/0262083574intro1.pdf

Hess, Charlotte, and Elinor Ostrom, eds. 2007b. *Understanding Knowledge as a Commons: From Theory to Practice*. Cambridge, MA: MIT Press.

Hiatt, H.H. 1975. "Protecting the Medical Commons: Who is Responsible?" *New England Journal of Medicine* 293(July 31):235-241.
http://content.nejm.org/cgi/content/abstract/293/5/235

Hiatt, H. H. 1985. "Will Disease Prevention Spare the Medical Commons." *Ciba Foundation Symposium* 110:218-235.

Hill, Peter J., and Roger E. Mieners, eds. 1998. *Who Owns the Environment?* Lanham, MD: Rowman & Littlefield.

Hill, Teresa. 1999. "Fragmenting the Copyleft Movement: The Public will not Prevail." *Utah Law Review*:797-822.

Holden, A. 2005. "Achieving a Sustainable Relationship between Common Pool Resources and Tourism: The Role of Environmental Ethics." *Journal of Sustainable Tourism* 13(4):339-352.

Holman, JoAnne. 1997. "An Information Commons: Protection for Free Expression in the New Information Environment." Ph.D. Dissertation, Indiana University.

Holman, JoAnne, and Michael A. McGregor 2005. "The Internet as Commons: The Issue of Access." *Communication Law and Policy* 10(3):267-289.

Hopf, Till. 2006. "The Right of Public Access to the Landscape as a Commons Situation." *GAIA: Ecological Perspectives for Science and Society.* 15(1):16-19.

Horowitz, John B., and H. Brian Moehring. 2004. "How Property Rights and Patents Affect Antibiotic Resistance." *Health Economics* 13(6):575-584.

Huber, Mary Taylor. 2005. *The Advancement of Learning: Building the Teaching Commons*. San Francisco: Jossey-Bass.

Huberman, Bernardo A., and Rajan M. Lukose. 1997. "Social Dilemmas and Internet Congestion." *Science* 277(5325):535-537.

Hughes, Justin. 1988. "The Philosophy of Intellectual Property." *Georgetown Law Journal*. 77: 287-366.

Hunter, Dan. 2003. "Cyberspace as Place and the Tragedy of the Digital Anticommons." *California Law Review* 91(2):439-519.

Hunter, Dan. 2005. "Walled Gardens." *Washington & Lee Law Review* 62 (Spring): 607-640.

Hurley, Jeremiah, and Robert Card. 1996. "Global Physician Budgets as Common-Property Resources: Some Implications for Physicians and Medical Associations." *Canadian Medical Association Journal* 154(8):1161-1168

Hutchinson, Steven, and Daniel O'Connor 2005. "Policing the New Commons: Corporate Security Governance on a Mass Private Property in Canada." *Policing and Society* 15:125-144.

Hyde, Lewis. 1983. *The Gift: Imagination and the Erotic Life of Property.* New York: Random House.

Hyde, Lewis. 1998. "Created Commons." The Andy Warhol Foundation for the Visual Arts; Paper Series on the Arts, Culture, and Society, No. 8. http://www.warholfoundation.org/paperseries/article8.htm

Ifeka, Caroline, and Sylvanus Abua. 2005. "Nigeria: Conservation, 'Traditional' Knowledge and the Commons." *Review of African Political Economy* 32(104/105):436-443.

Ikeda, Nobuo. 2002. "The Spectrum as Commons: Digital Wireless Technologies and the Radio Policy." Research Institute of Economy, Trade and Industry (RIETI), Tokyo. (RIETI Discussion Paper Series 02-E-002). http://papers.ssrn.com/sol3/papers.cfm?abstract_id=309980#PaperDownload

Ikerd, John. 2003. "Sustaining the Sacramental Commons." Presented at Rural Life Day 2003, Farming in the Sacramental Commons, Jefferson City, MO. http://web.missouri.edu/~ikerdj/papers/sacramental.htm

Illich, I. 1983. "Silence is a Commons." *The Coevolution Quarterly* 40:5-9. http://www.preservenet.com/theory/Illich/Silence.html

Information Law Institute. 2001. "The Commons Project." Information Law Institute, New York University, New York.

Jacobs, Harvey M., ed. 1998. *Who Owns America? Social Conflict over Property Rights*. Madison: University of Wisconsin Press.

Jallov, Birgitte. 2004. "Community Radio for Empowerment and Impact." *Journal of Development Communication* 15(2):56-68.

Janger, E. J. 2003. "Privacy Property, Information Costs, and the Anticommons." *Hastings Law Journal* 54(4):899-929.

Jenny, Annette, Fernando Hechavarria Fuentes, and Hans-Joachim Mosler. 2007. "Psychological Factors Determining Individual Compliance with Rules for Common Pool Resource Management: The Case of a Cuban Community Sharing a Solar Energy System." *Human Ecology* 35(2):239-250.

Jepson, W. E. 2002. "Globalization and Brazilian Biosafety: The Politics of Scale over Biotechnology Governance." *Political Geography* 21(7):905-925.

Joyner, Christopher C. 1998. *Governing the Frozen Commons: The Antarctic Regime and Environmental Protection*. Columbia, SC: University of South Carolina Press. (Studies in Global Commons).

Joyner, Christopher C. 2001. "Global Commons: The Oceans, Antarctica, the Atmosphere, and Outer Space." In *Managing Global Issues: Lessons Learned*. P. J. Simmons and C. de Jonge Oudraat, eds. Washington, DC: Carnegie Endowment for International Peace.

Kapczynski, Amy, Samantha Chaifetz, and Zachary Katz, and Yochai Benkler. 2005. "Addressing Global Health Inequities: An Open Licensing Approach for University Innovations," *Berkeley Technology Law Journal* 20:1031. http://www.benkler.org/EALFinal.html

Karlsson, Sylvia, ed. 1997. *Managing Common Resources in Local and Global Systems: Applying Theory across Scales*. Linkoping, Sweden: Research Programme on Environmental Policy and Society, Institute of Tema Research, Linkoping University. (Research Report from EPOS, no. 9).

Kaufman, Arthur, et al. 2006. "The Health Commons and Care of New Mexico's Uninsured." *Annals of Family Medicine* 4:22-27.

Kennedy, Donald. 2001. "Enclosing the Research Commons." *Science* 294(5550):2249.

Kennedy, Donald, ed. 2006. *Science Magazine's State of the Planet 2006-2007*. Washington, DC: Island Press.

Kettles, G. W. 2004. "Regulating Vending in the Sidewalk Commons." *Temple Law Review* 77(1):1-46.

Kirp, D. L. 2004. "University, Inc. Faustian Bargains and the Academic Commons." *Currents* 30(8):72.

