
Paying to Free Science: Costs of Publication as Costs of Research

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Many proponents of open access to journal articles online view costs of publication as an essential yet minor component of the cost of conducting research in the life sciences. Author-side charges for publication in open-access journals in those fields should, therefore, be paid principally by the agencies and foundations that fund research. Recent analyses of the potential cost-to-institution of a widespread transition away from purchasing subscriptions to scholarly journals and towards paying open-access publication fees on behalf of affiliated faculty must be amended to reflect the reality that third-party funding agencies already pay the bulk of such fees in the life sciences, and will likely continue to do so. *Serials Review* 2005; 31:103–106. © 2005 Andy Gass. Published by Elsevier Inc. Some rights reserved.

“At its essence,” writes Robert Terry of the Wellcome Trust in the March issue of *PLoS Biology*, “the open-access debate is not about economics, it is about access.”¹ While such an assertion likely raises the hackles of many publishers of scholarly journals, from the perspective of a funder of scientific research—and the Wellcome Trust is a notably generous one—Terry’s view is neither radical nor naive. “The Trust’s position is to support open unrestricted access to the published output of research, including the open access model, as a fundamental part of its charitable mission,” notes Sir Dominic Cadbury, Chairman of the philanthropy’s Board of Governors.² For many open-access proponents, the notion that sharing the results of scientific inquiry as widely as possible is central to the enterprise itself is the starting point—indeed, the “essence”—of any further discussion of the issue.

That said, the question of how to pay for the cost of producing peer-reviewed journal articles that are freely

available online is a logical next step to address. The answer that open-access publishers like The Public Library of Science (PLOS) have settled on is that, at least in biology and medicine, a publisher can be paid as a service provider. Instead of selling access to scientific journal articles, the publisher can be paid, up front and in one fell swoop, for the services it provides authors, institutions, and the scientific community—services like overseeing peer-review, preparing accepted manuscripts for publication, hosting their final versions online, and so on. In exchange for that one-time payment, open-access publishers like PLOS and BioMed Central assert no restrictions over the reuse of authors’ articles, and make them freely available online in centralized, subject-based repositories like the US National Library of Medicine’s PubMed Central.

Who should pay such “author-side,” as opposed to reader-side, fees? One common assumption is that institutional libraries might reasonably be expected to bear the cost of their affiliated faculty members’ publications in open-access journals that employ the author-side payment business model. In PLOS’ view, however, the “libraries shoulder open-access publication charges” system is not, by itself, the way that scientific publishing is most reasonably paid for.

The Cornell Report

A study recently conducted by a Cornell University Libraries (CUL) task force unintentionally perpetuates

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EDITOR’S NOTE: This article continues the discussion on Open Access focused on in volume 30, no. 4 (2004). We simply had so many positive responses to our initial issue that we could not include everyone, so I extended this opportunity to further exploration of issues and initiatives to PLoS, a key participant in this focus. Gass references Stevan Harnad, who likewise continues his explorations, responses, and formulations of Open Access with a recent critique in *Ariadne* (January 2005, <http://www.ariadne.ac.uk/issue42/harnad/intro.html>) entitled “Fast-Forward on the Green Road to Open Access: The Case Against Mixing Up Green and Gold.”

a misunderstanding of this point, however.³ Upon the report's release last fall, the *Library Journal Newswire* announced that the Cornell team "delivered a sober assessment of author-pays open access (OA) publishing."⁴ Its authors conclude that "CUL would likely see its serial expenditures *rise significantly* if the library used its current subscription funds to pay for author fees instead."

It should be said that the Cornell group deserves a tremendous amount of credit for being the first (or at least the first widely known initiative) to undertake a formal analysis of the amount a university spends on scholarly journals in terms of the number of articles its faculty publishes. The public availability of this kind of information is essential for productive discussions of different possible systems of financing academic serials. Far from being critical of the Cornell task force's project, then, the proceeding comments are intended simply to further the discussion of this undoubtedly influential work.⁵

As David Prosser (Director, SPARC Europe) and others have observed in listserv discussions, though, the report is plagued by a significant shortcoming. Its principal method is to compare the average cost-per-article of an institution's published output under the prevailing, subscription-based system with estimates of per-article open-access publication fees sufficiently high to sustain a typical scholarly journal. This strategy, however, entirely neglects the central role that third-party funding agencies play in paying for the publication of scientific research, in both the open-access and the subscription-based systems. For that reason, the report's widely noted conclusions—among them that many institutions' costs would rise significantly if open-access publishing became ubiquitous—are simply not valid.

