



Tragedy of the Commons Revisited: Librarians, Publishers, Faculty and the Demise of a Public Resource

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abstract: The model of scholarly publishing can be reduced, in economic terms, to a Tragedy of the Commons, whereby the individual interests of publishers, libraries and scholars are in conflict with what is in the best interest of the public good. Serials inflation, price discrimination, and site-license pricing are all manifestations of this dysfunctional economic model. Moral arguments to change human behavior are not effective because they do not provide individual incentives. Technology alone is also not a viable solution since it fails to change the underlying human behavior that is driving the economic model. Abandoning the current system of publishing is both risky and costly. This paper argues for a reintermediation of the library as governor of the public scholarly commons, but illustrates that these solutions are in conflict with the mission of the library profession.

During the last fifty years, publishers have transformed the guild of scholarly publishing into big business; so big, that last year a Morgan Stanley report enthusiastically proclaimed that “scientific publishing [has been] the fastest-growing media sub-sector of the past 15 years.”¹ While adding insult to injury, the report dismissed the work of SPARC to encourage academics to defect from commercial to non-profit publishers, and belittles librarians’ “vociferous campaign against journal publishers”, explaining that “a number of factors will dampen their cries for change.”²

Laying the blame on commercial publishers who have transformed an eclectic gift-economy into an immensely profitable industry at the expense of libraries and the scientific community is easy to do. We only have to point at egregious year-end profits posted by an oligopoly of Western-European publishers as evidence that the scholarly publishing model has been exploited. Librarians have not been complacent on this issue, yet the trend in spiraling serial prices over the last 25 years indicates that our “vo-



ciferous campaign” may have had little if any effect. A realization of this has led some to believe that the current model of scientific publishing is defective and needs to be completely overhauled.

The argument posed in this paper is that the scholarly publishing model is not defective, but that it is being rationally exploited by three contingent groups: publishers, scholars, and librarians. It will argue that technological solutions to publishing are risky and offer no solution to the exploitation. Market corrections may come about by reintermediating the library into the economic model, yet this solution is ultimately in conflict with the mission of the library profession.

Tragedy of the Commons

The Tragedy of the Commons was a landmark essay published in the journal *Science* in 1968 by ecologist Garrett Hardin.³ In his article, Hardin describes the problem of exploitation of public resources (like forests, seas and air) by a growing human population. The cause of the tragedy is based on the behavior of individuals acting rationally in their own self-interest, and maximizing their own consumption of a public resource to the detriment of others. In other words, the *individual* economic model does not scale upwards—what is good for the individual is not necessarily for the good of the whole.⁴

Hardin used a pasture analogy to emphasize this point. He describes a common village pasture on which local herders can put their cows to graze. Each of the herders considers the value of adding another animal to his herd, which has both positive and negative effects: To the herder, each additional animal means more profit when his cows are finally sold at market. The negative effect is the additional overgrazing created by adding one more animal to the pasture. Since the effects of overgrazing are shared by all of the herders, the negative effects are only a small fraction of the cost of adding another animal. But this is the conclusion reached by every herdsman in the village. The consequence is that the village pasture becomes overgrazed and every villager suffers. Hardin then sums up the dilemma where the interests of the individuals are not in line with the interests of the whole.

Therein is the tragedy. Each man is locked into a system that compels him to increase his herd without limit – in a world that is limited. Ruin is the destination toward which all men rush, each pursuing his own best interest in a society that believes in the freedom of the commons. Freedom in a commons brings ruin to all.⁵

All shared or public resources are susceptible to the Tragedy of the Commons, and there is no technological solution because technology does not change the underlying human behavior, which is the cause of the problem. Solutions to grow more trees, produce more food, or share a smaller catch of fish only delay the inevitable over-exploitation of the common resource. Hardin further cautions, that “whenever a distribution system malfunctions, we should be on the lookout for some sort of commons.”⁶

Information as a Public Commons

Information has very different characteristics than natural resources like lumber, air or fish. The downloading of an electronic journal article does not make the resource less



available, in fact it may do the opposite. Despite the different properties of information to natural resources, an information commons can still be exploited in the same ways as Hardin's pasture.