Kirtsoglou, Elisabeth, and Dimitrios Theodossopoulos. 2004. "'They are Taking Our Culture Away': Tourism and Culture Commodification in the Garifuna Community of Roatan." *Critique of Anthropology* 24(2):135-157.

Kleiman, Kelly. 2005. "Who owns public art?" *The Christian Science Monitor* (March 30, 2005) http://www.csmonitor.com/2005/0330/p15s01-usju.html

Klein, Naomi. 2001. "Reclaiming the Commons." *New Left Review* 9:81-89. http://www.newleftreview.org/A2323

Kleit, Rachel Garchick. 2004. "Designing and Managing Public Housing Self-Sufficiency Programs: The Youngs Lake Commons Program." *Evaluation Review* 28(5):363-395.

Kollock, Peter, and Marc Smith. 1996. "Managing the Virtual Commons: Cooperation and Conflict in Computer Communities." In *Computer-Mediated Communication: Linguistic, Social, and Cross-cultural Perspectives*. S. Herring, ed. Amsterdam: John Betjamins.

Korten, David. 2004. "Renewing the American Experiment." *Yes!* (Summer). http://www.yesmagazine.com/article.asp?ID=1004

Kramer, Roderick M. 2005. "A Failure to Communicate: 9/11 and the Tragedy of the Informational Commons." *International Public Management Journal & Public Management Review* 8(3):397-416.

Kranich, Nancy. 2003. "The Information Commons: A Selective Bibliography." *Knowledge Quest* 31(4):26-28.
http://www.ala.org/ala/aasl/aaslpubsandjournals/kqweb/kqarchives/volume31/312kranich.cfm

Kranich, Nancy. 2007. "Countering Enclosure: Reclaiming the Knowledge Commons." In *Understanding Knowledge as a Commons: From Theory to Practice*. C. Hess and E. Ostrom, eds. Cambridge, Massachusetts: MIT Press.

Krebs, Christopher P., Brion Sever, and Todd R. Clear. 1999. "Disparate Sentencing: A Tragedy of the Commons." *Corrections Management Quarterly* 3(2):60-76.

Krowne, Aaron. 2003. "Building a Digital Library the Commons-Based Peer Production Way." *D-Lib Magazine* 9(10) http://www.dlib.org/dlib/october03/krowne/10krowne.html

Kyläheiko, Kalevi. 2005. "From Comedy of Commons to Tragedy of Anti-commons."pp. 191-207 In: *Einkommensverteilung, technischer Fortschritt und struktureller Wandel*. G. Huber, H. Krämer, and H.D. Kurz, eds, Marburg: Metropolis.

Lange, David. 2003. "Reimagining the Public Domain." *Law and Contemporary Problems* 66, 1&2.
http://www.law.duke.edu/shell/cite.pl?66+Law+&+Contemp.+Probs.+463+(WinterSpring+2003)

Lee, Edward. 2003. "The Public's Domain: The Evolution of Legal Restraints on the Government's Power to Control Public Access through Secrecy or Intellectual Property." *Hastings Law Journal* 55:94-209.

Lee, In-Jae. 1998. "Collective Action and Institutions in Self-Governing Residential Communities in Seoul, Korea." Ph.D. Dissertation, University of Southern California.

Lee, Shin, and Chris Webster. 2006. "Enclosure of the Urban Commons." *GeoJournal* 66(1-2):27-42.

Lessig, Lawrence. 1999a. "Code and the Commons." Keynote Address at the Conference on Media Convergence, Held at Fordham University Law School, Feb. 9, 1999.
http://cyber.law.harvard.edu/works/lessig/fordham.pdf

Lessig, Lawrence. 1999b. *Code and Other Laws of Cyberspace*. New York: Basic Books.

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

Lessig, Lawrence. 2004a. "The Creative Commons." *Montana Law Review* 65(1):1-14.

Lessig, Lawrence. 2004b. *Free Culture: How Big Media Uses Technology and the Law to Lock Down Culture and Control Creativity*. New York: Penguin Press.

Lessig, Lawrence. 2006. ".commons." In *Norms and the Law*. J.N. Drobak, ed. Cambridge, MA: Cambridge University Press.

Levine, Peter. 2001. "Civic Renewal and the Commons of Cyberspace." *National Civic Review* 90(3):205-212. http://www.ncl.org/publications/ncr/90-3/chapter1.pdf

Levine, Peter. 2002a. "Building the Electronic Commons: A Project of the Democratic Collaborative." (Report) http://www.democracycollaborative.org/programs/public/BuildingElectronicCommons.pdf

Levine, Peter. 2002b. "Can the Internet Rescue Democracy? Toward an On-Line Commons." In *Democracy's Moment: Reforming the American Political System for the 21st Century*. R. Hayduk and K. Mattson, eds. Lanham, MD: Rowman and Littlefield.

Levine, Peter. 2003. "A Movement for the Commons?" *Responsive Community* 13(4):28-39. http://www.peterlevine.ws/responsivecommunity.pdf

Levine, Peter. 2007a. "Collective Action, Civic Engagement, and the Knowledge Commons." In *Understanding Knowledge as a Commons: From Theory to Practice*. C. Hess and E. Ostrom, eds. Cambridge, Massachusetts: MIT Press.

Levine, Peter. 2007b. *The Future of Democracy: Developing the Next Generation of Citizens*. Lebanon, NH: Tufts University Press and University Press of New England.

Lewis, Roger J. 2004. "Academic Emergency Medicine and the 'Tragedy of the Commons'." *Academic Emergency Medicine* 11(5):423-427.

Liang, Lawrence. 2003. "Global Commons, Public Space and Contemporary IPR." *Media Development* 50(1):29-33. http://www.wacc.org.uk/wacc/publications/media_development/2003_1/global_commons_public_space_and_contemporary_ipr

Linn, Karl. 1999. "Reclaiming the Sacred Commons." *New Village* 1:42-49. http://community-wealth.org/_pdfs/articles-publications/commons/article-linn.pdf

Linn, Karl. 2007. *Building Commons and Community*. NY: New Village Press.

Litman, Jessica. 1990. "The Public Domain." *Emory Law Journal* 39:965-1023.

Litman, Jessica. 2001. *Digital Copyright: Protecting Intellectual Property on the Internet*. Amherst, NY: Prometheus Books.

Little, Richard G. 2005. "Tending the Infrastructure Commons: Ensuring the Sustainability of our Vital Public Systems." *Structure and Infrastructure Engineering* 1(4):263-270.

Lohmann, Roger A. 1989. "And Lettuce is Nonanimal: Toward a Positive Economics of Voluntary Action." *Nonprofit and Voluntary Sector Quarterly* 18(4)367-383.

