CLARIFICATION:

This Report of the **Cornell University Library**'s **Task Force** on **Open Access** represents the **Task Force**'s initial examination into the **Open Access** publishing model and its impact on the Library. On October 7, 2004 the **Library Management Team** reviewed the report and requested additional analysis, particularly with regard to the underlying economic model from an institutional, rather than library, perspective and more consideration of projected costs and benefits,especially when considered from a multi-institutional or consortial point of view.

Report of the CUL Task Force on Open Access Publishing

Presented to the Cornell University Library Management Team
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Report of the CUL Task Force on Open Access Publishing

Charge and membership

The Task Force on Open Access Publishing was convened by Ross Atkinson in January 2004. The purpose of the Task Force is to study the information available on Open Access publishing and to provide the CUL Library Management Team with a report that addresses the following specific questions:

1. What is Open Access publishing? Are there different versions of or perspectives on how it should operate and be funded?

2. What are the factors that will affect the adoption of Open Access by the academic community?

3. Should the library community in general and CUL in particular take action to increase those prospects and, if so, what should those actions be?

4. If Open Access publishing becomes a significant component of scholarly publishing, how will it affect CUL services, and what operational changes might CUL need to undertake as a result?

John Saylor is chair of the Task Force, whose other members are Phil Davis, Terry Ehling, Oliver Habicht, Sarah How, and Kizer Walker. The Task Force met weekly from January through June 2004 to discuss the Open Access issue, coordinate research, and compile the present Report.

Executive summary

Alternative publishing models that would offer free and unimpeded access to scholarship promise both a more *affordable* system for academic institutions and their libraries and a more *democratic* one for readers and authors. The present Report examines both aspects of the Open Access promise and offers recommendations for CUL's involvement in the arena of Open Access publishing.

Economics

Library discussion of Open Access publishing to date has taken place in context of a "crisis of scholarly communication," by which is usually meant a serials pricing crisis in the sciences. Unless library budgets can keep up with the rising costs of publishing, there appears to be no ultimate solution to the pricing crisis. Open Access requires subvention. Publishing in any format costs money, whether it is based on revenue from subscriptions, or revenue from authors and their institutions. Our Task Force has concluded that what appears at present to be the most viable route for sustaining Open Access to peer-reviewed scholarship – a model in which institutions pay for their faculty to publish in refereed OA journals – would not bring about cost savings for Cornell. In fact, taking into account the number of articles published by Cornell researchers each year and the average cost to publish a single refereed article, CUL would likely see its serial expenditures *rise significantly* if the library used its current subscription funds to pay for author fees instead – even in scenario in which the majority of publishers switch overnight to a producer-pays OA business model (see Appendix).

Open Access publishing should not be regarded as an *ultimate* solution to the science serials crisis, but it can no doubt offer a *pragmatic* solution in specific cases. We should be discussing whether OA publishing is *better than* the current subscription model, and if so, for whom? This report attempts to address these questions from the perspective of the library, readers, authors, and the academy in general.

Democratization

If the economic consequences of Open Access publishing for academic institutions and their libraries are likely to be mixed, there may be overriding ethical arguments for removing barriers to access. Here, too, our Task Force recommends attentiveness and action in specific situations that can be improved by Open Access, rather than an all-out embrace of a particular mode of disseminating scholarship. While proposed new publishing models obviously democratize access on the most basic level, our Report holds that the question of author and even reader empowerment is a complex one and that a blanket approach to Open Access publishing may have unintended effects on the communities it is meant to serve. The need for Open Access and the consequences of publishing in this mode may vary significantly by academic discipline – differences appear greatest between the sciences, on one hand, and the humanities and social sciences, on the other.

Proposals for implementation of Open Access scholarly publishing, whether these involve an institutional repository model, a producer-payment plan, or some combination, imply significant shifts in university resources and in the relations between the university and the output of scholars. Where Open Access does not respond to felt needs on the part of scholars and their disciplines, it is unlikely to gain support of authors; if it is perceived as a threat to the autonomy of scholarly communities, it will not be voluntarily adopted. Where it is judiciously implemented based on need, Open Access publishing will be a great boon to the communities it serves.

Recommendations

While the traditional subscription model has certainly been abused by some publishing interests, our Task Force is convinced that subscription can still serve as an equitable model for disseminating scholarship under some circumstances, particularly when administered by scholarly societies, university presses, and academic libraries. We have concluded that the Open Access and subscription models can coexist and are in fact likely to do so for the foreseeable future. The pragmatic approach our Task Force is recommending for CUL should be understood as a continuation of the course the Library has taken up to now vis-à-vis Open Access publishing: a flexible, experimental approach that commits to support specific, viable applications tailored to particular needs, pursued as a key component of a diversified strategy of scholarly communications reform.

The Task Force recommends that CUL:

1. Foster and support viable Open Access publishing initiatives that respond to or resonate with real needs of specific scholarly communities.

2. Apply the following selection criteria in considering any Open Access publishing strategy or project:

- It appears, based on informed projection, to offer an approach that over time will be more cost effective for CUL than the current publishing model;
- It responds to and meets the needs of CUL's user communities and improves scholarly communication; and
- It minimizes detrimental financial, political, and cultural effects on scholarly networks.

3. Engage in ongoing environmental scanning to identify a broad range of local stakeholders and pursue outreach in order to raise awareness of OA issues among scholars at Cornell and to discern and respond to the needs and interests of various local scholarly communities. Outreach efforts should include:

- Public outreach (e.g., external speakers; publicity around activities of CUL's Electronic Publishing Program)
- Outreach targeted at specific communities (e.g., November 2003 Cornell Editors' Forum)

4. Establish a standing committee under CD Exec to monitor developments in OA publishing for the purposes of informing policies and decisions of the Library Management Team and raising awareness among CUL's constituencies. The committee's charge should include the creation and maintenance of a public website on OA publishing issues.

1. What is Open Access publishing? Are there different versions or perspectives on how it should be operated and funded?

Defining Open Access publishing

The most succinct and widely accepted definition of Open Access comes from a meeting of the biomedical community held on April 11, 2003 in Bethesda, Maryland, and is commonly referred to as the Bethesda Statement on Open Access Publishing[1]. It is composed of two clauses, one concerning copyright and the other concerning archival copies and access:

> An Open Access Publication[2] is one that meets the following two conditions:
>
> 1) The author(s) and copyright holder(s) grant(s) to all users a free, irrevocable, worldwide, perpetual right of access to, and a license to copy, use, distribute, transmit and display the work publicly and to make and distribute derivative works, in any digital medium for any responsible purpose, subject to proper attribution of authorship[3], as well as the right to make small numbers of printed copies for their personal use.
>
> 2) A complete version of the work and all supplemental materials, including a copy of the permission as stated above, in a suitable standard electronic format is deposited immediately upon initial publication in at least one online repository that is supported by an academic institution, scholarly society, government agency, or other well-established organization that seeks to enable open access, unrestricted distribution, interoperability, and long-term archiving (for the biomedical sciences, PubMed Central is such a repository).

