

The Stratified Economics of Open Access

Abstract

Those involved in scholarly publishing are coming to recognize how open access to this body of work can increase its value and reach. Yet no one economic model of open access prevails.

Rather, open access is being achieved through a variety of forms that include author self-archiving, immediate (sponsored) open access, delayed open access, and article-processing-fee open access. These open access models are each the result of a stratified scholarly publishing market that can be roughly grouped among independent journals, scholarly society publishers, and commercial publishers. Each of these three market segments is experimenting with forms of open access that hold promise for sustaining, if not extending, the segment's market position.

This paper reviews the economics of these open access models, while drawing attention to the consequences of this market stratification for access to knowledge and the sustainability of scholarly publishing as a whole.

The Stratified Economics of Open Access

Open access is a term which has been used since 2002 to describe those research articles and journals that can be read with a subscription or other form of fees.¹ Open access is a concept that grows out of long-standing principles of scholarly publishing which hold that the value of knowledge grows with that knowledge's increased circulation (David 1998). This is because with increased availability, any given study is itself informed by more of the relevant work of others, even as it goes on to inform more of the work of yet others. Online access to learned journals, in and of itself, has undoubtedly increased access to this knowledge and thus added to its value for researchers and publishers alike. With roughly 20% of the scholarly literature now open access, we are seeing how it further increases the value of this knowledge (Björk, Roos, & Lauri 2008).

In terms of recent trends, Tenopir and King have seen a general increase in the number of articles researchers are reading in an ongoing study dating back to 1977, with a significant leap taking place since the beginning of the twenty-first century (2008).² Articles that have been made

¹ The concept of "open access" was coined and formally defined by an international group of faculty members, publishers, and librarians that had come together in Budapest in 2002 by the Open Society Institute. The Budapest Open Access Initiative defined *open access* as a melding of tradition and technology. The tradition was to publish the results of one's research, "for the sake of inquiry and knowledge" and the technology was the Internet (Chan et al. 2002). Taken together, "the public good they make possible is the world-wide electronic distribution of the peer-reviewed journal literature and completely free and unrestricted access to it by all scientists, scholars, teachers, students, and other curious minds" (ibid.)

² Even as the number of articles read has increased, with readers increasing use of search strategies over browsing, the citing of this literature has taken a different course, as James A. Evans has found that the range has narrowed, even with increased on line access, to fewer, more recent citations from fewer journals, which may arise from the ease with which readers can go from references to the cited full text (2008).

open access, whether through archiving or by the journal, appear to be read more often in the short term (Davis, Lewenstein, Simon, Booth, & Connolly 2008). and cited more frequently with time (Hitchcock 2008), attesting to their increased contribution or value within the literature. The open access journal *PLoS Biology*, rising to the top of the life sciences in Journal Impact Factor in less than two years of publication, put to rest apprehensions about open access as a threat to the quality of knowledge and the recognition it receives (Kennison 2005).

Open access is also increasing the value of knowledge through a number of other channels, including publishers' generous agreements providing developing countries with free or deeply discounted access to a wide array of journals (Willinsky 2006, chapter 6); the use of open access research by government policymakers (Willinsky 2003) and by professionals in other fields (Willinsky & Quint-Rapoport 2007); and the contribution that open access is making to the educational quality of public knowledge resources such as *Wikipedia* (Willinsky 2008).

In this paper, I focus on the journal publishers and the economics involved in the various forms that open access has taken since the early 1990s. The journal market—which has been estimated to run to \$7 billion annually for English-language research in science, technology and medicine alone (Ware 2006)—can be said to be made up of three relatively distinct publishing economies, which I am identifying as independent journals, scholarly society publishers, and commercial publishers.³ All three segments publish peer-reviewed journals in pretty well all

³ This may appear analogous to, say, early twentieth-century automobiles with do-it-yourselfers, local production shops, and the emergence of mass production, except that in scholarly publishing large-scale manufacturing is driving unit costs up rather than down, while its distribution advantages have been overcome by open access. A corporate sector takeover of museums might be imagined as a better point of comparison, given the public trust

disciplines and subfields. Nor are these segments distinguished by the quality or the quantity of the work that individual journals publish (as difficult as it is to compare such factors across disciplines and publishers). Rather, what sets the segments apart is the cost structure historically associated with their publishing activities. In an odd economic turn, then, the price charged for a journal is more closely associated with the segment that publishes it than with either the quantity or quality of the journal's content.⁴ And it is this stratification that is shaping the economics of open access.

While it may seem on the surface that open access is simply an attempt to overcome price barriers, making research available to everyone on the same basis, each market segment is approaching open access as a means of sustaining if not extending its market position. This means that current developments in open access are not addressing what has already been declared on more than one occasion as “unsustainable” about scholarly publishing in its present

quality of research, with the result that ownership of artifacts is transferred to the private sector, while state and patron costs go up.