Lohmann, Roger A. 1992a. "The Commons: A Multidisciplinary Approach to Nonprofit Organization, Voluntary Action, and Philanthropy." *Nonprofit and Voluntary Sector Quarterly* 21(3):309-324.

Lohmann, Roger A. 1992b. *The Commons: New Perspectives on Nonprofit Organizations and Volunatry Action*. San Francisco: Jossey-Bass.

Lohmann, Roger A. 1995. "Buddhist Commons and the Question of a Third Sector in Asia." *Voluntas: International Journal of Voluntary and Nonprofit Organizations* 6,2: 149-158.

Lohmann, Roger A. 2001. "A New Approach: The Theory of the Commons." Pp. 167-178. In: *The Nature of the Nonprofit Sector*. Ed. J. S. Ott. Boulder: Westview.

Loren, Lydia Pallas. 2007. "Building a Reliable Semicommons of Creative Works: Enforcement of Creative Commons Licenses and Limited Abandonment of Copyright." *George Mason Law Review* 14 (Winter) 271-.

Loshin, Jacob. 2007. "Secrets Revealed: How Magicians Protect Intellectual Property Without Law." In *Law and Magic: A collection of Essays (forthcoming 2008)*. Durham, NC: Carolina Academic Press. http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1005564

Lougee, Wendy Pradt. 2007. "Scholarly Communication and Libraries Unbound: The Opportunity of the Commons." In *Understanding Knowledge as a Commons: From Theory to Practice*. C. Hess and E. Ostrom, eds. Cambridge, Massachusetts: MIT Press.

Lukasik, Stephen J. 2000. "Protecting the Global Information Commons." *Telecommunications Policy* 24(6-7):519-531.

Mace, B. L., Paul A. Bell, and R. J. Loomis. 1999. "Aesthetic, Affective, and Cognitive Effects of Noise on Natural Landscape Assessment." *Society and Natural Resources* 12(3):225-242.

Machan, Tibor R. 2001. *The Commons: Its Tragedies and Other Follies*. Stanford, CA: Hoover Institution.

Magnus, D., ed. 2002. *Who Owns Life?* Amherst, NY: Prometheus Books.

Maskus, Keith, and Jerome H. Reichman, eds. 2005. *International Public Goods and Transfer of Technology under a Globalized Intellectual Property Regime*. Cambridge: Cambridge University Press.

May, Christopher. 2000. *A Global Political Economy of Intellectual Property Rights: The New Enclosures?* New York: Routledge.

May, Christopher. 2006. "Escaping the TRIPs' Trap: The Political Economy of Free and Open Source Software in Africa." *Political Studies* 54(1):123-146.

McCann, Anthony. 2002. "Beyond the Commons: The Expansion of the Irish Music Rights Organisation, The Elimination of Uncertainty, and the Politics of Enclosure." Ph.D. Dissertation, University of Limerick, Ireland.

McCann, Anthony. 2005. "Enclosure Without and Within the 'Information Commons'." *Information and Communication Technology Law* 14(3):217-240.

McCarthy, James. 2005. "Commons as Counterhegemonic Projects: Neoliberalism, the Privatization of Nature, and the Commons." *Capitalism Nature Socialism* 16(1):9-24.

McGinnis, Michael, and Elinor Ostrom 1996. "Design Principles for Local and Global Commons." In *The International Political Economy and International Institutions, Vol. 2*. O. R. Young, ed. Brookfield, VT: Edward Elgar. (The Library of International Political Economy, no. 10).

McGovern, Francis E. 2002. "The Tragedy of the Asbestos Commons." *Virginia Law Review* 88(8):1721-1756.

McKibben, Bill. 2007. *Deep Economy: The Wealth of Communities and the Durable Future.* NY: Henry Holt.

McMurtry, J. 2001. "The Life Code of Value and the Civil Commons: A Reply to Three Educators." *Interchange* 32(3):261-270.

McMurtry, Larry. 1990. *Buffalo Girls*. NY: Simon and Schuster.

McSherry, Corynne. 2002. *Who Owns Academic Work? Battling for Control of Intellectual Property*. Cambridge, MA: Harvard University Press.

Merges, Robert P. 1996. "Property Rights Theory and the Commons; The Case of Scientific Research." *Social Philosophy and Policy* 13(2):145-167. http://www.law.berkeley.edu/institutes/bclt/pubs/merges/rpmart4.pdf

Merges, Robert P., and Glenn H. Reynolds. 1997. "Space Resources, Common Property, and the Collective Action Problem." *New York University Environmental Law Journal* 6(1):107-125. http://www3.law.nyu.edu/journals/envtllaw/issues/vol6/1/6nyuelj107.html

Melville, N., A. Stevens, R. K. Plice, and O. V. Pavlov. 2006. "Unsolicited Commercial E-Mail: Empirical Analysis of a Digital Commons." *International Journal of Electronic Commerce* 10(4):143-168.

Meyer, Aubrey. 1995. The Unequal Use of the Global Commons; produced for the Intergovernmental Panel on Climate Change; Working Group 3 Workshop on "*Equity and Social Considerations of Climate Change*", Nairobi 18-23 July 1995. http://www.gci.org.uk/papers/nairobi/nairobi.html

Meyerson, Frederick A. B. 1998. "Population, Development and Global Warming: Averting the Tragedy of the Climate Commons." *Population and Environment* 19(5):443-.

Mireles, Michael S. 2004. "An Examination of Patents, Licensing, Research Tools, and the Tragedy of the Anticommons in Biotechnology Innovation." *University of Michigan Journal of Law Reform* 38(1).

Mitchell, Don, and Lynn A. Staeheli. 2006. "Clean and Safe? Property Redevelopment, Public Space, and Homelessness in Downtown San Diego." In *The Politics of Public Space*. S. Low and N. Smith, eds. New York: Taylor & Francis.

Mitchell, Henry Chett. 2005. *The Intellectual Commons: Toward an Ecology of Intellectual Property*. Lanham, MD: Lexington Books. (Lexington Series in Social, Political and Legal Philosophy).

Montanye, J. A. 2001. "Rolling Blackouts: A Tragedy of the Commons." *Public Utilities Fortnightly* 139(9):16-19.

Moyers, Bill. 2004. "This is the Fight of Our Lives." Keynote speech, Inequality Matters Forum, New York University. Published on June 16, 2004 by Inequality.org http://www.commondreams.org/views04/0616-09.htm

Mudiwa, Morris. 2002. "Global or Local Commons? Biodiversity, Indigenous Knowledge and Intellectual Property Rights." In *Managing Common Property in an Age of Globalisation*. E. Manzungu, G. Chikowore,, D. Mushayavanhu, and D. Shoko, eds. Harare, Zimbabwe: Weaver.