For the purposes of this Report, our Task Force understands Open Access to pertain to dissemination of information in the *digital* environment. We understand Open Access *publishing* as comprising both formal third-party selection, editorial, review, and dissemination processes, and the "making public" of (non-refereed) works directly by their authors – insofar as the formal or informal act of publishing provides the legal, technical, institutional, and archival guarantees of accessibility spelled out in the Bethesda Statement. The scope of the present Report is restricted to the Open Access publication of *new scholarly works*, rather than retrodigitized and reissued works or works intended primarily for a popular readership.

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[1] http://www.earlham.edu/~peters/fos/bethesda.htm. Participants in the Bethesda Meeting on Open Access Publishing included scientists, representatives of scholarly societies, OA publishers, SPARC representatives, and health sciences librarians; see http://www.earlham.edu/~peters/fos/bethesda.htm#participants.

[2] "Open access is a property of individual works, not necessarily journals or publishers." (Original note in Bethesda Statement.)

[3] "Community standards, rather than copyright law, will continue to provide the mechanism for enforcement of proper attribution and responsible use of the published work, as they do now." (Original note in Bethesda Statement.)

Manifestations of Open Access publishing

The Bethesda Statement defines the characteristics of Open Access publishing, but it does not describe the forms or manifestations that Open Access can take. The following table, adapted from the medical literature[4] classifies types of Open Access publication and provides variations on the Bethesda definition.

Type of Open Access	Description	Example
E-print repository	Authors deposit pre-prints and/or post-prints in OA repository	• arXiv.org • CUL Technical Reports and Papers • DSpace
Unqualified	Immediate and full OA publication of journal	• D-Lib Magazine
Dual mode	Both subscription-print and OA journal editions offered	• British Medical Journal (BMJ)
Delayed OA	OA edition available some months after initial publication	• Most HighWire journals
Author fee	Authors/Institution pay fee to support OA publication	• BioMedCentral • PloS
Partial OA	Some articles in an issue are OA	• Many publishers use this for advertisement or promoting an article to a wider audience
Per capita	OA made available to country based on per capita income	• HINARI

Open Access repositories

The discussion of open access to scholarly literature is closely bound up with the evolution of "e-print" repositories – centralized systems for the storage and dissemination, in digital form, of pre-prints, and in some cases post-prints, deposited directly by authors. *Subject-based repositories* have emerged and thrived in certain fields; the arXiv is the original and most successful example. *Institutional repositories* represent an attempt to universalize the "e-print repository" concept by moving it beyond individual disciplines. Defined in a landmark SPARC position paper as "digital collections capturing and preserving the intellectual output of a single or multi-university

[4] J. Willinsky, "The Nine Flavours of Open Access Scholarly Publishing," *Journal of Postgraduate Medicine* 49.3 (2003): 263-67; http://www.jpgmonline.com/article.asp?issn=0022-3859;year=2003;volume=49;issue=3;spage=263;epage=267;aulast=Willinsky.

community,"[5] institutional repositories are embodied in DSpace and similar systems, such as CUL's Technical Reports and Papers.

In addition to institutional repositories' role in disseminating pre-prints (and other forms of "gray literature"), SPARC envisions a network of institutional repositories as part of an infrastructure of a new, disaggregated model of *formal* scholarly publishing. A "service layer" would build on the repository content, adding value through services such as certification at various levels, up to and including formal peer review (Crow 13-15). Elsewhere, Clifford Lynch describes how such a certification system might function: "[G]roups might construct a peer-review process that certifies selected works that are accessible in various institutional repositories and even develop overlay systems that span a complex of institutional repositories and create a 'virtual' journal."[6]

The potential of overlay journals has been discussed extensively in connection with subject-based repositories such as the arXiv, [7] and there are now a number of electronic journals that overlay arXiv content, including *Advances in Theoretical and Mathematical Physics*, the *Annals of Mathematics*, *Algebraic and Geometric Topology*, *Geometry and Topology*, and the *Journal of Nonlinear Mathematical Physics*. Archival content for *Advances in Theoretical and Mathematical Physics* (ATMP), which is published in print form by International Press, is made available electronically from the publisher's site largely via links to articles stored on the arXiv server (N.B., content published after the July 2003 issue [v7n4] is hosted on the International Press server).[8] As of June 2004, electronic articles from ATMP and seven other International Press journals will be available from Project Euclid through the Prime aggregation, which currently operates under a traditional user-pays subscription model.

The fact that a journal overlay would point to material housed in and distributed from an openly accessible subject-based or institutional repository does not solve the problem of the other fixed costs of formal publishing. A refereed overlay journal would add value associated with selection and peer review comparable to what is provided by a refereed journal (print or electronic) that collects submissions and distributes content in the conventional way. Although the individual articles that make up a volume of a virtual journal could be searched among the undifferentiated contents of the repository and freely retrieved, there is nothing that dictates the overlay itself must be distributed free of charge. As in the case of conventional journals, the added value could be paid for through access fees such as subscription or society membership charges, or through a submission fee. Whether publications are derived from OA pre-prints (as in the case of an overlay journal) or not, if *formally published* scholarship is to be kept openly accessible, the value-added costs will most likely be paid by the producer (i.e., the author or the author's institution).

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[5] Raym Crow, *The Case for Institutional Repositories: A SPARC Position Paper* (SPARC, 2002) 4. http://www.arl.org/sparc/IR/IR_Final_Release_102.pdf.

[6] Clifford A. Lynch, "Institutional Repositories: Essential Infrastructure for Scholarship in the Digital Age," *ARL Bimonthly Report* 226 (Feb. 2003): http://www.arl.org/newsltr/226/ir.html.

[7] Paul Ginsparg's 1996 "Winners and Losers in the Global Research Village" is an early example. Invited contribution for Conference held at UNESCO HQ, Paris, 19-23 Feb. 1996, during session Scientists' View of Electronic Publishing and Issues Raised, 21 Feb. 1996: http://arxiv.org/blurb/pg96unesco.html.

[8] See http://intlpress.com/journals/ATMP/archive/.

Who will pay to publish refereed scholarly information?

In an Open Access model of refereed scholarly publishing, the costs of publishing do not go away, they are simply redistributed. While the total costs may be reduced (through the elimination of print production and distribution), the remaining costs are still substantial and need to be covered in some other way, such as directly by the author or indirectly by his or her institution. This section analyzes the incentives for various stakeholders to pay to publish in the producer-pays model of Open Access publishing and will focus on authors, departments, libraries, and a separate Provost's Fund.