⁴ It is a case of price discrimination meeting monopolistic competition. Each segment places a different range of prices on monopolistically held goods of the same value. In terms of quantity, for example, Bergstrom and Bergstrom found across six disciplines, from ecology to physics, that commercial publishers were charging institutional subscribers from three to nine times more per-page than societies at the turn of the twentieth century (2004, p. 897). In terms of quality, they found that the average per-citation cost for commercial journals can be five to more than ten times higher than it is for society journals, as a journal that is cited more frequently has a lower per-citation cost compared to a comparably priced, less-cited title (ibid.). Also on the question of quality, Bergstrom observed in 2001 that for the field of economics “the six most-cited economics journals listed in the *Social Science Citation Index* are all nonprofit journals and their library subscription prices average about \$180 per year,” while “only five of the twenty most-cited journals are owned by commercial publishers, and the average price of these five journals is about \$1,660 per year” (2001, p. 3).

form (Byrne 2003; Davies & Greenwood 2004; Leonard et al. 2004). As the economics of open access is about the interests and means by which each of these three scholarly publishing segment operates, let me say a little more about each segment at this point.

1. *Independent Journals*. The oldest, if smallest segment, at this point, among publishing interests is represented by the individual scholar or groups of scholars who decide that a journal is needed or perhaps some other service that aids in the circulation of scholarly work. The independent journal has tended to operate on a shoestring, as the publishing process has within the context of the editors' work, as well as that of authors and reviewers, within a university. It is driven by the labor of scholars interested in helping colleagues in their area get their work out in ways not otherwise possible, setting minimal subscription prices which are intended to establish as wide a market as possible. These groups can, and often have, evolved into scholarly societies; they have at other times had their journals picked up by commercial or university presses. Raym Crow estimates that 15% of journals fall into this category of independent titles, based on his study of *Ulrich's Periodicals Directory* (2005). They have, as well, persisted in this independent sense in ways that have proven vital to open access publishing. And in the beginning, Henry Oldenburg started editing the *Philosophical Transactions* on this principle (as well as to draw some personal income, as he did not have a university or other paid position), with the Royal Society of London permitting him to use their "transactions," while declining to take on the role of publisher of this still-running journal until well into the eighteenth century.

2. *Scholarly Societies*. The next segment historically and in size in journal publishing is the scholarly society or association which typically forms around a disciplinary interest. Such societies publish journals as a service to their membership, to assert their expertise, and as a means to at least potentially generate a surplus, through sales to research libraries, to cover such

expenses as the society's professional staff. Societies account for roughly 40% of the journals published today, with the vast majority of societies publishing single titles (Crow 2005). A growing number of societies are contracting out their publishing to commercial publishers who now publish close to half of the societies' titles (ibid.).⁵ Turning their journals over to the commercial publishers enables societies to take advantage of the online publishing infrastructure of the commercial houses, as well as their far more savvy marketing and pricing practices.

3. *Commercial Publishers.* Finally and most recently, commercial publishers have grown into a dominant publishing force, first of all by initiating journals, when the scholarly societies were slow to respond to the great expansion of university research, particularly in the fields of science, technology and medicine (STM), in the decades following the second world war.⁶ By

⁵ A small number of scholarly societies (e.g., American Psychological Association, American Chemical Society), as well as non-profit university publishers (principally, Oxford University Press), have reached a scale and manner of publishing that makes them difficult to distinguish from the major commercial presses, even if what they generate is a *surplus* rather than a *profit*, per se. Crow found that the university presses published 700 journals, some of these sponsored by associations and some are what I am referring to as independent (2005).

⁶ Bergstrom sets out the commercial publisher's growing market share in the field of economics this way: "In 1960 there were about 30 English-language economics journals and almost all of them were owned by nonprofit organizations. In 1980 there were about 120 economics journals, half of them nonprofit and half of them commercial. By the year 2000 there were about 300 English-language economics journals with more than two-thirds of them owned by commercial publishers" (2001). The most colorful figure in the post-war commercialization of scholarly publishing is media mogul Robert Maxwell, who got his start by founding Pergamon Press in 1951. In terms of journal acquisitions, an Association for Child Psychology and Psychiatry secretary recalls that "Captain Maxwell . . . interviewed us [about starting the *Journal of Child Psychology and Psychiatry*], . . . in a room which seemed slightly sinister—he took no notes but the entire conversation was being recorded on a wire recorder . . . and in the words of one of his parliamentary colleagues, he seemed to be offering us a 'blank Czech'" (Berger & Taylor,

securing the editorships of respected scholars and societies, while employing professional staffs to, among other things, actively acquire and aggressively price and market titles, they are able to not only increase market share but subscription fees.⁷ As Crow sums up their market share, “commercial entities publish over 60% of all peer reviewed journals, either on their own or on-behalf of societies, with the six major commercial publishers playing a role in the publication of almost 30% of all scholarly journals” (2005).⁸