Murray, Fiona E. S., and Scott Stern. 2005. "Do Formal Intellectual Property Rights Hinder the Free Flow of Scientific Knowledge? An Empirical Test of the Anti-Commons Hypothesis." National Bureau of Economic Research, Cambridge, MA. (NBER Working Paper Series, no. 11465). http://www.nber.org/papers/11465

Nagel, K. L., and J. E. Nagel. 2007. "Losing Our Commons-Predatory Planning in New Orleans: The Importance of History and Culture in Understanding Place." *Multicultural Review* 16(1):28-33.

Nambiar, A. C. K. 1996. "New Frontiers in Co-operation: Co-operative Hospitals in Kerala." In *Rediscovering Co-operation: Volume III, Co-operatives in the Emerging Context*. R. Rajagopalan, ed. Anand, India: Institute of Rural Development Anand (IRMA).

Nazer, Daniel. 2004. "The Tragicomedy of the Surfers' Commons." *Deakin Law Review* 9(2):654-713. http://www.austlii.edu.au/au/journals/DeakinLRev/2004/29.html#Heading6

Nelson, Richard R. 2003. "The Advance of Technology and the Scientific Commons." *Philosophical Transactions: Mathematical, Physical and Engineering Sciences* 361(1809):1691-1708.

Nelson, Richard R. 2004. "The Market Economy, and the Scientific Commons." *Research Policy* 33(3):455-471.

Neves-Graça, Katja. 2004. "Revisiting the Tragedy of the Commons: Ecological Dilemmas of Whale Watching in the Azores*." Human Organization* 63(3):289-300.

Nimus, Anna. 2006. "Copyright, Copyleft, and the Creative Anti-Commons." http://subsol.c3.hu/subsol_2/contributors0/nimustext.html

Nonini, Donald M. 2006a. "The Global Idea of 'the Commons'." *Social Analysis* 50(3):164-177.

Nonini, Donald M. 2006b. "Reflections on Intellectual Commons." *Social Analysis* 50(3):203-216.

Norgaard, Richard B. 1995. "Intergenerational Commons, Globalization, Economics, and Unsustainable Development." *Advances in Human Ecology* 4:141-171.

Oakerson, Ronald J. 1978. "The Erosion of Public Highways: A Policy Analysis of the Eastern Kentucky Coal-Haul Road Problem." Ph.D. Dissertation, Political Science, Indiana University.

Olwig, Kenneth R. 2003. "Commons & Landscape." In *Commons: Old and New*. E. Berge and L. Carlsson, eds. Trondheim, Norway: Norwegian University of Science and Technology. (ISS Rapport, no. 70). http://dlc.dlib.indiana.edu/documents/dir0/00/00/12/30/index.html

O'Mahony, Siobhan. 2003. "Guarding the Commons: How Community-Managed Software Projects Protect their Work." *Research Policy* 32(7):1179-1198.

Onsrud, Harlan, Gilberto Camara, James Campbell, and Nardindi Shakravarthy Chakravarthy. 2004. "Public Commons of Geographic Data: Research and Development Challenges." *Lecture Notes in Computer Science* 3234:223-228. http://www.dpi.inpe.br/gilberto/papers/commons_giscience2004.pdf

Opderbeck, David W. 2004. "The Penguin's Genome, or Coase and Open Source Biotechnology." *Harvard Journal of Law & Technology* 18:167. http://vlex.com/vid/264680

Ostrom, Elinor. 1990. *Governing the Commons: The Evolution of Institutions for Collective Action*. New York: Cambridge University Press.

Ostrom, Elinor. 2002-2003. "Managing Resources in the Global Commons." *Journal of Business Administration* 30-31:401-413.

Ostrom, Elinor, Joanna Burger, Christopher B. Field, Richard B. Norgaard, and David Policansky, 1999. "Revisiting the Commons: Local Lessons, Global Challenges." *Science* 284(5412):278-82. http://www.sciencemag.org/cgi/reprint/284/5412/278.pdf

Ostrom, Elinor, and Charlotte Hess 2007. "A Framework for Analyzing the Knowledge Commons." In *Understanding Knowledge as a Commons: From Theory to Practice*. C. Hess and E. Ostrom, eds. Cambridge, Massachusetts: MIT Press.

Ostrom, Vincent. 1968. "Organization of Decision-Making Arrangements and the Development of Atmospheric Resources." Workshop in Political Theory and Policy Analysis, Indiana University, Bloomington, IN. http://dlc.dlib.indiana.edu/documents/dir0/00/00/01/20/index.html

O'Toole, Randal. 1998. "The Tragedy of the Scenic Commons." In *Managing the Commons*. J. A. Baden and D. S. Noonan, eds. Bloomington: Indiana University Press.

Pardo, Mercedes, J.M. Echavarren, and Eliana Alemán. 2003. "The Environment as a Common Good in the Time of Globalization: Its Conceptualization and Social Perception." In: *Commons: Old and New.* E. Berge, and L. Carlsson, eds. Trondheim: Department of Sociology and Political Science, Norwegian University of Science and Technology. http://dlc.dlib.indiana.edu/archive/00002351/

Park, Jacob. 1999. "Global Governance, Institutions, and the Tragedy of the Commons." *Ethics, Place and Environment* 2(2):287-.

Parks, Laurent A., Cheryl H. Keen, James P. Keen, and Sharon Daloz, 1996. *Common Fire: Lives of Commitment in a Complex World*. Boston: Beacon Press.

Pasquale, Frank. 2006. "Toward an Ecology of Intellectual Property: Lessons from Environmental Economics for Valuing Copyright's Commons." *Yale Journal of Law and Technology* 8(78) (Jan):1-37. http://papers.ssrn.com/sol3/papers.cfm?abstract_id=584682

Paul, Christine. 2006. "Digital Art/Public Art: Governance and Agency in the Networked Commons."*First Monday,* special issue; number 7 (September). http://firstmonday.org/issues/issue11_9/paul/index.html

Peleikis, Anja. 2003. "Who Owns the Village? Legal Pluralism, Cultural Property and Social Security in a Baltic Tourist Centre: The Case of Nida on the Curonian Spit/Lithuania." In *Max Planck Institute for Social Anthropology, Report 2002-2003*. Halle/Saale, Germany: Max Planck Institute for Social Anthropology.

Pessach, G. 2003. "Copyright Law as a Silencing Restriction on Nonfringing Materials: Unveiling the Scope of Copyright's Diversity Externalities." *Southern California Law Review* 76(5):1067-1104.

Peterson, E. J., A. A. Jennings, and J. Ma, 2006. "Screening Level Risk Assessment of Heavy Metal Contamination in Cleveland Area Commons." *Journal of Environmental Engineering* 132(3):392-404.

Pintassilgo, Pedro, and João Albino Silva. 2007. "'Tragedy of the Commons' in the Tourism Accommodation Industry." *Tourism Economics* 13(2):209-224.