The Internet is a public good, composed of a resource called "bandwidth." Since individual users are not charged in proportion to their use, it is rational for individuals to consume bandwidth greedily without considering that their actions have an effect on the performance of the entire Internet. Because every individual can reason this way, the performance of the Internet can degrade which makes everyone worse off. Computer scientists Bernardo Huberman and Rajan Lukose reported that "the Internet is not immune to the problems intrinsic to any public good, as congestion sometimes threatens to render it useless."⁷ But as congestion rapidly slows down the network, individuals frustrated by the lack of performance will reduce or desist their use, freeing up bandwidth that can then be consumed again. Their analysis of bandwidth use of the NSF backbone illustrated that the effect of this behavior is a series of regular network spikes. They argued that the congestion problem of the Internet would disappear if individuals were charged in proportion to their consumption of bandwidth. At Cornell University, a new bandwidth policy went into effect July 1, 2003. In order to provide disincentives for individuals exploiting the network, users will be billed three-tenths of a cent for every megabyte downloaded over a two-gigabyte monthly threshold. Roughly speaking, two gigabytes is the equivalent of more than 65,000 typical e-mail messages; 7,000 graphics files; 500 MP3s; or 1 to 2 feature-length MPEG movies.

The Academic Library as a Public Commons

Gary Byrd first described the academic library as a public commons, created by using public money for the purposes of creating a shared resource for the academy.⁸ Each member of the institution is effectively taxed to provide support for the library: students are taxed from their tuition fees; college and departmental operating funds are proportionally redirected; and incoming grant money is skimmed for indirect costs—some of this money going to the library.

The library is a cornerstone of every college and university and is created from the belief that building a common intellectual resource is more efficient and effective than individual scholars purchasing and managing their own information. A book that is shared by multiple readers over its lifetime is more efficient than every reader purchasing his/her own copy. An institution that shares a single subscription of a journal may be more efficient than multiple individual subscriptions. Print resources (like natural resources) are subject to same laws as other resource sharing. Access may be reduced during high demand, and in the case of books or individual journal issues, may be completely unavailable to readers for extended periods of time. The library has traditionally attempted to maximize utility of its resources for its community. It has done this by setting limits on borrowing privileges, or restricting journals to in-house use (*viz.* the reference collection).

Whereas the purpose of establishing a library is to create efficiencies on campus, the concept of a library as a public commons leaves it open to exploitation by individual constituencies. The ecologist Hardin later writes that "under special circum-



stances even an unmanaged commons may work well. The principle requirement is that there be no scarcity of goods.”⁹ In other words, if library acquisition budgets increase *at least* at the same rate of increase in subscription costs, the library will be able to continue its function in the academy without risk of a crisis. We all know that these conditions have not been met—library budgets have not kept pace with the price inflation of subscriptions for several decades,¹⁰ and this situation is unlikely to change in the near future.

The Academic Library is Exploited by Publishers, Scholars and by Librarians

The exploitation of the public commons is not the exclusive domain of commercial publishers. Each of the constituent communities in the information chain are responsible to some degree.¹¹ **Publishers** are exploiting the academic library by pricing journals on what the market can bear, and by invoking a price discrimination model between individual and institutional copies. They have also guaranteed immunity to attrition by bundling resources and by building non-cancellation clauses into their licenses. **Scholars** are also to blame by maximizing their production of information, and by insisting that the library provide free access to all other information that might be of use. Lastly, **librarians** are to blame, by building comprehensive collections as status symbols and by insisting that unlimited and free access is a guaranteed right for any and all potential users, wherever they might be.