Among these three segments, the scholarly societies and commercial publishers have at times taken a common stance toward open access, as in the case of the International Association of STM Publishers, which represents 100 societies and commercial publishers, has put it: “Publishers are currently either implementing, or testing, ways to harmonize this visionary goal [of open access] with economic reality” (*Overview* 2008, p. 10). This “economic reality,” however, is marked by the historic bifurcation of journal pricing practices between scholarly

1988, p. 243). Maxwell’s offer, as later editors described it, included “Pergamon’s willingness to produce and distribute the journal at their own risk and expense, as well as cover all editorial expenses, provide free reprints to authors, distribute the journal worldwide and several other advantageous proposals” (ibid p. 243). In a pattern of acquisitions and corporate concentration, Elsevier bought Pergamon in 1991 for 440 million pounds, resulting in a 25% increase in subscription prices, followed by letters of protest and subscription cancellations, at least in the case of Princeton University Librarian Donald W. Koepp (Koepp 1991; McCabe 1999).

⁷ Bergstrom and Bergstrom report that “in economics, for example, the average inflation-adjusted price per page charged by commercial publishers has increased by 300 percent since 1985, whereas that of nonprofit economics journals has increased by ‘only’ 50 percent” (2004, p. 897).

⁸ The leading six are now five with further acquisitions: Elsevier, Springer, Wiley-Blackwell, Taylor & Francis, and Sage.

societies and commercial publishers, reviewed above.⁹ It is a reality also marked by a loosely defined set of independent journals, whose editors are discovering that open access publishing can be achieved in good measure through freely available software tools and the university's existing infrastructure.

The economic discrepancies within this three-tiered cost structure point to more fundamental questions for scholarly publishing than who will pay for open access. That something would seem to speak to a confusion that currently besets scholarly publishing around whether it is a business or not, or what sort of business it is, or rather what sort of business/non-business it is. Open access has grown out of the simplest scholarly urges, and more work needs to be done on what economic and intellectual property principles should guide the growth and contribution of this scholarly work in the digital era. This is not the paper to consider these larger principles, although its analysis of the economics of open access is intended to have the value-add, we might say, of bringing these economic discrepancies to the fore.

THE INDEPENDENT ORIGINS OF OPEN ACCESS

Open access emerged in the 1990s out of the tinkering of scholars and groups of scholars, who found that they had everything to gain through their ability to use their networked computers to freely share their work and that of others, whether by establishing what we now think of as an open access journal that can break into an otherwise saturated market or by setting up a place to share papers about to be published. They found that by taking advantage of this new technology they could again be a source of innovation and development in scholarly publishing. Open access has revitalized independent forms of scholarly communication, enabling scholars to far more

⁹ See note 3.

readily (a) assert the right and necessity of scholars having access to the complete body of relevant work through archives and journals; (b) exercise rights of academic freedom and editorial independence in striking out with their own journals; and (c) bring journals published by scholars working outside of the industrialized world into far wider circulation, as well as bringing such scholars into editorial positions with journals that can be edited from anywhere.

To take two early and important examples, in 1991, the physicist Paul Ginsparg began a pre-print service that is now known as arXiv.org at Los Alamos National Laboratory, and two years later, the statistician Gene Glass launched *Education Policy Analysis Archives*, a peer-reviewed journal at Arizona State University. There are other historical instances from that decade, but these two signal the original impulses and economic principles behind the two major means by which open access has taken hold in scholarly communication.¹⁰

Ginsparg's pre-print server—to which physicists submitted their working and published papers, as well as stopping in on a daily basis to consult new work—continues to provide a means of opening up what had long been the private circulation of pre-prints and off-prints to all physicists, establishing, in effect, what has evolved into the author self-archiving route to open access. He simply took hold of this new tool of the scholarly trade, the networked computer, and directed it toward vastly extending what was already a scholarly practice intended to improve the circulation of knowledge. A certain efficiency arises from the tight integration of scholarly access and production. Where a good number of faculty members were willing to post a copy of an article on their own webpage, the archive created a readily searchable resource that made open

¹⁰ Certainly a contender for one of the first online journals, still publishing, is *The Electronic Journal of Communication*, which was born digital and open access on September 21, 1990
<http://www.cios.org/www/ejcmmain.htm>.

access an operating principle for potentially making the whole of the published, peer-reviewed research literature open and available to the world.

Similarly, Glass was able to see that the networked computer greatly facilitated the two key requirements of scholarly publishing, namely the peer review and the circulation of the resulting work, while editing the work in the process of reviewing the papers himself.¹¹ The open access journal ran on this new ability to bring the entire publishing process within the scope of the scholars' sponsored tools and trade. But it took hold because of how doing so advanced the original and necessary impulse of scholarly work to grow out of this vital point of access to the current and archived body of knowledge.