Should authors pay?

Emerging examples of Open Access publishing rely on the producer (author or institution) to pay all of the fixed costs to publish. The model comes from the biomedical field, which is well funded by government grants. It is also a field in which publication costs represent a small percentage of total research expenses. Support for OA publishing is less pronounced in other disciplines in which grants are smaller and fewer, and journal subscription prices are not prohibitive.

The concept of authors paying for – or contributing to the cost of – publication of their peer-reviewed articles is not new to the sciences; this is fundamentally distinct from "vanity press" publishing, where authors pay their way *around* peer review. Unrelated to Open Access, page charges to authors have long been a feature of scientific publishing, particularly for manuscripts that include figures. The commercialization of scientific publishing has lately begun to push aside the practice, however; while many American society publishers still require page charges of their authors, commercial publishers can afford to remove all author-payment barriers. In academic publishing, as in any economic setting, actors want to minimize the costs of their own participation. With the elimination of page charges, authors have an incentive to defect from the society publisher model to the commercial model, despite the fact that the latter is, when all the costs are added up, a more expensive publishing model.[9]

What do scientists' experiences with author-payment in the conventional publishing model imply for Open Access publishing? Authors are generally in favor of increasing the access to their own publications, yet may be unable (or unwilling) to pay the costs of making this a reality. A survey of authors publishing in the *Proceedings of the National Academy of Sciences* (PNAS) reveals that about half would pay to support an Open Access option. Of those who support the idea, 80% would be willing to pay only $500.[10] These results are similar to an author survey by Oxford University Press: 54% said that they would pay to be published, yet 84% (of these 54%) would only pay $500, 12% would be willing to pay $1000, and only 4% an amount above that[11]. The

[9] In behavioral economics this is known as a "social dilemma," a situation in which individual rationality leads to collective irrationality. That is, reasonable individual behavior leads to a situation in which everyone is worse off than if they might have been otherwise.

[10] Nicholas R. Cozzarelli, Kenneth R. Fulton, and Diane M. Sullenberger. "Results of a PNAS Author Survey on an Open Access Option for Publication." *PNAS* 101.5 (2004): 1111.

[11] Richard Gedye. *Is There a Future for Scholarly Publishing*? 23rd Annual Charleston Conference on Issues in Book and Serial Acquisition, 5-8 Nov. 2003, Charleston, SC.

Company of Biologists[12], a non-profit British publisher, is experimenting with giving authors the option of choosing between conventional and Open Access modes of publication. Authors willing to pay $2,160 (a price the publisher notes is "highly subsidized") can make their articles free to the world. It should be noted that all CoB articles roll into the free mode after six months. As of May 3, 2004, 325 articles had been published in CoB journals, including 10 Open Access articles.

The cost of publishing a journal article varies greatly by field, publisher and journal. Prestigious journals that reject most submissions claim that this figure may be close to $10,000 or even higher.[13] BioMedCentral currently holds the author fee for most of their journals at $525 per article, but costs are highly subsidized by institutional membership fees. The company is still losing money. The Public Library of Science (PloS) charges $1,500 per article to publish in its flagship journal, *Biology*, but this fee is also based on institutional support and a large foundation grant.

An ad hoc survey of four Life Sciences researchers at Cornell (Plant Sciences, Ecology, Microbiology, Molecular Biology & Genetics) revealed that scientists in these fields are used to paying page costs to society publishers, but these payments are typically small, averaging between $200 and $300 per published article. Much larger payments (e.g. $1,000) are required if an author wishes the publisher to print a full-color plate.

One incentive-based argument designed to encourage researchers to publish in Open Access journals is based on the claim that OA journals will be more prestigious than their subscription-based counterparts. This claim has recently been advanced in a correspondence published in Nature,[14] which attempts to show that enhanced access leads to wider readership and, in turn, to more citations of Open Access journals. Citations are the basis of Impact Factor, a widely used measurement of journal prestige in the sciences. However, the Nature piece was based on a limited study of conference papers in computer science and does not appear to be generalizable in scope or domain.

On April 15, 2004, ISI released the first part of a study of authors' citation behavior vis-à-vis OA journals. ISI reports: "In many cases we [ISI] have been deluged with eloquent letters from sincere supporters of a particular journal under evaluation. We are often told of an extremely wide and growing base of subscribers to a particular journal. What we find, though, is that wide distribution does not necessarily result in higher citations."[15] In fact, OA journals generally underperformed subscription-based titles. In other words, the business model (i.e. OA) does not, in itself, appear to have a positive effect on the prestige of journals. ISI will update their analysis again this summer.

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[12] Publishers of *Development*, *Journal of Cell Biology*, and *Journal of Experimental Biology*.

[13] David Malakoff, "Opening the Books on Open Access," *Science* 302.5645 (2003): 550-54.

[14] Steve Lawrence, "Free Online Availability Substantially Increases a Paper's Impact," *Nature* 411.6837 (31 May 2001): 521.

[15] James Testa and Marie E. McVeigh, *The Impact of Open Access Journals: A Citation Study from Thomson ISI* (Thomson ISI, 2004) http://www.isinet.com/media/presentrep/acropdf/impact-oa-journals.pdf.

In summary, most authors at present, even in the Life Sciences, would likely be unable or unwilling to pay to publish their work when a competing subscription model allows them to publish for free. While many society publishers still require page charges, these costs are highly subsidized by the subscription model and are much lower than what a viable author-payment model of Open Access publishing would have to demand. While journal prestige could provide authors an incentive to move to a new publishing model despite the higher cost to them, judging from the ISI findings, the OA model alone does not yet appear to increase the prestige of a journal.

Should departments pay?

Requiring departments to pay the publication costs of its faculty may make some sense in that it would sensitize a close-knit community of authors to the costs of publishing. And according to sociologists and political scientists, small groups of individuals can manage and allocate shared funds more effectively than larger groups.[16, 17]

The prospect of putting fiscal control of publishing costs in the hands of departments may be unpalatable to the faculty who may view it as a loss of academic freedom, or a form of welfare for those who cannot compete for grants. In fields where grants are small and/or rare, leaving to the department the decision of whom to fund and for what reason may be a source of controversy and may be construed as a form of censorship.

In the Life Sciences, where page charges are still common, these costs come directly out of researchers' grant sources, and most grant proposals provide a line item for publication costs. For those authors who fund their own publication costs, the idea that the department would support colleagues who could not find funding sources would be, in the words of many of the faculty, "unfair" or a type of "departmental welfare." These researchers' comments reflect a highly competitive environment where the best are able to secure research funds and publish in the best society presses.