The economic model in this information chain (from publisher, to library, to scholar) is unlike any other natural resource. In it, “the library acts as a passive agent for its users, paying the institutional subscription fee and creating the public good. The publisher recognizes that the library provides a public good and sets a library subscription price to effectively extract rents from the patrons who use the journal.”¹² It is a model in which, as Herbert White describes, “natural selection and the pressures of the marketplace simply do not apply.”¹³

This dysfunctional model is evidently well understood by publishers. In a speech at an international conference of libraries, the CEO of Elsevier Science, Derk Haank

remarked, “in science, the people who drink are not the people who are paying, it is a disastrous model as any bartender can tell you.”¹⁴ Scholars are not price-conscious because they are not spending their own money, although they are each indirectly taxed for library resources. There is also an established belief that journal articles must be free

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for all scholars. Academics will not tolerate a pay-for-use system, and it is unlikely that a true open academic system would exist where individuals are expected to pay for each unit of information. We would effectively return to an archaic system of gentleman-scholars and private collections. As a whole, we would be much worse off.

Publishers should not be entirely blamed for taking advantage of a system that has worked to their advantage, but in this dysfunctional economic model, librarians are not



passive victims either. The scholarly publishing marketplace is characterized by both overproduction and overconsumption. In acting as purchasing agents for the end-user, the library provides a service in the information chain, with the goal of maximizing use of the common collection. In essence, it is an axiom of our profession to promote use of library resources and to support scholars in their drive to maximize their scholarly output. In other words, librarians act not only as an agent that promotes overconsumption, but overproduction as well.

Overconsumption of Information

Scholars will rationally attempt to maximize the amount of information they consume, and there is certain evidence to confirm this statement. According to researchers Carol Tenopir and Donald King, the number of articles read each year by scientists has remained constant between the late seventies until the mid 1990s—approximately 100 articles per year. By the mid 1990s, this number increased to 120 articles per scientist, and by the beginning of the 2000s, the number reached 130 articles per year.¹⁵

Tenopir and King also report that the average time spent reading has not increased during this period, indicating that scientists are doing more reading without spending more time. They speculate that this increased efficiency may be due to electronic publishing, growth in bibliographic searching, and electronic interpersonal communication with colleagues.

The fact that the number of articles read per year was constant from the 1970s to the early 1990s in spite of the fact that more articles were being published each year, may indicate that the inconvenience of working with paper journals and with a central repository (i.e. library), was a limiting factor in scholars' drive to read more. When time-saving efficiencies became implemented, scholars' consumption of information increased. Whereas Tenopir and King's research indicates that this trend is still continuing, the limiting factor in consumption will be scholars' time. The quintessential consumer behavior of academics has been coined by Hans Roosendaal as, "authors want to publish more, readers want to read less."¹⁶

Overpayment for Information

In their monumental article, "Scientific and Technical Serials Holding Optimization in an Inefficient Market," Stephen Bensman and Stanley Wilder demonstrated that a pay-per-article model is much more cost-effective than a subscription model for all except a small number of core journals that have demonstrated themselves to be both high value and low cost.¹⁷ As a result, comprehensive collection development by a subscription model-only is an inefficient use of publicly-shared funds. "Put bluntly," Wilder remarks, "comprehensive collecting is inconsistent with value-based collecting."¹⁸

As a result, the Louisiana State University Library began to adopt a document delivery service with CARL UnCover, to provide their patrons with direct access to serials that had either been canceled or never subscribed. Currently subscribed LSU serials were blocked from the system and the library covered the expense of all article deliveries except for those costing more than \$26.50 or from researchers making heavy demands on the service.



According to the very detailed report by Jane Kleiner and Charles Hamaker, LSU cancelled over \$700,000 worth of subscriptions between 1993 and 1996. During a 42-month period, the library spent just under \$137,000 on all document delivery costs (including copyright fees). Even for titles requested over ten times, supplying articles by document delivery was considered to be more cost effective than reinstating subscriptions for all except one title.¹⁹ Similar cost effectiveness was also reported at Furman University, a small liberal arts college, and at California State University, a multi-campus system.²⁰

This example illustrates that a library does not need to choose between *access* and *ownership*, but can effectively integrate them both into a collection management model. In the LSU model, the library set up parameters to ensure that the service was not being exploited by individual members of the LSU community.