Of course, Glass and Ginsparg did not have scholarly societies to sustain or corporate shareholders to appease, nor did they have overhead expenses or staff payrolls to meet. They had only an interest in furthering the scholarly circulation of knowledge on the principle that this is what their work is about. They did not imagine that the "information just wants to be free," but understood that the resources which they needed to make this knowledge available fell within the scope of the work sponsored by government, foundation and (largely tax-exempt) institutions in the name of learning.

¹¹ I first contacted Gene Glass in 2001 as part of a survey of editors that Larry Wolfson and I were conducting on the costs of moving a journal to electronic publication. Gene responded almost immediately to our detailed inquiry about cost structures with the simple but effective "Zero, nada, no budget, no grad assistant, no secretary" (G. Glass, personal communication, February 2001). No one else in our survey was publishing on that basis, but his example inspired us to make it possible through open source software for others to follow suit (Willinsky & Wolfson 2001, n.

Their innovative approaches to open access were, however, based on their own particular knack of working with networked computers. In a way that had obviously not been the case with printing, the publishing tools needed to distribute and circulate research were now part of the scholarly trade. While others have continued to build their own archiving and journal publishing systems, what made open access economically viable on a global scale was a related innovation in a similar spirit of openness. This was the development of *open source software* systems for archiving articles and journal publishing. Open source software is a class of software which dates back to the 1980s and now includes among its more prominent instances Linux, Apache, and Mozilla Firefox, which are freely distributed and supported by communities of users. It arose out of a similar impulse and environment as open access, given as it was to sharing what was known about how to operate computers and regarded as a public good (Weber 2004).

SELF-ARCHIVING OPEN ACCESS

The most promising aspect of authors archiving a copy of their published work in an open access repository is that this approach open access is its ability to cut across the three segments, without seeming to disturb current economic models or practices. In the longest-standing instance, with arXiv.org, for example, the publishers of the relevant physics journals report that they have experienced no greater decline in journal subscriptions than is happening more generally, as a result of the proliferation of titles and the increases in prices (intended to compensate, in part, for subscription losses).¹² Self-archiving was also the first of the open access initiatives to benefit

¹² A representative of the American Physical Society, with 14 journals of which three are covered by the content in arXiv.org, reported to Alma Swan that arXiv.org had not had an effect on subscriptions but that there had been “an overall decline of an average of about three percent a year (less lately) across all journals since the 1960s,” and the

from the development of open source software systems, in the form of Eprints.org released by the University of Southampton in 2000, which made freely available the means for libraries and others to set up such archives (Tansley & Harnad 2000).

Out of a recognition that at least some authors were archiving their work on their own websites, and that this seemed unlikely to hurt subscriptions, publishers began to include a right to do so within the copyright transfer policies that authors were asked to sign. At this point, just over half the publishers in a sample of 461, grant authors the right to post a peer-reviewed version, while an additional 12% allow posting of the version submitted to the journal.¹³ Such policies are an especially effective way for scholarly societies to enable their members to improve the circulation of their work without seeming to threaten subscription revenues, and from the American Anthropological Association to the Society of In-Vitro Biology, there has been an embrace of this path to open access, just as there has among commercial publishers from Elsevier to Wiley.¹⁴

Today, there are more than 1,200 open access archives or repositories world-wide, with most of them maintained by university libraries, to which authors are posting versions of their work. While this could lead in principle to open access for at least half of the current literature, authors have not been exploiting this opportunity in large numbers. In response to relatively low levels of participation in self-archiving, a number of universities and research funding agencies

Institute of Physics with 40 titles (of which four are covered by arXiv.org) reported that “the general attrition slope has not changed” (Swan 2005).

¹³ These figures are drawn from the SHERPA/RoMEO database of publisher archiving policies, including those of scholarly societies and commercial publishers <http://www.sherpa.ac.uk/romeo/>.

¹⁴ Green Publishers, SHERPA/RoMEO <http://www.sherpa.ac.uk/romeo.php?colour=green>.

have begun to mandate self-archiving in recognition of how it extends the value of the work.¹⁵

The leading instance of funder mandating is the U.S. National Institutes of Health, whose policy covers all of the research supported by the \$28 billion spent by this agency annually, which is expected to lead to 80,000 articles deposited in its open access archive PubMed Central.