Popper, D. E., and F. J. Popper. 2006. "The Onset of the Buffalo Commons." *Journal of the West* 45(2):29-34. http://policy.rutgers.edu/faculty/popper/45-2-29.pdf

Powledge, F. 2001. "Patenting, Piracy and the Global Commons." *Bioscience* 51(4):273-277.

Poynder, Richard. 2003. "Reclaiming the Digital Commons." *Information Today* 20(6):33-34. http://www.richardpoynder.co.uk/reclaiming_the_digital_commons.htm

Pritchard, A.C. 1997. "Auctioning Justice: Legal and Market Mechanisms for Allocating Criminal Appellate Counsel." *American Criminal Law Review* 34: 1161, 1167-68.

Prögler, Josef. 1999. "Mapping the Musical Commons: Digitization, Simulation, Speculation." *First Monday* 4(9) http://www.firstmonday.org/Issues/issue4_9/progler/index.html.

Purdy, Jedediah. 2007. "People as Resources: Recruitment and Reciprocity in the Freedom-Promoting Approach to Property." *Duke Law Journal* 56: 1047-1113. http://eprints.law.duke.edu/1609/

Radin, Margaret J. 2001. *Contested Commodities: The Trouble with Trade in Sex, Children, Body Parts, and Other Things*. Reprint of 1996 ed. Cambridge, MA: Harvard University Press.

Rai, Arti K. 2001. "Evolving Scientific Norms and Intellectual Property Rights: A Reply to Kieff." *Northwestern University Law Review* 95:707-713. http://eprints.law.duke.edu/archive/00000093/01/95_Nw._U._L._Rev._707_(2000-2001).pdf

Rai, Arti K. 2007. "Knowledge Commons: The Case of the Biopharmaceutical Industry." *First Monday* 12, 6 (4 June). http://www.firstmonday.org/issues/issue12_6/rai/index.html

Rai, Arti K., and James Boyle. 2007. "Synthetic Biology: Caught between Property Rights, the Public Domain, and the Commons." Duke Science, Technology & Innovation Paper No. 12. http://papers.ssrn.com/sol3/papers.cfm?abstract_id=941732

Rainie, Lee, and Bente Kalsnes. 2001. "The Commons of the Tragedy: How the Internet Was Used by Millions After the Terror Attacks to Grieve, Console, Share News, and Debate the Country's Response." Pew Internet & American Life Project, Washington, DC. http://www.pewinternet.org/pdfs/PIP_Tragedy_Report.pdf

Randeria, S. 2003. "Cunning States and Unaccountable International Institutions: Legal Plurality, Social Movements and Rights of Local Communities to Common Property Resources." *Archives Europeennes de Sociologie* 44(1):27-60.

Rankin, Daniel J., Katja Bargum, and Hanna Kokko. 2007. "The Tragedy of the Commons in Evolutionary Biology." *Trends in Ecology and Evolution* 22(12) 643-651).

Rao, Robert, Erica Wiseman, and Kimiz Dalkir. 2004. "Public Access to Information and the Creation of an 'Information Commons'." *Proceedings of the Annual Meeting-American Society for Information Science* 41:198-205.

Rasmussen, David W. and Bruce L. Benson. 1994. *The Economic Anatomy of a Drug War: Criminal Justice in the Commons.* Lanham, MD: Rowman & Littlefield,

Reese, R. Anthony. 1995. "Reflections on the Intellectual Commons: Two Perspectives on Copyright Duration and Reversion." *Stanford Law Review* 47(4):707-747.

Reichman, Jerome H., and Paul F. Uhlir. 2003. "A Contractually Reconstructed Research Commons for Scientific Data in a Highly Protectionist Intellectual Property Environment." *Law and Contemporary Problems*, vol. 66, nos. 1 & 2.

Rheingold, Howard. 1993. *The Virtual Community: Homesteading on the Electric Frontier*. New York: Addison-Wesley.

Rheingold, Howard. 2002. *Smart Mobs, The Next Social Revolution: Transforming Cultures and Communities in the Age of Instant Access*. Cambridge, MA: Perseus Books.

Rider, Robert. 1998. "Hangin' Ten: The Common-Pool Resource Problem of Surfing." *Public Choice* 97(1/2):49-64.

Rifkin, Jeremy. 2002. "The Treaty Initiative to Share the Genetic Commons." *Regulatory Affairs Journal* 13(12):974-975.

Ringel, M. 2006. "Common-Property-Ressourcen als Facette globaler Umweltschutzpolitik." *Wirtschaftswissenchaftliches Studium* 35(3):141-146.

Rogers, Nedjo Blake. 1995. "Modern Commons: Place, Nature, and Revolution at the Strathcona Community Gardens." Ph.D. Dissertation, Simon Fraser University.

Rose, Carol M. 1986. "The Comedy of the Commons: Custom, Commerce, and Inherently Public Property." *The University of Chicago Law Review* 53(3):711-781.
http://www.law.yale.edu/documents/pdf/Property_and_Persuasion_Carol_M_Rose.pdf

Rose, Carol M. 1999. "Expanding the Choices for the Global Commons: Comparing Newfangled Tradable Allowance Schemes to Old-fashioned Common Property Regimes." *Duke Environmental Law and Policy Forum* 10:45-72.
http://www.law.duke.edu/shell/cite.pl?10+Duke+Envtl.+L.+&+Pol'y+F.+45

Rosin, Thomas. 1998. "The Street as Public Commons: A Cross-Cultural Comparative Framework for Studying Waste and Traffic in India." Presented at "Crossing Boundaries," the seventh annual conference of the International Association for the Study of Common Property, June 10-14, 1998, Vancouver, British Columbia, Canada.
http://dlc.dlib.indiana.edu/documents/dir0/00/00/01/47/index.html

Roth, J. H. 2006. "A Mean-Spirited Sport: Japanese Brazilian Croquet in Sao Paulo's Public Spaces." *Anthropological Quarterly* 79(4):609-632.

Rowe, Jonathan. 2001. "The Hidden Commons." *Yes!* 18:12-17.
http://www.yesmagazine.org/article.asp?ID=443

Rowe, Jonathan. 2002. "Fanfare for the Commons: The Trees, the Air, Open Spaces, the Sky." *Utne Reader* 109:40-43.

Rowe, Jonathan. 2007. How Commerce Consumed the Commons: Where the Commons Went, and How to Get it Back. *Yes!* (Winter) http://www.yesmagazine.org/article.asp?ID=1580

Runge, C. Ford., and E. Defrancesco 2006. "Exclusion, Inclusion, and Enclosure: Historical Commons and Modern Intellectual Property." *World Development* 34(10):1713-1727.