Caveat to article economy

Despite the evidence that an article-based transaction would be cheaper for libraries, the CEO of Elsevier Science disagrees, "I do not believe that paying by the drink is a suitable model; it is cumbersome for us, but it is also cumbersome for our contract partners—the libraries and universities."²¹

A move to an article-based economy would be disastrous for many publishers, whose portfolios are filled with low use/high cost niche journals. The creation of the Big Deal—an arrangement where a library can purchase unlimited access to a publisher's entire suite of journals—is an ingenious model from the standpoint of the publisher, especially if it can include a non-cancellation clause. In exchange for access to titles a library has not historically purchased in print, the library gives up its ability to defect from a subscription model and move to a more efficient article-based model.

Price Discrimination: Personal vs. Institutional Subscriptions

Following Hardin's earlier example of individual herdsmen and a village pasture, we move to a situation involving personal and institutional (or library) journal subscriptions.

Consider a journal-pricing model involving price discrimination between individual and institutional subscriptions. An individual subscription costs \$100 and an institutional subscription costs \$500. Since the individual is effectively being taxed in order to support the library, it is in his/her own best interest to have the library subscribe to this journal. If there are fewer than five users of this journal on the campus, the college ends up spending more money on an institutional copy than if each interested reader subscribes individually. Is there any empirical evidence that this is happening?

Carol Tenopir and Donald King have documented that the number of personal subscriptions held by scientists has been declining since the 1970s, resulting in an increased reliance on library-provided copies, from an average of 5.8 subscriptions per scientist in 1975 to 2.5 subscriptions in 1995.²² In a 2000–2002 update, they report the number is reduced to 2.2 subscriptions.²³ The researchers speculate that these remaining subscriptions either fulfill the role of current awareness and browsing, or are the benefit of membership to a scientific society.



While fearful of publicly disclosing actual subscription numbers, many publishers have openly admitted that their personal subscription base has been declining. Some publishers of highly specialized technical niche journals, with very few potential subscribers, have abandoned personal subscriptions altogether and only offer an institutional rate.

Convenience of personal paper copy disappears when library purchases online

In the past, individual researchers subscribed to personal copies because the time spent physically going to the library and the inconvenience due to competition for certain popular titles outweighed the cost to the individual.²⁴ In addition, when multiple individuals compete for a limited resource (i.e. a single print library journal), the inconvenience of finding an issue checked out or temporarily unavailable provides a viable incentive for a personal subscription. Convenience and immediacy have real value to a researcher. In this way, it makes perfect rational sense to have multiple copies of a title on campus, but only in a print journal model.

Scholarly journals, especially in the sciences, have made a rather rapid transition from paper to online. The success of electronic journals is founded on the fact that scientific results can be disseminated more quickly and to more individuals in an academic community than by a limited number of print journals. The rationale to continue a personal subscription to a journal becomes more difficult to substantiate when its contents can be viewed from a scholar's own computer. When it becomes unnecessary to trek to the library and compete over a limited print resource, the incentive to purchase a personal publication weakens considerably. If *someone else* is willing to pay for that access, then it is in the best interest of the individual to cancel his/her own copy. Scholars have been voting with their wallets, and winning—but we will see that they lose in the long run.

Site Licenses: Price Discrimination Goes Electronic

Unlike paper subscriptions, electronic journals are resources that effectively cannot be diminished. The downloading of an article by multiple readers does not make that resource scarcer for other readers.

Electronic journals also remove the inconvenience to the reader of traveling to a central building to share a resource that may be under great demand. Academics have reacted very rationally in this new online environment. Personal, departmental and laboratory subscriptions are quickly abandoned when the library negotiates for a single

site-wide subscription. We are moving into an environment where there is only one networked subscription and that responsibility for paying and maintaining access falls solely on the library.

Apart from the financial responsibility that comes with managing a central resource with central money, library management of electronic resources may be more costly to the institution than individual subscriptions.



In reaction, publishers have developed some very creative mechanisms to secure their revenue from an institution. Some publishers have set arbitrary dates in the past as a starting point for price negotiations, established no-cancellation clauses, bundled journal packages, or calculate subscription prices by factoring in all subscriptions across campus.