The move to mandates has brought some of the more indirect economic matters of access to the fore. Publishers, including those who permit authors to archive, see mandated archiving as an incursion on the exclusive property rights they have secured from authors (in exchange for publication). They recognize the risk that this seemingly incidental open access introduces, and in some instances have curtailed an author's archiving rights, limiting it in many cases to the author's final draft, after peer review (but prior to copyediting, layout and proofreading), while also imposing an embargo period that prohibits archiving until 12 to 24 months have passed since original publication.¹⁶ Publisher organizations, representing the larger societies and commercial publishers, are also engaged in lobbying and public relations efforts that have resulted in NIH adopting a 12-month embargo, and that more recently led to proposed legislation, currently before the U.S. Congress, that would prohibit government agencies from

¹⁵ At this point 24 institutions, 4 departments, and 30 funding agencies have author self-archiving policies or mandates calling for open access <http://www.eprints.org/openaccess/policysignup/>.

¹⁶ The SHERPA/RoMEO database of publisher policies does include 55 publishers, out of 457, that permit authors to post the final, published PDF in an archive on publication, with 13 permitting this after an embargo period <http://www.sherpa.ac.uk/romeo/PDFandIR.html>. In turn, self-archiving strategist, Stevan Harnad has countered the embargoes with a call for Immediate Deposit/Option Access policies, in which embargoed work is immediately deposited in an archive, with open access replaced by an Email Eprint Request button that readers can use, much as they once sent postcards asking for reprints (Harnad 2006).

mandating open access, in the way that the NIH has done (Peak 2008).¹⁷ As the International Association of STM Publishers puts it, “publishers do not believe that self-archiving offers a sustainable alternative for scientific publishing” (2008 p. 11).

No less a part of the current economics of open access is how archiving is seen as a transitional and strategic state, involving the establishment of a parallel but lesser universe of scholarly communication that shadows the published record of the literature, while instantiating expectations around the value and viability of open access. Universities may use open source software to set up the archive within the scope of existing institutional technical infrastructures, but there are costs associated with operating them, while they do not reduce the need to subscribe to the published literature.¹⁸ There are costs, as well, associated with open access to degraded and delayed versions of the published record, setting up a business class and coach access model that may end up taking hold rather than serving as a transitional stage. Archiving also has greater costs among scholars in the humanities, where accurate citing of the actual (published) text is essential, greatly reducing the value of the self-archived version, with similar concerns about precision of language making them reluctant to post drafts in any form.

¹⁷ There have been a number of failed public relations moves, which have tended to exaggerate “threats [posed by open access] to the economic viability of journals and the independent system of peer review,” as the Professional & Scholarly Publishing Association of American Publishers puts it on their website—<http://www.prismcoalition.org/>—leading to a disavowal from the publishing community.

¹⁸ The International Association of STM Publishers directs part of its attack on self-archiving by bringing up the expense of maintaining archives, citing a number of reports that place the costs of setting up and operating an archive between \$8,500 and \$1.5 million, while calling for a cost-benefit analysis of operating archives (*Overview* 2008, p. 11).

Author self-archiving remains the form of open access that applies across this otherwise stratified market, even if the responses from the large societies and commercial publishers have involved greater restrictions and lobbying against mandates. On the other hand, the open access journal has gone in very different directions across these three segments. The Directory of Open Access Journals, certainly the best guide to open access titles, is approaching 4,000 in number, with examples from every discipline, as well as from what I am identifying as the three segments of the journal market. Yet among independent journals, open access is proving the mode of choice for placing these titles on something of an equal footing to those of society and commercial publishers. Scholarly societies, on the other hand, are understandably torn between how open access might serve their members better by increasing access to their work, while undermining one of the principal reasons for membership in the first place. They have tended to experiment with delayed open access, as a means of preserving the principle that membership should have its privileges. The commercial publishers (along with larger non-profit publishers in well-funded fields) are considering whether a simple transfer of rising subscription fees into rising article-processing charges might prove the sustainable open access model for them. Let me consider each of these economies in a little more detail.

OPEN ACCESS INDEPENDENT JOURNAL PUBLISHING

With the move of independent journals to open access, I need to describe, by way of full-disclosure, my own involvement in this segment of the publishing economy through my work with the Public Knowledge Project (PKP). Since 1998, PKP has sought to directly effect the economics of open access by providing open source software for journal management and publishing that can reduce start-up and publishing costs, while ensuring global online presence

and indexing.¹⁹ Among the more than 2,000 journals that are currently using PKP's Open Journal Systems software, we estimate that perhaps half are new titles that have emerged over the last seven years, with almost all of them, old and new, providing open access to their content, although with a number doing so on a delayed basis, some time after initial publication, or while still selling subscriptions to their print editions.²⁰

The economics of this form of open access depends on the sponsored and subsidized nature of scholarly communication, as the journals grow directly out of the resources and forms of work that are funded by the university, granting agencies, and foundations. To a degree, the difference with independent journals is their apparent interest in simply sharing this work, rather than investing all that it takes to establish a business layer on top of this sponsored activity. Among the independent journals that I have worked with, *Postcolonial Text* was launched in 2003 without special funding or a revenue model, as it found the support it needed distributed across a fairly large community of committed academics. They have copyedited, laid out, and proofed articles, as well as managed a double-blind review process, in an effort to develop what might be termed the postcolonial quality of this interdisciplinary field, not only through open access publishing, but also by assembling an international collective of editors, currently from

¹⁹ The Public Knowledge Project is a research and development initiative located at Stanford University, Simon Fraser University, University of British Columbia, and Arizona State University and is directed toward improving the scholarly and public quality of academic research through the development of innovative online publishing and knowledge-sharing environments (<http://pkp.sfu.ca>).