Should libraries pay?

If the library is currently paying for journal subscriptions, that is, providing free access to information for its community members, should it pay journal author charges for its institution's faculty, so that everyone in the world can receive free access to the article? It is, after all, a tenant of librarianship to provide the widest possible access to information. If authors wish to make their work widely available, but are prevented because of high publication charges (an individual disincentive), what is the role of the library in at least subsidizing these publication costs?

Price *insensitivity* on the part of authors and readers is a contributing factor in the spiraling cost of STM journals. When the library pays author charges (either directly, or through institutional membership fees), the researcher is kept insensitive. If an argument for OA publishing is that it will reduce pressure on library budgets, then the library's OA strategy must include some means of sensitizing readers and authors to the real costs of publishing. While publishers call it an

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[16] Elinor Ostrom, "Coping with Tragedies of the Commons," *Annual Review of Political Science* 2 (1999): 493-535.

[17] Peter Kollock, "Social Dilemmas: The Anatomy of Cooperation," *Annual Review of Sociology* 24 (1998): 183-214.

"institutional membership" and not "library membership," fees are almost exclusively paid by library budgets.

Example 1: BioMedCentral, a for-profit British OA publisher began with author charges, but quickly moved to an institutional membership model when author-submissions were lower than expected. Under an institutional membership, authors can publish for free in BMC journals. While this model was similar in nature to a traditional subscription model, institutional memberships were (initially) low and libraries could forecast annual expenses. Beginning 2005, BMC will move to a pricing model that will charge the institution for each article accepted and published in a BMC journal. The Triangle Research Libraries Network, a collaborative organization of Duke University, North Carolina Central University, North Carolina State University, and The University of North Carolina at Chapel Hill recently published an open letter to BioMedCentral against this pricing model change and threatening to pull support from this publisher.

Example 2: Public Library of Science, or PloS, is a non-profit publisher that has recently entered the OA market with their flagship journal *PLoS Biology*. Their approach has been to start slowly and enter the market with a prestigious product that has a high chance of success, rather than flood the market with titles in the hope that a few will stick (BMC approach). The PLoS economic model is based on author payments plus subsidies from institutions and other granting agencies. The author-cost to publish in *PLoS Biology* is set at $1,500 per article; the publisher contends this fee is far below real costs, yet anything higher would create a large disincentive for contributing authors.

Cornell is a Promoting Member of PloS ($10,000/yr), which provides a 30% discount to Cornell authors who decide to publish in PLoS journals. The publisher has also made it clear that full subsidy would desensitize authors to the costs of publishing. So while the author fee presents a personal disincentive to publish with PLoS in economic terms, the publisher hopes to attract potential authors with the prestige of its title.

Should payment come from a Provosts Fund?

There has been some discussion among OA advocates about the creation of a separate fund outside of the library that could be used to fund articles published in OA journals. SPARC has called this source of funding a "Provost's Fund." Like any collective pool of money intended for allocation in the best interests of the community, the Provost's Fund would require some sort of governance or risk abuse. An unregulated fund for author publication fees would be similar to channeling all faculty and student requests for purchasing materials directly to the acquisitions department without evaluation by a librarian.

For the sake of argument, let us consider a model with some governance: a board of judges decides which research should be funded for publication and which should not. Faculty member One asks the board for $525 to pay for an article in a BMC Journal. The judges agree to this request. Faculty member Two asks for £10,000 to publish in Nature (or some equivalent journal). After much debate, the board funds it. Faculty member Three request $2,160 to publish in the journal *Development*, a prestigious society journal (discussed above under "Authors"). The board responds, "you can submit the manuscript without a fee and after six months it will be free to all." The third faculty member says "if you funded author fees for faculty members One and Two, why not for me?"

The creation of an extra-library Provost's Fund to pay for publication in OA journals would not seem to solve the OA funding problem. Without governance, it is even worse than our current subscription model; with governance, the potential for bureaucratic complications and political antagonisms is too great. It seems unlikely, in fact, that such an arrangement would ever be tolerated by the academic community.

Cost of producer-payment for Cornell

Our Task Force has estimated that Cornell University Library would actually spend more as an institution if the publication of all refereed scholarly articles moved from the traditional subscription-based model to a producer-payment model. If the library used its subscription funds to pay for author fees, it could see its serial expenditures rise by at least 1.5 million dollars/year. This figure is based on the number of articles published by Cornell researchers each year (over 3,500) and an estimate of the average cost ($1,500) to publish each article – an estimate that is considered to be substantially lower than what most publishers now claim to be true costs.

Based on the figures presented in the Appendix, the average per-article cost would need to be lower than $1,100 for CUL to save any money in a producer-pays model. This assumes that all publishers participate in the producer-pays model. If we removed Elsevier from this scenario, the per-article costs would need to be under $800, and under $400 per article if the largest commercial publishers decided not to participate. Considering that most optimistic estimates of the cost per article to publish is $1,500, it is unlikely that CUL will save money under any producer-payment scenario.

It should be noted, however, that our estimates are based on today's publishing situation, and change is rapid. As the situation evolves, the Library may conclude that cost increases are offset by the Open Access promise to move control of scholarly publishing back to academics, their associations, and their institutions.

2. What are the prospects that Open Access publishing will be adopted by the academic community?

As a point of departure, it is crucial to recognize that there is no single "academic community," but multiple *communities* with various cultures of scholarship, various levels of investment in the existing system of scholarly communication, various needs with regard to reforming that system, and various interests at stake in the Open Access discussion. The conventional campus divide between sciences and humanities scholarship is significant here, but must not overshadow distinctions among and within disciplines in these two broad sectors.[18] Organized online dissemination of openly accessible scholarly literature evolved in certain scientific disciplines from existing pre-print traditions;[19] to date, this e-print repository model has not proved widely adaptable beyond the fields where it originated. We would suggest that OA publishing will be adopted where it meets specific needs and priorities of a community of researchers, but is unlikely to be adopted if imposed in a top-down or one-size-fits-all manner.

One aspect of the question of adoption concerns researchers' willingness to pay author fees in a producer-payment model of OA publishing. Here it is important to bear in mind, again, that in the sciences many American society publishers already levy author page charges as a way of subsidizing journal subscription prices and spreading the publication costs among many stakeholders. It may be useful to summarize the response to the existing practice of page charges by publishers (a partial author-payment model).