Apart from the financial responsibility that comes with managing a central resource with central money, library management of electronic resources may be more costly to the institution than individual subscriptions.

Consequences of site-license economics

Carl Bergstrom and Theodore Bergstrom, an economist and a zoologist, argue that from a price-maximizing model, an institution will pay more money than it would by paying for individual subscriptions. They write, "if a journal is priced to maximize the publisher's profits, scholars on average are likely to be worse off when universities purchase site licenses than they would be if access were by individual subscriptions only."²⁵

They argue however that this is not always the case, and that "site-licenses are not always disadvantageous. Journals issued by professional societies and university presses are typically priced so as to maximize subscriptions while recovering average costs. When such journals are sustained by institutional site licenses, the net benefits to the scientific community are larger than if these journals are sold only by individual subscriptions."²⁶

Looking at the variables controlling library pricing of the top 99 journals in economics for 1985, George Chressanthi and June Chressanthi developed an elaborate multiple regression model involving twenty predictor variables. The researchers reported that every \$1 increase in the price of a personal subscription resulted in a \$1.29 increase in the price of a library subscription, all other variables held constant. Their work confirmed that individuals canceling their own personal subscriptions resulted in higher library costs, in essence confirming a Tragedy of the Commons.²⁷

The blame for price discrimination should not be leveled entirely on the publisher. By insisting that entire communities in all locations be granted unfettered access to online information, the library advocates for a model that is economically unfavorable.

Moral Arguments to Halt the Tragedy Won't Work

To restate, the current information chain is an example of three constituent groups acting rationally to exploit a common resource. What is in the best interest of publishers, librarians, and scholars is not in the best interest of the university, its budget, or in the best interest of science. Any solution that fails to address the interests of the *individual*, does not address the cause of the problem.

The Association for Research Libraries (ARL), Association of College and Research Libraries, and SPARC have joined together to provide *Create Change*, a toolkit for both librarians and faculty on the issues related to the scholarly serials crisis.²⁸ ARL's approach is to target faculty as the authors and consumers of information in an attempt to



change their behavior. Faculty are encouraged to submit their articles to society or association publishers, and if they serve as editors, to consider defecting from a commercial to a non-profit journal. In essence they have proposed a possible solution to the exploitation of the public commons by one of the constituent groups—the publishers. If all journal articles were being published by non-profit entities, the profiteering motive of publishers would be removed from the system. There is no doubt that the educational campaign by SPARC and the sponsorship of new non-profit and competitive journals has had a positive effect on the scholarly journal market. I will argue, however, that this solution does not solve the underlying economic tragedy of the commons.

Firstly, the proposal for change is grounded in a moral argument, and does not address the incentives and rationale for individual actions. In essence, the argument proposed is:

For the sake of the library, please consider not reading/authoring/editing expensive journals.

If every academic were able to make this personal sacrifice, we would be able to correct the dysfunctional economic model. Unfortunately, this argument does not provide rational incentives for scholars to change their behavior. The reader does not directly pay for journals, and consequently has no direct incentive to choose the less expensive alternatives. Many society publications still levy author page-charges. While the resulting publications are subsidized by the creators of the information, a model including author fees acts as an incentive for these individuals to defect to commercial journals. In addition, scholars are motivated by other incentives in their decision to submit, read, and provide editing for a journal, like prestige and the benefits that come along with it—promotion and tenure.

“Appeals to individual publishers, scholars, or even librarians to restrain themselves for the common good will not work,” since there is always a tendency of individuals in large groups not to pursue common goals.²⁹ In other words, voluntary collaborative action is unlikely to happen. Elinor Ostrom, a political scientist, describes that only in very small communities can individuals sharing a public commons effectively govern themselves, and that they can do this through sanctioning and shaming individuals who break the rules of resource sharing.³⁰

At a time when library budgets are suffering terrible cutbacks, commercial publishers have posted landmark profits. Earlier this year, librarians assailed a single publisher on the ReedElsCustomers listserv for posting egregious profits, with the hope of shaming this publisher into lowering its journal prices. Based on evidence over the last thirty years, this is unlikely to happen. Some argue that it is time to take publishing back from the publishers.