²⁰ Open Journal Systems assists editors in managing the publishing process by automating the clerical activities (receiving, recording, filing, corresponding, forwarding, collating, compiling, etc.) and providing structural support for managing peer-reviews, editorial decisions, copyediting, layout, proofreading, and publication, as well as indexing with Google Scholar, PubMed and other services (<http://pkp.sfu.ca/ojs>).

Canada, India, Singapore, France, South Africa, and Australia (Willinsky & Mendis 2007). *Open Medicine*, to take a second instance, was launched in 2007 by professional medical journal editors who sought to establish, by serving without remuneration, a new breed of medical journal that refuses the pharmaceutical and medical device advertising that otherwise sustains medical journal publishing, while offering open access to what they consider a public good (Willinsky, Murray, Kendall, & Palepu 2007).

Independent journals are finding that a number of university libraries are willing to host open source software and websites for open access journals run by their faculty and, in some cases, students.²¹ This signals a new role for libraries in scholarly communication, one that is contributing to the viability of open access not only for independent journals but for society journals as well (see below). Simon Fraser University Library, to take another example, is the lead developer of the software for PKP's journal, conference, and indexing systems. And if the libraries are not taking on the role of university presses in this new role of hosting journals, there are signs that the university presses may yet get involved with open access independent journals, judging by the recent announcement that Harvard University Press is launching its first open access journal, *Journal of Legal Analysis*, by taking advantage of this same open source software to reduce management costs (New 2008).

The independent open access journal is also proving a boon for scholarship in the southern hemisphere. Here, the International Network for the Availability of Scientific

²¹ Among the examples of libraries hosting journal publishing software are University of Toronto Library (<https://jps.library.utoronto.ca/>); University of Technology Sydney (<http://utsescholarship.lib.uts.edu.au/>); University of Guelph (<http://journal.lib.uoguelph.ca/>); University of New Brunswick (<http://www.lib.unb.ca/Texts/index.php?id=57>).

Publications (INASP), with whom PKP also works, has helped local editors set up regional online journal publishing systems in Vietnam, Nepal, Philippines, Sri Lanka, and Indonesia, with editors bringing their journals, some of them decades old, online within reach of national, regional and global indexes. The majority of these journals offer open access to their online editions, often going back to their first issue, enabling their articles to become part of a global knowledge exchange with a much broader reach due to open access.²² In Latin America, SciELO and Redalyc are two organizations that are providing journals with open access publishing platforms through which independent and society titles can also contribute to this global exchange.²³ The economics of open access in these cases build not only on this new publishing medium, combined with the clerical-cost and energy reductions afforded by open source software systems, but on the formation of cooperative groups driven by common scholarly goals. To say they form an alternative to corporate market models would belie the contribution that Google Scholar, for example, plays by leveling the indexing playing field and increasing the global presence of this work. These are mixed economies (think, too, of the hardware involved), with the measure at issue not ideological fidelity but the means of affording increased access to knowledge.

OPEN ACCESS SCHOLARLY SOCIETY JOURNAL PUBLISHING

With scholarly society publishers, the largest instance of open access arises as a result of the electronic publishing platform provided by Highwire Press, operated by Stanford University Libraries, for some 140 publishers, with a great many scholarly societies and non-profits among

²² See Asia Journals Online <http://www.asiajol.info/>.

²³ See Redalyc <http://redalyc.uaemex.mx/> and SciELO <http://www.scielo.org/>.

them. The 1,200 journals available through Highwire Press currently offer free access to two million articles (out of the five million articles available on the site), largely based on a form of delayed open access, which typically involves releasing articles 12 months after publication. Highwire Press also helps the majority of journals offer immediate open access to developing countries. Delayed and developing country open access would seem to offer scholarly societies a ready means of increasing the readership, citation and contribution of their members' work, without putting their subscription revenues at risk.²⁴

However, society journals face increasing competition from the major commercial publishers whose journals, while more expensive, are often bundled in ways that take up an increasing proportion of the library's acquisitions budget (Prosser 2004). As noted, some societies find it easier to turn their titles over to these publishers rather than competing against them. Still, alternatives to this route, which typically result in increased subscription fees for society titles, are being proposed from within the library community, including Crow's business plan forming publishing cooperatives among scholarly societies (2006). These cooperatives would manage to address the societies' lack of market presence, undercapitalization, lack of staff resources and risk aversion. I would take the cooperative idea a step further by recommending that societies form publishing cooperatives in association with research libraries as a more efficient and stable means of meeting the publishing costs of the society's journal, compared to selling subscriptions. It would enable better integration of the journals into the

²⁴ See note 10 above. Other library initiatives that provide publishing support, in conjunction with university presses, include Project Muse at Johns Hopkins Library (<http://muse.jhu.edu/>), and Project Euclid at Cornell University Library (<http://projecteuclid.org/>).

library's systems, with the cooperative's journals then made open access as a benefit to both authors and the larger community (2006, pp. 227-232).