Page charges are tolerated by life scientists because of their desire and incentive to publish in the best (i.e., the most prestigious) journals, many of which are controlled by society publishers. In general, these page charges only amount to a few hundred dollars, and are typically written off as grant expenses. In Engineering, the IEEE requests a per-page contribution from authors, but payment is entirely voluntary. Page charges are rare in Chemistry. None of the journals published by the American Chemical Society have page charges – with the exception of the *Journal of Natural Products*, which is published by the ACS on behalf of the American Society of Pharmacognosy. In spite of large grants in the Physical Sciences, physicists appear to be quite intolerant of having to pay to publish. Ten years ago the journal Physical Review D (High Energy Physics) reinstated page charges for authors. In the words of the Editor-in-Chief of the American Physical Society:

> What happened […] was that people started boycotting our journal and started publishing in *Nuclear Physics* [a journal published by Elsevier], which did not have page charges but which cost about 10 times as much on a per page basis to the institution. If page charges and article charges have to be paid out of the authors' grants, as happens in the U.S., then the authors are faced with a dilemma. Either they pay the page charges or they send a post-doc or a graduate student to a meeting. The cost would

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[18] For example, see Peter Suber's list of "disciplinary differences relevant to open access": http://www.earlham.edu/~peters/fos/lists.htm#disciplines.

[19] SPARC lists eight scientific disciplines where successful subject-based repositories emerged as "digital extensions of existing peer-to-peer research communication practice": "high-energy physics and mathematics (arXiv); economics (RePEc); cognitive science (CogPrints); astronomy, astrophysics, and geophysics (NTRS and ADS); and computer science (NCSTRL)." Raym Crow, *The Case for Institutional Repositories: A SPARC Position Paper* (SPARC, 2002) 11; http://www.arl.org/sparc/IR/IR_Final_Release_102.pdf.

> be about the same […] It is not going to be easy to convert to [the author-pays] mode of operation.[20]

With the exception of the Life Sciences, where low page charges are accepted as compensation for publishing in high-prestige journals, there appears to be little tolerance in the scientific community for paying to publish. The estimated author charges for Open Access journals appear to exceed the amount that would be acceptable to most researchers without subsidy. Perhaps most importantly, our Task Force has calculated that a complete subsidy of author charges would be more expensive for Cornell than conventional journal subscriptions (see Appendix). Subsidy also has the effect of desensitizing authors to the true costs of publishing, as discussed above.

Open Access publishing and scholarship in the humanities

Discussion of Open Access publishing takes place in context of a "crisis of scholarly communication," by which is usually meant a serials pricing crisis in the sciences. Other areas of scholarship may perceive a different crisis and demand a different response. The Modern Language Association of America (MLA) has taken measures to define and address a scholarly publishing crisis in language and literary studies, understood primarily as a loss of ground for specialized scholarly monographs. In 1999, the MLA convened an Ad Hoc Committee on the Future of Scholarly Publishing, which published its report in 2002.[21] The report describes this cluster of problems: The university presses, facing loss of subsidies, are less able to bring out low-selling specialized monographs. Libraries, bound to commit shrinking funds to cover spiraling costs of journals (primarily outside the humanities), are a less reliable market for the specialized scholarly book. At the same time, academic departments in the humanities are more fixated than ever on the book – even two books – as the "gold standard" for promotion and tenure.[22] The result is an inflation of book manuscripts even as outlets for publication threaten to dwindle.

The Ad Hoc Committee recommended that departments review their promotion and tenure expectations and consider broadening the range of acceptable publication categories (a measure to curb monograph inflation that is intended to strengthen, not diminish, the role of the specialized monograph in humanities scholarship). Proposals to reform tenure review processes are familiar from the scholarly communications discussion in the library, which has tended to endorse Open Access alternatives. The MLA recommendations, however, do not mention Open Access, and while a more diverse publishing landscape in the humanities might provide fertile ground for Open Access initiatives, it is not clear from the MLA report that Open Access publishing responds directly to a (real or perceived) *need* on the part of humanities disciplines. The priority

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[20] R. Ramachandran, "We Have to Be Able to Recover Our Costs. Interview with Prof. Martin Blume, Editor-in-Chief, American Physical Society." *Frontline* 21.2 (17-30 Jan. 2004): http://flonnet.com/fl2102/stories/20040130001308200.htm.

[21] MLA Ad Hoc Committee on the Future of Scholarly Publishing, "The Future of Scholarly Publishing," *Profession 2002* (New York: MLA, 2002) 172-86; http://www.mla.org/pdf/schlrlypblshng.pdf.

[22] See Leigh Estabrook, *The Book as the Gold Standard for Tenure and Promotion in the Humanistic Disciplines* (Champaign, IL: Committee on Institutional Cooperation, 2003): http://www.cic.uiuc.edu/groups/CIC/archive/Report/ScholarlyCommunicationsSummitReport_Dec03.pdf.

issue seems to be ensuring the viability of publishing for a specialized (i.e., narrow) readership, rather than broad dissemination. [23]

The Committee on Institutional Cooperation (CIC) addressed the MLA report at a December 2003 CIC Summit on Scholarly Communication in the Humanities and Social Sciences. The CIC report from this meeting[24] takes issue with the MLA's conclusions about a loss of publishing outlets for specialized monographs. The CIC report goes further than the MLA, however, in recommending scholarly communications alternatives. Among other things, the CIC calls for member universities to initiate "inter-institutional 'collaboratives'" for development of digital repositories in specific disciplines or interdisciplinary areas, and for authors to retain non-exclusive rights to their work. While Open Access was discussed in some of the summit sessions summarized in the report, the official recommendations (CIC, page 3) do not specify Open Access as an attribute of the proposed repositories. The proposed repository system would include "elements of strong peer review" as well as structures for dissemination and archiving. Significantly, the proposed system is a collection of subject-based digital repositories, rather than a network of institutional repositories, the system often envisioned as the backbone of an Open Access publishing model.

Who needs Open Access? Who owns scholarly communication?

The existing system of scholarly communication is a distributed one and draws its vitality from its decentralized character. Production of the conventionally published, peer-reviewed article involves evaluation and guidance by a dispersed network of scholars. Each journal contains interventions from multiple institutions; faculty colleagues at a single institution (even a single department) publish in multiple journals. Ironically, in light of the distributed nature of electronic dissemination networks, several features of proposed OA models tend to centralize these relationships, either in institutions or scholarly societies which, despite their obvious importance in any system of scholarly communication, cannot match the agility of disciplines, sub-disciplines, and cross-disciplinary initiatives.

Where Open Access does not respond to felt needs on the part of scholars and disciplines, it is unlikely to be adopted. Proposals for implementation of OA scholarly publishing, whether these involve an institutional repository model, a producer-payment plan, or some combination of these, imply significant shifts in university resources and in the relations between the university and the output of scholars. Open access will not be voluntarily adopted if it is perceived as a threat to the autonomy of scholarly communities. What follows are considerations on ways in which individual scholars and dispersed academic communities might lose ground to institutions in certain implementations of an OA publishing model. These assessments pertain in particular to the social sciences and humanities, but will be relevant in some respects to the sciences as well.