Costs of publication, open-access advocates often say, should be viewed as costs of research.⁶ Costs of research are born by both the institutions at which faculty conduct it and by external granting agencies. Therefore, in the open-access world view, costs of publication should be paid not just by institutions, through their libraries, but also (or perhaps exclusively) by the grantmakers who have paid for the work that is reported in scientists' primary articles.

In practice, this is a less radical proposition than it may sound. Particularly in the United States, many research funders already pay, directly and indirectly, for the publication of primary scientific articles. The US National Institutes of Health, for example, estimates that it already spends "\$30 million annually in direct costs for publication expenses, including page and color charges and reprints." Averaged over the 60,000 to 65,000 articles per year that result from NIH-funded research, that \$30 million amounts to roughly \$450 to \$500 per NIH-funded paper.^{7,8} The same \$30 million totals slightly under 0.22 percent of the \$13.7 billion that NIH spent on extramural grants for research projects in the fiscal year 2003, and a lower percentage of the money NIH spent on all research in that period (factoring in work conducted within NIH).⁹ A very high

percentage of that \$30 million in direct publishing expenses undoubtedly funds the publication of articles that are then resold in journals that are accessible online only by subscription.

What do these data mean for projects like the Cornell report? For one thing, they mean that the CUL task force is exactly right when it argues that "the consequences of publishing in [the open-access] mode may vary significantly by academic discipline," and notes that "differences appear greatest between the sciences, on one hand, and the humanities and social sciences, on the other." It certainly seems doubtful that any third party is already subsidizing the publication of a substantial fraction of, for example, the moral philosophy literature to the tune of nearly \$500 per article.

The statistics on NIH expenditures also suggest the following for primary literature in the life sciences, and particularly biomedical fields: it is not realistic for an institutional library to assume that it alone would bear the costs of its faculty's open-access publication fees. Libraries' expenditures on biomedical serials are currently supplemented with NIH's expenditures on direct publishing payments made to the same journals. Similarly, in at least some models, institutional subsidies for open-access publication fees are already supplemented with payments by funding agencies. This is the case in the PLoS Institutional Membership model, where members' dues virtually never offset more than 50 percent of an author's publication charge; the rest of that fee is paid by the author's research funder (or, of course, is waived at the author's request, no questions asked). For authors from institutions that do not have membership arrangements with open-access publishers (meaning most authors in PLoS journals), the bulk of the publication fees they pay come from their grants or other funds provided by external sources, rather than their employing institutions.

PLoS does not suggest, then, that an institution like Cornell should assume the full costs of its faculty's open-access life sciences publications—or base calculations of the cost of a wholesale conversion to open-access publishing on that assumption. Realistically, in fact, a more poignant question is whether, in the long term, institutions (distinct from funding agencies) should assume *any* of those costs. [Even if the answer to that question is "no," there is probably something to the argument that in the short term, institutions inclined to support open-access have valid reasons for providing incentives for their faculty to publish in open-access journals, as they do by paying a portion of researchers' open-access publication costs.] The two largest private charitable funders of biomedical research in the world, the Wellcome Trust and the Howard Hughes Medical Institute, pay open-access publication fees in full for their funded investigators. The largest government funder of life sciences research in the world, NIH, allows authors to use grant funds to pay for open-access and other publication fees; if the agency quintupled the funds it already spends on direct

publishing costs, that increased sum would total just over 1 percent of the amount it awards annually in grants, and average out to \$2250 to \$2500 per NIH-funded article.

Where do research institutions and their libraries fit into this equation? This is certainly an important question. And a case could probably be made that institutions should play some role in funding the open-access publication of some of the life sciences literature. But to analyze whether an institution would stand to gain or lose financially by paying 100 percent of author-side fees for 100 percent of its faculty's publications is to analyze a model of paying for open-access publishing that virtually no open-access proponent actually advocates.