Ryan, Chris, and Michelle Aicken, eds. 2005. *Indigenous Tourism: The Commodification and Management of Culture*. San Deigo, CA: Elsevier.

Safrin, Sabrina. 2004. "Hyperownership in a Time of Biotechnological Promise: The International Conflict to Control the Building Blocks of Life." *American Journal of International Law* 98:641-685.

Saldivar-Tanaka, Laura, and Marianne E. Krasny. 2004. "Culturing Community Development, Neighborhood Open Space, and Civic Agriculture: The Case of Latino Community Gardens in New York City." *Agriculture and Human Values* 21(4):399-412.

Saltman, Richard B., and Sven-Eric Bergman 2005. "Renovating the Commons: Swedish Health Care Reforms in Perspective." *Journal of Health Politics, Policy and Law* 30(1):253-276.

Sand, Peter H. 2004. "Sovereignty Bounded: Public Trusteeship for Common Pool Resources?" *Global Environmental Politics* 4(1):47-71.

Sandel, Michael J. 2005. "Markets, Morals, and Civic Life." *Bulletin of the American Academy* 58(4):6-10.

Sandell, K. 1995. "Access to the 'North' – But to What and for Whom? Public Access in the Swedish Countryside and the Case of a Proposed National Park in the Kiruna Mountains," in C.M. Hall and M.E. Johnston (eds), *Polar Tourism: Tourism in the Arctic and Antarctic Regions*, pp. 131–45. Chichester: John Wiley.

Sanders, Scott Russell. 2006. "Defending our Common Wealth: Community or Communities: Which Makes Us Happier?" *In Balance* no. 35 (Spring). http://www.newdream.org/newsletter/common_wealth.php

Saveri, Andrea, Howard Rheingold, Alex Soojung-Kim Pang, and Kathi Vian. 2005. *Toward a New Literacy of Cooperation in Business: Managing Dilemmas in the 21st Century*. Palo Alto: Institute for the Future. http://www.iftf.org/docs/SR-851A_New_Literacy_Cooperation.pdf

Sawhney, Nitin. 2003. "Cooperative Innovation in the Commons: Rethinking Distributed Collaboration and Intellectual Property for Sustainable Design Innovation." (Ph.D. Dissertation, Massachusetts Institute of Technology, 2003).http://web.media.mit.edu/~nitin/thesis/nitin-phd-thesis.pdf

Sax, Joseph L. 1999. *Playing Darts with a Rembrandt: Public and Private Rights in Cultural Treasures*. Ann Arbor, MI: University of Michigan Press.

Scafidi, Susan. 2005. *Who Owns Culture? Appropriation and Authenticity In American Law.* Rutgers University Press,

Scharper, Stephen B., and Hilary Cunningham. 2006. "The Genetic Commons: Resisting the Neo-liberal Enclosure of Life." *Social Analysis* 50(3):195-202.

Scheffran, Jürgen. 2005. "Privatization in Outer Space: Lessons from Landsat and Beyond." In Limits to Privatization: How to Avoid too Much of a Good Thing. Ernst Ulrich von Weizsäcker, Oran R. Young, and Matthias Finger, eds. Sterling, VA: Earthscan.

Schlager, Edella, and Elinor Ostrom. 1992. "Property Rights Regimes and Natural Resources: A Conceptual Analysis." *Land Economics* 68, 3:249-262.

Schmidtz, David, and Elizabeth Willott 2003. "Reinventing the Commons: An African Case Study." *U. C. Davis Law Review* 37(1):203-232.

Schweik, Charles M. 2005. "An Institutional Analysis Approach to Studying *Libre* Software 'Commons'." *Upgrade* 6(3):17-27.

Schweik, Charles M. 2007. "Free/Open-Source Software as a Framework for Establishing Commons in Science." In *Understanding Knowledge as a Commons: From Theory to Practice*. C. Hess and E. Ostrom, eds. Cambridge, Massachusetts: MIT Press.

Schweik, Charles M. and Robert English. 2007. Tragedy of the FOSS Commons? Investigating the Institutional Designs of Free/libre and Open Source Software Projects. *First Monday* 12,2 (5 February). http://www.firstmonday.org/issues/issue12_2/schweik/index.html

Sedjo, Roger A. 1992. "Property Rights, Genetic Resources, and Biotechnological Change." *The Journal of Law and Economics* XXXV(1):199-213.

Selsky, John, and Pyar Ali Memon. 1997. "Urban Port Development Conflicts: Towards Managing and Amenity Commons." *Urban Policy and Research* 15(4):259-268

Sened, Itai, and William H. Riker. 1996. "Common Property and Private Property: The Case of Air Slots." *Journal of Theoretical Politics* 8(4):427-447.

Sharma, Eklabya, Nandita Jain, S. C. Rai, and Renzino Lepcha. 2002. "Ecotourism in Sikkim: Contributions toward Conservation of Biodiversity Resources." In *Institutionalizing Common Pool Resources*. D. K. Marothia, ed. New Delhi: Concept.

Shaw, Meredith. 2006. "Nationally Ineligible Works: Ineligible for Copyright and the Public Domain." *Columbia Journal of Transnational Law* 44(3):1033-1066.

Shepsle, Kenneth A. 1983. "Overgrazing the Budgetary Commons: Incentive-Compatible Solutions to the Problem of Deficits." In *The Economic Consequences of Government Deficits*. L. Meyer, ed. Boston: Kluwer-Nijhoff.

Shiva, Vandana. 2000. *Stolen Harvest: The Hijacking of the Global Food Supply*. Cambridge, MA: South End.

Shiva, Vandana. 2001. *Protect or Plunder: Understanding Intellectual Property Rights*. New York: Zed Books.

Shiva, Vandana. 2002. "The Enclosure and Recovery of the Biological and Intellectual Commons." In *Institutionalizing Common Pool Resources*. D. K. Marothia, ed. New Delhi: Concept.

Shiva, Vandana, and Ruth Brand. 2005. "The Fight Against Patents on the Neem Tree." In *Limits to Privatization: How to Avoid too Much of a Good Thing*. Ernst Ulrich von Weizsäcker, Oran R. Young, and Matthias Finger, eds. Sterling, VA: Earthscan.

Shulman, Seth. 2002. "Trouble on 'The Endless Frontier:' Science, Invention and the Erosion of the Technological Commons." New America Foundation & Public Knowledge, Washington, DC. http://www.publicknowledge.org/pdf/ trouble_on_the_endless_frontier.pdf

Sietzen, Frank. 2001. "Commercial Space: A Global Commons?" *Aerospace America* 39(8):35-51. http://www.aiaa.org/aerospace/Article.cfm?issuetocid=125&ArchiveIssueID=17

Sim, Loo-Lee, Sau-Kim Lum, and Lai Choo Malone-Lee. 2002. "Property Rights, Collective Sales and Government Intervention: Averting a Tragedy of the Anticommons." *Habitat International* 26(4):457-470.