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[23] Peter Suber's paper "Promoting Open Access in the Humanities" (http://www.earlham.edu/~peters/writing/apa.htm) outlines several factors that have made Open Access less of a priority issue in the humanities than in the sciences; nevertheless, as his title suggests, Suber takes a position of unqualified support for OA publishing in the humanities.

[24] *Report of the CIC Summit on Scholarly Communication in the Humanities and Social Sciences*, (Champaign, IL: Committee on Institutional Cooperation, 2004) http://www.cic.uiuc.edu/groups/CIC/archive/Report/ScholarlyCommSummitReport_Feb04.pdf.

Producer-payment model

In the current subscription-based publishing model, peer review is an author's only barrier to publishing in a journal; in a pure producer-payment system, those without access to funds would be excluded, irrespective of the scholarly merit of their articles. In many of the sciences, where most research originates in large, well-endowed institutions, a model in which institutions pay publishing costs on behalf of their faculty might adequately support the dissemination of scholarship (although our projections indicate that these institutions would see their costs for publishing greatly outstripping their current serial budgets). In social scientific and humanities fields, however, where smaller, less prestigious institutions produce significant research, this model could seriously strain institutional budgets and critically disrupt scholarly communication.[25] This could lead to, or reinforce, an unfortunate stratification of the research system between rich and poor campuses, and also along disciplinary lines.

What is more, local control of the economics of publishing within universities also has the potential to expose scholars' publishing avenues to the pressures of institutional and departmental politics. Such politics may, in turn, be susceptible to pressure from external interests – industry lobbying in the case of some fields, for instance, or pressures exerted in the name of national security, etc. Greater departmental and institutional oversight and control over faculty publishing would likely be perceived by many scholars as a challenge to their academic freedom.

Institutional repositories

The institutional repository model might itself be considered a type of producer-paid publishing system, one that (in its most basic form) would seem to preclude political and economic barriers to dissemination by hosting "the *entire* intellectual output of the institution."[26] While it would clearly ease access to individual works, scholarly communities may, in fact, experience the institutional repository model as a loss of their autonomy to the institution. While institutional repositories allow the author to retain legal rights to distribution that are typically signed over to a publisher in the existing model, the institutional repository model places the mechanics of distribution in the hands of the author's employer and subsumes the authors work under an institutional "brand." Faculty members could find themselves at odds with university administrations over such issues as dissemination of materials (e.g., deposited lecture notes) in the context of distance learning programs, particularly if the scholar has moved on to another institution.

Scholarly communication depends on formal and informal certification of the quality of research. Discussions of certification in an institutional repositories-based OA model point to two levels: a weak, preliminary certification that stems from the repository's institutional imprimatur, and a strong one that includes some form of peer review. In SPARC's model, the institutional repository enhances institutional prestige, and vice versa. Repositories are to "serve as meaningful indicators of an institution's academic quality . . . . complement[ing] existing metrics for gauging institutional productivity and prestige";[27] conversely, "the reputation of the author's

[25] This is the converse of the "free rider" issue that has been raised in the Open Access discussion, where smaller institutions consume more OA research than they produce.

[26] Crow 17; emphasis added.

[27] Crow 6.

host department" can supply an "implicit and associative" form of certification to work housed in the repository.[28] Certainly, in the current system of scholarly communication, the reputations of individual scholars already both feed and feed on institutional prestige, but the institutional repository model would seem to raise the stakes of institutional branding to a degree that could potentially inhibit equal participation by new and established scholars. While the existing system offers promising junior faculty at low-prestige institutions a means to attach their professional reputations to a high-prestige journal, "associative" certification could filter these voices and limit career mobility.

Beyond informal certification offered by institutional branding, various peer review strategies have been proposed to add value to the institutional repository model of OA publishing. Some have called for a system of society-based review panels that would certify the literature of their appropriate fields and index what has been certified. Although such panels might offer an efficient and cost-effective way of verifying the quality of openly accessible material, this strategy would seem to exchange the diffuse and relatively diverse existing system for one that would centralize and bureaucratize the administration of peer review. Concentrating peer review in the scholarly societies would also reinforce disciplinary structures, while existing journals increasingly cut across disciplines (and sometimes also across academic/non-academic lines). Finally, to the extent that it would replace the internally coherent journal issue with a master index of discrete articles, the review panel strategy would seem to risk a certain atomization of scholarship at the same time that it homogenizes the administration of scholarly communication.

A peer review strategy based on journal overlays (see part 1 of this Report) appears to be a more promising approach. Allowing dispersed communities of scholars to build peer-reviewed overlay journals on the institutional repository infrastructure could permit many existing journals to move to an Open Access model and enable organic, autonomous formation of new intellectual communities around the OA material housed in institutional repositories. This approach leaves many of the cultural practices associated with scholarly publishing intact. It is a scholar-centered approach and willing adoption may come at the expense of some of the visibility for individual institutions promised in SPARC's position paper. Scholars tend to identify more strongly with their disciplines and sub-disciplines than with their institutions (and this tendency is likely to grow more pronounced as new academics can increasingly look forward to dividing their careers among a succession of institutions). An institution-based scholarly communications infrastructure must be flexible enough to accommodate various scholarly affiliations – or affiliations of scholars with communities beyond academia.

If institutional repositories are to serve as a viable framework for global scholarly communication, a prerequisite is pervasive, even universal, participation by institutions, as well the seamless interoperability of repositories. The technological, political, and organizational developments that this implies still do not account for the costs associated with a robust peer-review system, which the reduction of distribution costs to near-zero does not eliminate.

[28] Crow 13.

3. Should the library community in general and CUL in particular take action to increase those prospects and, if so, what should those actions be?

Nationally and internationally, the academic library community has actively supported open access to scholarly information. Libraries have played a key role in the scholarly publishing reform efforts of SPARC, which has come out as a strong advocate of Open Access[29] and currently supports the primary news organ on this issue.[30] CUL, along with 106 ARL peer libraries, is a founding member of SPARC. In March 2004, the ALA co-signed the "Washington, D.C. Principles for Free Access to Science,"[31] in concert with nine other library associations, including the ALA's Association of College and Research Libraries (ACRL) division. CUL will continue to take a leading role in promoting reforms that serve the academic community and the public good. But what specific actions should CUL take locally, at Cornell, with regard to Open Access publishing?