Slow Death for Research Libraries

ARL statistics illustrate a trend that the role of the library as a public resource is in decline—a gradual reduction of the purchasing power for libraries, fewer books acquired as a result of shunting monograph monies for serials, and a decline in the number and diversity of serials purchased in academic libraries.³¹ As Gary Byrd writes,



The most important tragic consequence for our current system of scholarly communication will be the slow death of research libraries as much more than archives of the past. Their ability to collect and provide access to the current scholarly record will be gradually destroyed. The publishers and scholars who depend on the research library's budget and scholarly information resources will be forced to find alternative, and probably more expensive, ways to disseminate and gain access to these resources.³²

If the institution of the library cannot adequately serve the needs of scholars, they will find other methods to circumvent the system, and the library quickly becomes obsolete as a governor of a public scholarly resource. In his thought-provoking piece, *In Oldenburg's Long Shadow*, Jean Claude Guédon describes the disintermediation of the academic library in the information chain. As libraries move to purchasing entire publisher packages, the library reduces itself to merely a purchasing agent for the university. He writes:

It is not inconceivable that librarians could end up simply holding the local nozzle of a universal knowledge pump when they deal with current materials, while sitting on top of largely obsolete or secondary information . . . Should this dire prediction come to pass, libraries would end up as little more than dusty museums where old books would be stored and old digital files would be periodically refreshed to remain compatible with a fast-evolving technology.

—and adds sarcastically, “what a stimulating and vibrant future this is!”³³

Abandoning the Current System for Unknowns: Technology is Not the Answer

red herring

noun

1. A smoked herring having a reddish color.
2. Something that draws attention away from the central issue.

[From its use to distract hunting dogs from the trail.]

The desire to look to technology for answers to this crisis is incredibly tempting, but I fear that we are chasing a red herring. Proposals to reduce costs in the system are temporary, and serve only to delay the inevitable.

Recently, libraries have been encouraged (both by publishers and by administrators) to cancel all print subscriptions from individual publishers and go “e-only” for a marginal cost savings in the first year. This solution does not protect the library from the effects of the Tragedy, but only serves to further disintermediate the library from the information chain. Without control over individual print subscriptions, the library becomes a prisoner in a lose-win relationship with publishers.³⁴ Economist Robert Parks argues that this one-time reduction in costs will only put the crisis off a few years, not solve it.³⁵ Mark McCabe, an economist who worked for the U.S. Department of Justice's Antitrust Division argues that a move to an e-only model with publishers removes the remaining power of the library to impose limited price discipline on existing high-priced titles arguing, “the few control mechanisms that did exist on the demand and supply side now disappear.”³⁶

A realization that the budgetary crisis affecting libraries and their ability to remain as effective agents in the scholarly publication chain has led some to believe that the current model of scientific publishing is defective and needs to be completely overhauled. Richard Kaser, former Executive Director of the National Federation of Abstracting & Information Systems wrote in *Nature Web Debates*:

It concerns me that some are talking rather casually here and elsewhere about chucking a system that has served science well for over a century and extremely well over the last several decades of automation, in order to achieve a dream that sounds so easily accomplished but, upon attempts to implement, could just as easily turn into a nightmare of unanticipated results... I am suggesting that it would be foolhardy for the scientific community to trade a system that works reasonably well for a system that might—or might not—work.³⁷

Ann Okerson, Associate University Librarian at Yale University, also responds to the question of overhauling the scientific communication model in *Nature Web Debates*:

The high risk of not taking more time is that we will lose something quickly and replace it slowly. We will lose a system of publication that undeniably succeeds in making the best work widely known quickly and preserves it for long-term use. The researcher in search of high-quality information does not need to lose productivity because he or she has to make a lurching adjustment and navigate a new communication system that has been hustled into place prematurely.³⁸

What about open access publishing?