Smith, Henry E. 2000. "Semicommon Property Rights and Scattering in the Open Fields," *Journal of Legal Studies* 29(1): 131-169.

Smith-Nonini, Sandy. 2006. "Conceiving the Health Commons: Operationalizing a 'Right' to Health." *Social Analysis* 50(3):233-245.

Snider, J. H. 2002. "Who Owns the Airwaves? Four Theories of Spectrum Property Rights." New America Foundation, Public Assets Program, Washington, D. C. (Spectrum Series, no. 3). http://www.newamerica.net/Download_Docs/pdfs/Pub_File_808_1.pdf

Soroos, Marvin S. 1982. "The Commons in the Sky: The Radio Spectrum and Geosynchronous Orbit as Issues in Global Policy." *International Organization* 36(3):665-677.

Soroos, Marvin S. 1988. "The International Commons: A Historical Perspective." *Environmental Review* 12(1):1-22.

Soroos, Marvin S. 1997. *The Endangered Atmosphere: Preserving a Global Commons*. Columbia, SC: University of South Carolina Press.

Soroos, Marvin S. 2001. "The Evolution of Global Commons." In *Global Environmental Policies: Institutions and Procedures*. New York: Palgrave.

Soroos, Marvin S. 2005. "Garrett Hardin and Tragedies of Global Commons." In *Handbook of Global Environmental Politics*. P. Dauvergne, ed. Northampton, MA: Edward Elgar.

Steed, Brian, and Burnell Fisher. 2007. "Street Trees—Are They a Misunderstood Common-Pool Resource?" Presented at the Fall Colloquium, Workshop in Political Theory and Policy Analysis, Indiana University-Bloomington. http://www.indiana.edu/~workshop/colloquia/papers/fischer&steed_paper.pdf

Steemers, Jeanette. 2004. "Building a Digital Cultural Commons: The Example of the BBC." *Convergence* 10(3):102-109.

Stiglitz, Joseph E. 1999. "Knowledge as a Global Public Good." In *Global Public Goods: International Cooperation in the 21st Century*. I. Kaul, I. Grunberg, and M. Stern, eds. New York: Oxford University Press.

Strathern, Marilyn. 2004. *Commons and Borderlands: Working Papers on Interdisciplinarity, Accountability and the Flow of Knowledge*. Wantage, UK: Sean Kingston.

Suber, Peter. 2007. "Creating an Intellectual Commons through Open Access." In *Understanding Knowledge as a Commons: From Theory to Practice*. C. Hess and E. Ostrom, eds. Cambridge, Massachusetts: MIT Press.

Sumner, Jennifer. 2005. *Sustainability and the Civil Commons: Rural Communities in the Age of Globalization*. Toronto: University of Toronto Press.

Sur, A. 2003. "Sharing Spectrum: Can a 'Commons' Approach Help Maximize Spectrum Use." *Telecommunications* 37(9):8-11.

Tapscott, Don, and Anthony D. Williams. 2006. *Wikinomics: How Mass Collaboration Changes Everything*. New York: Portfolio.

Tavani, Herman. 2004. "Balancing Intellectual Property Rights and the Intellectual Commons: A Lockean Analysis." *Journal of Information Communication and Ethics in Society* 2:S5-S14.

Tavani, Herman. 2005. "Locke, Intellectual Property Rights, and the Information Commons." *Ethics and Information Technology* 7(2):87-97.

Taylor, Betsy. 2003. "Gender and the Global Struggle to Reclaim the Commons: Civic Environmentalism, Anti-Globalization and Participatory Research." *Canadian Woman Studies* 23(1):62-68.

Theobald, Paul. 1997. *Teaching the Commons: Place, Pride, and the Renewal of Community*. Boulder, CO: Westview Press.

Thompson, Barton H. 2000. "Tragically Difficult: The Obstacles to Governing the Commons." *Environmental Law* 30(2):241-. http://papers.ssrn.com/sol3/delivery.cfm/000712601.pdf?abstractid=236031#Paper%20Download

Thompson, Dale B. 2006. "Of Rainbows and Rivers: Lessons for Telecommunications Spectrum Policy from Transitions in Property Rights and Commons in Water Law." *Buffalo Law Review* 54(1):157-210.

Thümmel, Thomas, and Max Thümmel. 2005. "Privatization of Telecommunication in Japan." In *Limits to Privatization: How to Avoid too Much of a Good Thing*. Ernst Ulrich von Weizsäcker, Oran R. Young, and Matthias Finger, eds. Sterling, VA: Earthscan.

Tietenberg, Tom. 2003. "The Tradable-Permits Approach to Protecting the Commons: Lessons for Climate Change." *Oxford Review of Economic Policy* 19(3):400-419.

Toly, Noah. 2005. "A Tale of Two Regimes: Instrumentality and Commons Access." *Bulletin of Science, Technology & Society* 25(1):26-36. http://ceep.udel.edu/publications/sustainabledevelopment/2005_sd_biodiversity_Costa%20Rica_tale_2%20regimes.pdf

Travis, Hannibal. 2000. "Pirates of the Information Infrastructure: Blackstonian Copyright and the First Amendment." *Berkeley Technology Law Journal* 15:777-864.

Triggle, David J. 2004. "Patenting the Sun: Enclosing the Scientific Commons and Transforming the University-Ethical Concerns." *Drug Development Research* 63(3):139-149.

Triggle, David J., and Kenneth W. Miller. 2002. "Doctoral Education: Another Tragedy of the Commons?" *American Journal of Pharmaceutical Education* 66(3):287-292.

Turner, Roy M. 1993. "The Tragedy of the Commons and Distributed AI Systems." In *Proceedings of the International Workshop on Distributed Artificial Intelligence*. Hidden Valley, PA, http://cdps.umcs.maine.edu/Papers/1993/TofCommons/TR.html

Turner, T. E., and L. S. Brownhill. 2002. "Gender, Feminism and the Civil Commons: Women and the Anti-Corporate, Anti-war Movement for Globalization from Below." *Canadian Journal of Development Studies* 22(SPI):805-818.

Udell, Jon. 2004. "Tragedy of the Network Commons ." *InfoWorld* (July 30). http://www.infoworld.com/article/04/07/30/31OPstrategic_1.html

Uhlir, Paul F. 2003. "Re-Intermediation in the Republic of Science: Moving from Intellectual Property to Intellectual Commons." *Information Services and Use* 23(2/3):63-66. http://eprints.rclis.org/archive/00000817/03/uhlir.pdf

Uhlir, Paul F. 2006. "The Emerging Role of Open Repositories for Scientific Literature as a Fundamental Component of the Public Research Infrastructure." In *Open Access: Open Problems*. G. Sica, ed. Monza, Italy: Polimetrica International Scientific.