Finally, a number of the larger societies working in well-funded research fields, such as the American Chemical Society, American Society for Clinical Investigation, American Physiological Society, and the Royal Society of Chemistry, have begun to offer authors a chance to purchase open access within their otherwise subscription journals, a model that links these societies to the economic experiments currently underway among the major commercial publishers.

COMMERCIAL PUBLISHERS' OPEN ACCESS

On October 7, 2008, the major publishers took a big step toward open access when BioMed Central, the largest for-profit open access publisher, announced that it had been bought by Springer, the second largest of academic journal publishers, for a price estimated to be in the area of \$35 million (Mergers 2008). Springer CEO Derek Haank summed up the move this way: "This acquisition reinforces the fact that we see open access publishing as a sustainable part of STM publishing and not an ideological crusade" (ibid.). BioMed Central, which began in 2000 and refers to itself as The Open Access Publisher, has close to 200 journals available only online. To cover its publishing costs and generate a profit, it drew on the long-standing practice in the sciences of levying "page charges" which was originally intended to supplement subscription fees.²⁵ In pioneering this approach to open access at the turn of the century, BioMed Central

²⁵ The Astronomical Journal explains its \$100 a page charges as follows: "Support from page charges allows lower subscription prices and thus a greater circulation for the journal as well as open access after two years"

<http://www.iop.org/EJ/journal/-page=extra.2/AJ>.

initially charged authors \$500 to see an accepted article published, with institutional and national memberships providing another means of covering the charges. Meanwhile, the fee has since risen to \$1,350 an article, with some variation among BioMed Central's different journals.²⁶

For its part, Springer had already begun experimenting with the article processing fee model with its Open Choice option, in which authors could purchase for \$3,000 open access to their particular articles within an otherwise subscription-based journal. There are similar programs underway at the other major publishers, Elsevier, Wiley-Blackwell, Taylor and Francis, and Sage.²⁷ While obviously not a commercial publisher, Oxford University Press operates on a similar scale to the major commercial press and, more importantly for our purposes here, has been far more open about its open access option than the commercial publishers, even as it charges a comparable fee. Oxford Open is a \$3,000 open-access option that it offers for 70 of its titles. In 2006, 11% of its authors in the life sciences took advantage of this option, with only 5% in medicine and 2% in the social sciences and humanities doing so (Richardson 2006).²⁸ As a

²⁶ While the standard fee is \$1,350 per article for BMC journals, the fees run as high as \$2,145 for Genome Biology and as low as \$155 for Case Journal, with nine journals published on behalf of societies by BMC not charging at all, such as the International Society of Chinese Medicine <http://www.biomedcentral.com/info/about/apcfaq#howmuch>.

²⁷ For table comparing the article processing fees of the major commercial and non-profit publishers, see Hill (2008), although note that its representation of Open Access is inaccurate.

²⁸ The lower participation rate in Oxford's open access option in medicine might be explained by a rare enough instance of price competition among comparable journals. For medical researchers interested in open access, BioMed Central offers close to 200 titles with a standard author fee at less than half that of Oxford Open's option for its medical journals. The lower participation rates of social science and humanities scholars may be explained by a lack of research funding to cover such costs with less emphasis in their fields on citation counts (which appear to be increased by open access).

result of its experimentation with open access options, Oxford has switched four of its science journals into open access titles, while adjusting subscription prices for the hybrid journals based on their open access revenues (Suber, 2007).²⁹ Whether this will form a pattern that the commercial publishers follow remains to be seen.