There has been a lot of talk recently about Open Access Initiative,³⁹ and new models of publishing that rely on the author to incur costs upfront so that access can be free for all readers. BioMed Central, a for-profit company started by publishing entrepreneur Vitek Tracz, proposed a publishing model where authors pay a \$500 charge to offset the cost of free access.⁴⁰ Economically for the institution, this model would make a lot of sense, but since authors are averse to paying any direct costs for publishing, this appears to be a disincentive, especially for new untested journals with low initial prestige.

BioMed Central very quickly moved to encouraging libraries to pay an institutional subscription fee so that its authors could publish for free. While the institution is not called a subscriber, but an “institutional member,” the model moves us back into a Tragedy of the Commons. Institutions pay more money in this model than the sum of all author payments in the initial model. Because we are dealing with a for-profit publisher, it is completely rational that institutions will see their “membership” fees rise precipitously if this product and its journals become prestigious. Individual authors will push for the library to continue its subscription despite a clear price discrimination model being in effect.

In the fall of 2003, the Public Library of Science, a non-profit organization, will introduce two new open-access titles.⁴¹ While it is not known at this time whether PLoS will adopt a similar institutional membership as BioMed Central, the costs to the author (or library) may more closely reflect the *actual* cost of publishing than the costs the market will bear.



In a non-profit model, open-access publishing may very well provide a cost-effective alternative. Even with the existence of open-access journals, there are few incentives (except moral) for authors and readers to change their behaviors. In a provocative article analyzing the incentives of all players in the scholarly communication game, economist Robert Parks argues that there are little if any incentives for any of the players to move to open-access publishing model.⁴²

Changing the Rules of the Game

If we want a different outcome from this economic game, then I submit that instead of abandoning the current system for untested and costly alternatives, we should attempt to modify the rules and incentives of the current system. In his thought-piece on the effect of Big Deals on libraries, Ken Frazier writes, “game theory demonstrates that changing the conditions and strategies of play can and does alter outcomes. If the rules, rewards and penalties are changed, the behavior of the players will change dramatically.”⁴³

Publishers, scholars, and librarians are also rational players in this game. In the current system there are no personal consequences for scholars to limit their use of expensive journals and no disincentives for submitting articles to expensive journals.

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There are currently no incentives for publishers to limit their profits by lowering the prices of their journals—in fact there is an incentive for executives and shareholders of these publicly traded companies to do the opposite. And lastly, there are personal consequences (from faculty) for librarians who refuse to subscribe to the journals that faculty read, author, and edit. In essence, we have set up a game that is designed to benefit each constituent group but ultimately harms the university and the scientific establishment.

In order to change the outcome of the game, we need to look at changing the rules. There has been ample discussion that the academic tenure and promotion system need to change. While changing the incentives for scholars has been proposed, this transformation is unlikely to come from librarians. Similarly, limits on the profit that can be made by publishers, competition in the marketplace, and government intervention on monopolistic publisher behaviors would all have an influence on the price and terms set for acquiring information. Efforts to change these constituent groups in the information chain are absolutely necessary; and in the meantime, I would like to conclude by focusing on pragmatic and library-centered solutions.

Library Solutions: Governance and Incentives

The role of government is to manage public resources for the maximum and long-term benefit of all interested parties, and the role of librarians as governors of an intellectual resource is essentially the same. Unless we are willing to give up this responsibility, as



proposed by Dutch economist Henk Plasmeijer,⁴⁴ then we will have to re-intermediate the library into the economic model, and cease to serve merely as a purchasing agent for the scholar community.

In principle, libraries must have control over their collections and be able to actively manage them for the benefit of their communities.

Specifically this may entail:

1. A system where libraries can select or reject information on the basis of its relevancy, utility and cost.
2. A model where libraries pay for information based on actual use rather than potential use.
3. A business model where information can be acquired just-in-time, rather than just-in-case.
4. A system that provides incentives for authors to submit their scholarship to cost-effective publications, or alternatively, disincentives that prevent the opposite.
5. A cost-sharing model with the library so that scholars become more aware of the true costs of purchasing information.
6. A model that enhances the library's ability to share information with other libraries.