Taking appropriate action
Our Task Force recommends that CUL foster and support viable Open Access publishing initiatives that respond to or resonate with real needs of specific scholarly communities. However, while the authors of this report are sympathetic with Open Access principles and with emerging practical examples, we do not endorse a particular business model unconditionally. We recommend that any Open Access publishing strategy or initiative under consideration by CUL meet the following requirements:

- It appears, based on informed projection, to offer an approach that over time will be more cost effective for CUL than the current publishing model;
- It responds to and meets the needs of CUL's user communities and improves scholarly communication; and
- It minimizes detrimental financial, political, and cultural effects on scholarly networks.

The financial and organizational resources and intellectual output of the university community must be allocated in ways that will not produce new disparities between groups of authors and readers and will look to a more egalitarian future.

Environmental scan and outreach
Given the relatively recent emergence of the OA issue and the various strategies and implementations considered in this report, the Task Force believes CUL can best serve its constituency by identifying and approaching a broad range of local stakeholders both to raise awareness among scholars at Cornell and to apprehend the needs and interests of various local

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[29] Richard K. Johnson, "Open Access: Unlocking the Value of Scientific Research," paper presented at "The New Challenge for Research Libraries: Collection Management and Strategic Access to Digital Resources" conference, University of Oklahoma, 4-5 Mar. 2004 http://www.arl.org/sparc/resources/OpenAccess_RKJ_preprint.pdf.

[30] *SPARC Open Access Newsletter*: http://www.arl.org/sparc/soa/index.html.

[31] *Washington D.C. Principles For Free Access to Science A Statement from Not-for-Profit Publishers*: http://www.dcprinciples.org/statement.htm.

scholarly communities. We recommend that CUL initiate a regimen of ongoing environmental scanning, as well as an outreach program around OA matters; the latter should include targeted efforts like the November 2003 Cornell Editors' Forum, as well as public activity, such as inviting speakers to campus and publicizing the activities of CUL's Electronic Publishing Program.

A CUL Standing Committee on Open Access Publishing
The Task Force recommends CUL establish a standing committee to monitor developments in OA publishing for the purposes of informing policies and decisions of the Library Management Team and raising awareness among CUL's constituencies. Collection development functions naturally include discussion and action around scholarly communication reform, including Open Access issues. Our Task Force recommends that the Collection Development Executive Committee be assigned the responsibility of establishing the standing committee and its charge, which should include the creation and maintenance of a public website on Open Access publishing as part of CUL's *Issues in Scholarly Communication* site (http://www.library.cornell.edu/scholarlycomm/).

Current state of affairs

CUL has already taken a leading role in several initiatives that promote Open Access. An informal inventory of CUL supported projects and activities that can be defined as Open Access efforts, as defined in this Report, yields the following docket:

Open Access journals or aggregations:

PloS (Public Library of Science)
BioMedCentral

Subject-based e-print repository

arXiv _ Established in 1991, this well-known e-print service for physics, mathematics, non-linear science, computer science, and quantitative biology is now maintained by CUL

Institutional repository

CUL Technical Reports and Papers

Other local efforts

At this writing CUL is also involved in the local prototyping of DSpace, the open source digital repository system developed jointly by MIT and Hewlett-Packard. DSpace is an access-neutral system that supports both open and restricted access to content based on community-defined criteria.

Closer to home, CUL is the developer of DPubS (Digital Publishing System), based on the Dienst system, developed by Cornell's Computer Science Department in the early 1990s and used for several years as the engine behind NCSTRL. The code base has been significantly modified and extended, and this enhanced version of the Dienst system now support Project Euclid. Like DSpace, DPubS is access agnostic – it readily supports both barrier-free and restricted access to its database of content.

The most robust implementation of DPubS is Project Euclid. The Euclid environment supports electronic journals in mathematics and statistics from independent and society publishers. While

the majority of journals served via Euclid are access restricted, one significant journal – *Annals of Mathematics* – is available on an Open Access basis. A new OA journal, *Probability Surveys*, will be added this summer. The DPubS system, developed at Cornell, will be 'generalized' and enhanced over the next two years under a grant from the Mellon Foundation. While the current implementation of DPubS is agnostic as to business model, DPubS v.2, which will be released under an open source license, should contribute to the development and support of Open Access publishing by lowering some of the administrative barriers to entry for those publishers who adopt the system.

Other 'open' content served via local implementations of DPubS includes the TechReports and Papers (see above) and Windows on the Past.

Beyond the Status Quo

An environmental scan in the fall of 2003, in advance of a forum for local editors, revealed that Cornell supports a rich variety of serial publishing activity. Should CUL decide to become more proactive in encouraging Open Access publishing on campus, a number of local journal projects presented themselves as candidates for internal support and service:

The Philosophical Review
John Rowehl, managing editor
circulation: ~2,500
print edition produced by Boyd Printing in Albany
(1998 _ current) available on POIESIS
(1:1 _ 1997) available on JSTOR

Asian Music: Journal of the Society for Asian Music
Martin Hatch, production editor
owned by the Society for Asian Music
circulation: ~500
print edition produced by ICS Press in Ithaca
No on-line edition
complete backfile available from JSTOR

Medieval Philosophy and Theology
Scott MacDonald, editor
owned by Cambridge University Press
on-line version available from Cambridge Journals On-line
circulation: unknown by editor but perhaps below CUP's cost-recovery threshold

Based on some anecdotal data acquired during this outreach excursion, the Task Force is fairly confident that the cost to CUL (or to the Provost's office) to cover operating expenses for a modest-sized scholarly journal would be in the $200k _ $225k p.a. range.

4. If Open Access publishing becomes a significant component of scholarly publishing, how will it affect CUL services, and what operational changes might CUL need to undertake as a result?

The role played by various forms of formal and informal Open Access publishing can be expected to grow, but it appears unlikely that OA will become the dominant model of scholarly publishing in the foreseeable future. Particularly as regards formally published, peer-reviewed literature, OA will likely remain a specialized form serving particular academic fields with unique demands. This Report has addressed economic as well as political and cultural issues that limit OA's applicability. Political changes are conceivable, however, that could alter the terrain in favor of OA; for example, governments could pass laws mandating that research produced with public monies must be published in Open Access journals.[32] In any case, it is worthwhile to consider a range of scenarios in addressing the potential impact on CUL operations of the expansion of Open Access publishing. Three scenarios are explored below:

a) OA becomes the dominant form of refereed academic publishing
In the event that an OA model with robust peer-review replaces the traditional mode of academic publishing, there must be some fund available to pay for author's publications, since authors (with few exceptions) are unable or unwilling to pay the full expenses (see Questions 1 and 2). As explained in question 1, these funds are problematic for scholarship if they come from the author's department, so it is likely that the library or some newly created fund (i.e. Provost's Fund) will be expected to pay these expenses. Currently, CUL pays membership fees to BioMedCentral and PLoS, so there is a precedent for the library subsuming author expenses for the benefit of the institution. Since CUL works with a fixed annual budget, the prospects of paying for article charges if anticipated costs cannot be estimated will be problematic and may require a type of slush fund for this purpose. As discussed in part 1 of this Report, a type of governing board would also need to be set up to ensure that these funds are not misused.