One interesting variation of the article-processing fee might be termed the entire sub-discipline processing fee. The particle physics community has launched an experiment by the name of SCOAP3 (Sponsoring Consortium for Open Access Publishing in Particle Physics), which seeks to affect “a global conversion of the main corpus of [particle physics] journals to the open access model” (SCOAP3 2007, p. 3). The group has calculated that with a \$15 million payment to publishers, open access to the entire field of particle physics could be purchased (based on a fee of between \$1,500 to \$3,000 an article multiplied by the number of articles published in this field). The \$15 million turns out to be less than is being paid by libraries in total subscription fees for the six relevant journals where over 80% of this literature appears (Mele, Dallman, Vigen, & Yeomans 2006). Libraries are being asked at this point to commit to shifting their subscription fees to this purchase of open access, with the actual amounts committed based on their country’s share of articles produced. At this point, SCOAP3 has managed to secure pledges for roughly half of the amount needed from libraries and other agencies in 13 countries, while the publishers have expressed an interest in tendering bids on this whole-field open access purchase. With the price of physics journals topping the subscription scale (Kean 2007), this sort of direct negotiation seems a positive step, especially in conjunction with an innovative form of

²⁹ For 2008, the subscription reductions went as high as 20% for Oxford’s hybrid titles, while in 2009, Oxford announced that journal prices for the Oxford Open journals would rise but 4%, compared to a 6.7% increase for all Oxford Journals.

cooperative made up of the libraries and particle physics community that seeks to establish, for the benefit of the larger world, open access to its literature.

It also needs to be said that an article-processing fee approach to open access repositions the transaction between publisher and author. Rather than authors turning over their copyright to publishers in exchange for publication, they are fully contracting a service that ensures the widest possible distribution of their work with the journal's imprimatur. The researchers' interests are thus served within the academy's reputation economy, in which tenure, promotion, and relocation depend on getting one's name out there. With the subscription model, on the other hand, publishers balance journal prices (and price increases) against subscription sales (and loss), limiting the reach and impact of their authors. Yet this contracting of publishing services does not address the stratification of cost levels, and how the academic community will continue to support the shift to the much higher pricing models of commercial publishers.

To be fair, the commercial publishers are prepared to explain the value they bring to scholarly publishing. The International Association of STM Publishing offers a good number of reasons why the cost of published research articles runs between \$1,500 and \$4,000. The association points to "the collective investment of hundreds of million of euros in electronic developments," as well as how "where editorial administration takes place within the university, it is usual for the costs to be charged back to the publisher"; it reminds readers that "profits are a major source of reinvestment and innovation" while "society publishers frequently use surpluses from journals to support other activities such as conferences, travel and research grants or public education"; then there is the "3-7 year investments in the development of new journals around which emerging scientific communities seek to coalesce" as well as the additional review management costs for those journals that have a very high rejection rate, when only accepted

articles will pay the article processing fee (*Overview* 2008, pp. 6-8). All that is missing from these explanations is an awareness of the degree to which these publishing services—namely, “registering, certifying, formalizing, improving, disseminating, preserving, and using scientific information” (*Overview* 2008, p. 3)—are being offered at very different rates in the current journal economy, just as independent journals and small-scale society publishers are no less committed to “making long-term investment in publications around which emerging, and established scientific communities coalesce and evolve” (*ibid.*).

It may be unreasonable to expect major commercial publishers, having worked this hard and smartly to capture a significant portion of scholarly publishing over the course of the last half-century, to abandon all that they have achieved. And yet the 2008 economic crash is bound to alter publisher expectations and entitlement rights, given how the chill is bound to hit libraries no less than the rest of the economy, just as the extent of this recession may well alter the regulation and protection of such areas of public trust. As things stand, the academic community needs to better represent its own interests by insisting that the story told about open access by major publishing organizations is not the whole or only story for scholarly publishing. The academic community need only hold up the viable alternatives to which scholarly societies and independent journals, research libraries, and university presses are turning to increase access to this knowledge at low to moderate costs. To that end, a number of us will continue working on providing the means for, and research on, an economics of an open access that (a) is facilitated by shared and open source resources and cooperative ventures, (b) develops capacities among journal editors publishing in developing countries, (c) supports path-breaking scholars seeking to set a new field in motion, and (d) provides a viable alternative to scholarly societies, particularly

those working in low-budget and under-funded research areas where substantial article-processing fees are beyond the pale.

At this point, two things are clear about open access. It has proven itself a viable and visionary goal for scholarly work—witness the thousands of open access journals and hundreds of open access archives that are making a difference to what people read and cite—and it is almost impossible to cost out or otherwise economically assess, without taking current market stratification into account. This stratification means that open access is going to cost \$3,000 an article on top of the university-sponsored contribution of content and expertise that goes into it, among one segment; while among another segment, open access will be provided with little more than the already substantial university-sponsored contribution.

Which is only to say that the more basic and fundamental question for the future of scholarly publishing is not whether open access is sustainable. Rather, the sustainability question is far more about the economic stratification that emerged in the years leading up to online publishing and open access, and whether it should continue unexamined and unchallenged in the digital era. Historically, a change of publishing mediums on this scale alters the production economy. It is too much to expect, one imagines, changes in this case entailing some rationalization of the billions invested in scholarly publishing based on reducing current discrepancies in publishing cost structures among the three segments. At the very least, my hope is that communication scholars and their societies will be at least as quick to turn to innovative research libraries as to commercial publishers in discovering the new best terms by which this public good is cultivated, circulated, and built upon.

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