All of the above suggestions may appear unsurprising except for a model of cost-sharing. Consumers of information would be much more discriminating than libraries if they had to purchase their own information. Even a system of co-payments, where a library charges back a small percentage of the real cost of purchasing information would provide great incentives for scholars to modify their behavior. Co-payments are a standard practice in the medical insurance industry and have the effect of sensitizing consumers of the costs (or rather prices charged) for treatments and drugs. Unfortunately, the concept of library user-fees is morally offensive to most librarians. Without charging money, however, the library may invoke other incentives (or disincentives) to modify user behavior. These changes involve either rationing or limiting access to information. For example, libraries may consider limiting electronic access to individual buildings or communities on its campus that have demonstrated real need for access instead of insisting on providing access to its entire community. Retrenching even further, the library could return to limiting free access only within library buildings, as proposed a decade ago by Bruce Kingma and Philip Eppard.⁴⁵ Libraries may still guarantee free access to all materials, but significantly delay access to those titles not held in libraries, providing a real disincentive for use. I bring up these examples—while completely ludicrous to practicing libraries—to illustrate that most economic solutions to the Tragedy are antithetical to the tenets of our profession.

Therein lies the tragedy and the dilemma for libraries. We are trapped between the responsibility of governing a public commons and the mission of providing free and unfettered access to information. If libraries are to maintain control over a public resource, the ultimate solution may not be in everyone's single interest, but ultimately in the best interest of the academy.



Postscript: The Tragedy of Central Funding

In many college libraries, acquisition funds are divided up into separate lines managed by individual selectors. In order to purchase expensive products that have potential use outside the responsibility of a single selector, one of the solutions has been to create a shared public resource or central budget line. This common resource is often created by taxing each selector or library, or by skimming the total library budget before allocated the remaining funds to individual selectors. In essence, this is creating a public commons within a public commons.

Forced between paying for a resource out of a personal budget and paying for it out of a public budget, it is in the best interest of selectors to move as many resources out of their own personal budget and into the public budget. This is not deviant behavior expressed by a few greedy individuals, but a rational and logical choice.

The greater the pressure on each individual line, the greater the pressure to move resources to this public fund. But, the greater the pressure on the public fund, the greater the pressure to increase this tax on individual budget lines. What is clearly going on is not a change in the total acquisitions money coming in, but redistribution from individual lines to a central line.

Like Garrett Hardin's analogy of the common village pasture, as long as a selector is getting some nominal (or even potential) benefit from the support of a centrally funded resource, it is in his/her best interest to keep it funded there. For example, resource X costs one unit of funding for a single selector. There are ten libraries contributing to a central line, all taxed one-tenth of one unit for this resource. As long as the value of the resource to the original selector exceeds $X/10$, then it is better to be taxed than to pay the entire bill.

While a central model can be very effective for some resources that are considered truly multi-disciplinary and are considered good value for the money, a model involving two fund structures leads to less effective use of a public resource, and possible abuse of the system. Individuals or committees set up to manage this commons need to be responsible stewards. Specifically, they must have the ability to reject resources that are not multidisciplinary or cost-effective. Secondly, they must be able to cost-share with individual selectors in order to share the financial risk. Lastly, they must have the authority to cancel or return resources to the responsibility of individual selectors that have proven to have low utility and high cost.

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Notes

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4. This argument refutes Adam Smith's central axiom of the "invisible hand." "By pursuing his own interest," Smith writes in his famous treatise, *The Wealth of Nations*, "he frequently promotes that of the society more effectually than when he really intends to promote it." See Adam Smith, *An Inquiry into the Nature and Causes of the Wealth of Nations* (1776). Available in Project Gutenberg: <<http://gutenberg.net/>> [September 17, 2003]. You may be more familiar with Princeton's mathematician, John Nash, who shared the Nobel Prize in Economics for his development of the field of game theory. In the 2001 Academy Award winning film, *A Beautiful Mind*, Nash (played by actor Russell Crowe) declares "Adam Smith was wrong," as he instantly realizes that what is the best in interest of each of his colleagues was not in best interest of the group.
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