As discussed in part 1 and detailed in Appendix, author charges would need to be very low if Cornell were to see any cost savings from a producer-pays model of refereed OA publishing. If average author publication charges were $1,500/article, the library would require an infusion of almost $1.5M/year if academic publishing were to move from a subscription-based to a producer-pays model (see Appendix). If the library were expected to support both modes of publishing simultaneously, increased annual costs could be as high as $5.5M/year, assuming that all Cornell authors published in OA journals, but the library were still required to subscribe to traditional journals.

For the library, a total OA future for the scholarly research article would mean that its responsibility for collecting textual materials would be limited to books and other miscellaneous scholarly materials. While we can imagine a savings of shelf space and staff time by eliminating

[32] In fact, during the writing of the present Report, the U.S. Congress and the U.K. Parliament both recommended mandating provision of Open Access to papers resulting from government-funded research. See Andrea L. Foster and Lila Guterman, "American and British Lawmakers Endorse Open-Access Publishing." Chronicle of Higher Education 50.47 (30 July 2004): http://chronicle.com/weekly/v50/i47/47a01302.htm; also House of Commons Science and Technology Committee, *Scientific Publications: Free for All? Tenth Report of Session 2003-04*, House of Commons, United Kingdom Parliament, 7 July 2004: http://www.publications.parliament.uk/pa/cm200304/cmselect/cmsctech/399/39902.htm and http://www.publications.parliament.uk/pa/cm200304/cmselect/cmsctech/399/399.pdf.

journal check-in (a savings already enjoyed as a result of the reduction of print journals in science libraries), the future of digital archiving is, of course, far from settled. There would also be no need for librarians to manage licensed journal resources. What would these librarians then be doing? University libraries like Cornell would need to work with existing and future public archives to ensure that OA content would be maintained and migrated into the foreseeable future, and perhaps this would mean printing and keeping a repository of OA articles. There has been little discussion of the shared responsibility for providing metadata for OA materials, or of the prospect of having to assume responsibility for archives if new OA publishers were to burst in a second dot-com bubble. The claims that the academy would enjoy monetary savings by moving to an OA model are only correct if viewed from the singular perspective of the production of information.

b) OA becomes a significant mode of publishing, but remains limited in scope

CUL already appears to be functioning successfully in this mode. It supports the arXiv for segments of the physics and computer science communities and is working on joint projects to help support the dissemination of scholarly materials to the mathematics community. Other specialized projects like the Core Historical Literature of Agriculture, and the Home Economics Archive provide access to significant scholarly collections of information free of charge to the world. CUL is making voluntary membership payments to the Public Library of Science and BioMedCentral, which are both focused on the biomedical fields. If Open Access continues as a significant, but limited mode of publishing, the operation impact on CUL would small. CUL has demonstrated itself to be experimental, flexible, and able to pursue new projects with little overall effect on the other functions of the library.

c) OA remains marginal and limited and shows little adoption by the academic community

Under budget pressure, the library might consider retrenching from support of certain OA publishers because they have proven to provide low value in comparison with their cost. Unless the library sees OA publishing as a continuing experiment or is committed to supporting this business model for moral or political reasons, CUL might best pursue what our Task Force considers the most pragmatic position for the library: sensitivity to the particular publishing needs of researcher communities and active support promising new ventures as they arise.

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Appendix. *Estimating Expenditures in an Open Access Journal Environment. A Cornell University Library Case Study*

Total Serial Expenditures (2003). In addition to academic journals, "serials" include databases, directories, newspapers, yearbooks, etc.	8,000,000	i
Percent of Total Serials Expenditures devoted to scholarly journals	50%	ii
Estimate of Expenditures devoted to scholarly journals	4,000,000	A
ISI Author Hits (2003)	5,465	B
Number of titles fully indexed by ISI (SCI, SSCI, AHCI)	8,769	C
Total estimate of scholarly journals	20,000	D
Estimated article coverage of ISI (using logarithmic distribution)	92%	E = logC/logD
Estimated Total Author Hits	5,961	F = B * (1/E)
% total author hits that are first-authored someone at CU (ISI sample of 100 articles)	61%	G
Cornell First Author Articles (total estimate)	3,636	H = F * G
Cost per article (if access were free for everyone and we were just paying author charges), averaged over all articles in all journals	$ 1,100	I = A/H
Expenditures, excluding Elsevier participation		
Expenditures on Elsevier (2003)	1,700,000	J
% of Journal expenditures on Elsevier	43%	K = J/A
Journal budget, excluding Elsevier	2,300,000	L = A - J
Number of Cornell-affiliated hits in Science Direct Journals (2003)	980	M
Correcting for multiple-authors	598	N = M * G
% of total Cornell articles published in Elsevier	16%	O = N / H
Cornell articles published in journals other than Elsevier	3,039	P = H - N
Cost per Cornell article if Elsevier used an author-payment model	$ 2,844	Q =J / N
Cost per article if all publishers other than Elsevier used an author-payment model	$ 757	R = L / P

Expenditures, excluding participation by all big commercial publishers		
Expenditures on all big commercial publishers (estimate based on Kluwer, Wiley, Springer).	3,000,000	S
% of Journal expenditures on big commercial publishers	75%	T = S / A
Journal budget after removing big publishers	1,000,000	U = A - S
Estimated number of articles published in big publisher journals (based on size and proportion of Elsevier calculations)	30%	V
Cornell articles published in journals other than big publishers	2,545	W = H*(1-V)
Cost per article if all publishers other than the big commercial ones were Open Access publishers	$ 393	X = U / W
Notes:		
1. Based on current estimates, if the entire Cornell Library journal budget were used to support Open Access publishing, the cost per article would need to be less than $1100/article if we are to save money as an institution (Figure I). If true costs to publish are $1,500, the library will expend about $1.5M more than in the current model.		
2. Removing just Elsevier, the author costs per article would need to be around $800/article if we are to save money as an institution (Figure R)		
3. If we were to remove the largest commercial publishers (who will resist moving to an Open Access model), the cost per article would need to be under $400/article if we are to save money as an institution.		
4. Considering that most optimistic OA estimates of the cost per article to publish is $1,500, it is unlikely that Cornell will save money under any scenario.		
5. We did not factor in page charges since these fees are irretrievable by the institution.		