Uzawa, Hirofumi. 2007. "Environment, Commons, and Social Common Capital." *Ecological Research* 22(1):23-24.

Vaidhyanathan, Siva. 2001. *Copyrights and Copywrongs: The Rise of Intellectual Property and How it Threatens Creativity*. New York: New York University Press. http://homepages.nyu.edu/~sv24

Vaidhyanathan, Siva. 2002. "The Content-Provider Paradox: Universities in the Information Ecosystem." *Academe* 88(5). http://www.aaup.org/publications/Academe/2002/02so/02sovai.htm

Vaidhyanathan, Siva. 2004. *The Anarchist in the Library: How the Clash Between Freedom and Control is Hacking the Real World and Crashing the System*. New York: Basic Books.

Vail, David, and Lars Hultkrantz. 2000. "Property Rights and Sustainable Nature Tourism: Adaptation and Mal-Adaptation in Dalarna (Sweden) and Maine (USA)." *Ecological Economics* 35(2):223-242.

Van Alstyne, William W. 2003. "Reconciling what the First Amendment Forbids with what the Copyright Clause Permits: A Summary Explanation and Review."*Law and Contemporary Problems,* vol. 66, nos. 1 & 2: 225-238 www.law.duke.edu/shell/cite.pl?66+Law+&+Contemp.+Probs.+225+(WinterSpring+2003)+pdf

Vanneste, Sven, Alain Van Hiel, Francesco Parisi, and Ben Depoorter. 2006. "From 'Tragedy' to 'Disaster': Welfare Effects of Commons and Anticommons Dilemmas." *International Review of Law and Economics* 26(1):104-122.

Van Vugt, Mark. 1996. "Social Dilemmas and Transportation Decisions." Ph.D. Dissertation, University of Limburg, Maastricht, The Netherlands, 1996.

van Wendel de Joode, Ruben. 2005. "Understanding Open Source Communities: An Organization Perspective." Ph.D. Dissertation, Delft University of Technology, The Netherlands.

van Wendel de Joode, Ruben, J. A. de Bruijn, and Michel van Eeten. 2003. *Protecting the Virtual Commons: Self-Organizing Open Source and Free Software Communities and Innovative Intellectual Property Regimes*. The Hague: T. M. C. Asser.

Vogler, John. 2000. *The Global Commons: Environmental and Technological Governance*. 2nd ed. New York: Wiley.

Vogler, John. 2005. "Studying the Global Commons: Governance without Politics?" In *Handbook of Global Environmental Politics*. P. Dauvergne, ed. Northampton, MA: Edward Elgar.

von Weizsäcker, Ernst Ulrich, Oran R. Young, and Matthias Finger, eds. 2005. *Limits to Privatization: How to Avoid too Much of a Good Thing: A Report to the Club of Rome*. Sterling, VA: Earthscan.

Wagenaar, P., and S. Soeparman. 2004. "Coping with the Dilemma of Common Pool Information Resourcing: Integrating Information Domains in the Dutch Police." *Information Polity* 9(3/4):181-192.

Wagner, Wendy E. 2004. "Commons Ignorance: The Failure of Environmental Law to Produce Needed Information on Health and the Environment." *Duke Law Journal* 53(6):1619-1745. http://dlc.dlib.indiana.edu/archive/00002376/

Waller, Patricia F. 1986. "The Highway Transportation System as a Commons: Implications for Risk Policy." *Accident Analysis and Prevention* 18(5):417-424.

Warren, Lynda M. 2001. "Protecting the Global Commons." *Forum for Applied Research and Public Policy* 16(3):6-13.

Waters, Donald J. 2007. "Preserving the Knowledge Commons." In *Understanding Knowledge as a Commons: From Theory to Practice*. C. Hess and E. Ostrom, eds. Cambridge, Massachusetts: MIT Press. www.loc.gov/section108/docs/PreservingtheKnowledgeCommons.doc

Wehrwein, Peter. 1998. "Protecting the Medical Commons," *Harvard Public Health Review* 2:20-28 . http://www.hsph.harvard.edu/review/protecting_the.shtml

Wellenius, Bjorn, and Isabel Neto. 2007. "The Radio Spectrum: Opportunities and Challenges for the Developing World." *Info—The Journal of Policy, Regulation and Strategy for Telecommunications* 8(2):18-33.

Wellman, Barry 2005. "Community: From Neighborhood to Network." *Communications of the ACM* 48 (10, October): 53-55.

Werbach, Kevin. 2004. "Supercommons: Toward a Unified Theory of Wireless Communication." *Texas Law Review* 82(4):863-973.

West, Mark D. and Emily M. Morris. 2003. "The Tragedy of the Condominiums: Legal Responses to Collective Action Problems after the Kobe Earthquake," *American Journal of Comparative Law* 51: 903-940.

Williams Jones, B. 2005. "Knowledge Commons or Economic Engine: What's a University For?" *Journal of Medical Ethics* 31(5):249-250. http://jme.bmj.com/cgi/content/full/31/5/249

Williamson, Sima, David Brunckhorst, and Gerard Kelly 2003. *Reinventing the Common: Cross-Boundary Farming for a Sustainable Future*. Sydney: Federation.

Yang, Honggang. 1995. "The Disputing Process: An Ethnographic Study of a Homeowners Association." *Mediation Quarterly* 13(2).

Young, Oran R., ed. 1997. *Global Governance: Drawing Insights from the Environmental Experience*. Cambridge, MA: MIT Press.

Young, Oran R., ed. 1999. *The Effectiveness of International Environmental Regimes: Causal Connections and Behavioral Mechanisms*. Cambridge, MA: MIT Press.

Yu, Peter K. 2002. "Bridging the Digital Divide: Equality in the Information Age." *Cardozo Arts & Entertainment Law Journa*l 20, 1.

Yu, Allen K. 2007. "Enhancing Legal Aid Access through an Open Source Commons Model." *Harvard Journal of Law & Technology* 20 (Spring) 374.

Zdarsky, Frank A., Ivan Martinovic, and Jens B. Schmitt. 2006. "The Case for Virtualized Wireless Access Networks." *Self-Organizing Systems, Proceedings Lecture Notes in Computer Science* 4124:90-104.

Zoloth-Dorfman L, and S. Rubin. 1995. "The Patient as Commodity: Managed Care and the Question of Ethics." *Journal of Clinical Ethics*. 6(4)Winter:339-57.

Zorn, Stephen A. 1984. "Antarctic Minerals: A Common Heritage Approach." *Resources Policy* 11 (March): 2-18.