A different important question is how much it would cost the world-at-large to pay for the publication of scientific research articles in the author-side-payment-only model, compared with what the world-at-large spends on subscriptions to scientific journals combined with author-side payments to the same journals. Certainly some organizations and agencies would end up paying more than they currently pay. Wellcome Trust analysts have estimated, for example, that it would cost between 1 and 2 percent of their grantmaking funds to pay open-access publication fees for every paper their grantees produce. [They have added that they would gladly pay those costs.] Others would undoubtedly pay less. The following section addresses briefly why it might be in the interest of an organization—be it a funding agency, research institution, government, or another relevant body—to subsidize the cost of publishing open-access scientific articles even if doing so was not financially advantageous.

Comparing Apples and More Accessible Apples

The question of relative costs, absent additional questions, ignores important differences between articles that are open-access and those that are not. PLoS and many others have elsewhere attempted to articulate why (for reasons that have little to do with the “serials crisis”) a predominantly open-access world of scientific publishing might be preferable to the status quo.¹⁰ As far as initiatives like the CUL task force report are concerned, these arguments constitute an additional dimension to consider in weighing the merits of institutional support for open access.

The Cornell report rightly notes that in this additional dimension, especially, different fields of academic research are subject to vastly different imperatives for open access. The ethical case for public access to the results of research on AIDS, for example, is a lot stronger than the ethical case for public access to the results of research on, for example, literary criticism. Stevan Harnad (Universite du Quebec à Montreal, well-known advocate of authors' self-archiving their journal articles in institutional repositories) and many others argue that these moral differences are no reason not to make all scholarly literature freely available

online—and proponents of that position make a compelling case. The point here is simply that factors beyond cost-to-institution must be incorporated into calculations of the benefits of open access, and that those additional factors do vary across academic disciplines. Again, the case for open access to literature in the life sciences, and specifically biomedicine, is particularly strong.

At the end of the day, this is probably the point at which the view of open-access critics fundamentally diverges from PLoS' (and perhaps the Wellcome Trust's as well). The motivation behind PLoS' founding actually had little to do with concerns about library budgets or the spiraling costs of scientific serials. It was predicated instead on the idea that science—and particularly publicly funded science—is most appropriately viewed as a public resource. Scientific journal articles can benefit the industry, consumers, educators, researchers, and others, as tools to be read and used in innovative ways. And since, as a society that funds scientific research, we can disseminate the fruits of this public resource without restrictions on access and reuse, that is the way we should choose to do so.

Notes

1. Robert Terry, “Funding the Way to Open Access,” *PLoS Biology* 3, no. 3, March 2005. DOI: 10.1371/journal.pbio.0030097 [not yet online at the time of this writing].
2. Wellcome Trust, “Annual Report and Financial Statements 2004,” p. 5; see <http://www.wellcome.ac.uk/assets/wtd015233.pdf> (accessed March 8, 2005).
3. “Report of the CUL Task Force on Open Access Publishing Presented to the Cornell University Library Management Team August 9, 2004”; see <http://www.dspace.library.cornell.edu/handle/1813/193> (accessed March 8, 2005).
4. Andrew Albanese, “Cornell: Open Access Costly,” *Library Journal Newswire*, February 1, 2005; see <http://www.libraryjournal.com/article/CA498857?display=NewsNews&industry=News&industryid=1986> and [verticalid=151](http://www.libraryjournal.com/article/CA498857?display=NewsNews&industry=News&industryid=1986) (accessed March 8, 2005).
5. It may be the case that concerns similar to the ones described here were what led the Cornell University Library Library Management Team to append the following “Clarification” to the front page of the report on October 7, 2004: “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.”
6. Andy Gass and Helen Doyle, “The Reality of Open-Access Journal Articles,” *Chronicle of Higher Education Review*, February 18, 2005, p. B13.
7. “Questions and Answers: NIH Public Access Policy,” Question 16; see http://www.nih.gov/about/publicaccess/publicaccess_QandA.pdf (accessed February 22, 2005).

8. There seems to be some dispute over precisely what fraction of the total annual published STM, or life sciences, or biomedical research articles is represented by the 60–65,000 funded by NIH. Estimates have ranged in some quarters as low as 10%, in others over 50%. For the purposes of this discussion, an exact figure is unimportant; the point is simply that NIH funds the publication of articles its grantees produce, as do many other granting agencies.
9. See <http://www.grants.nih.gov/grants/award/research/RGAVG9803.htm> (accessed March 8, 2005); \$13.7 billion figure calculated as follows: number of research project grants times average grant size.
10. See for example, “Why PLoS Became a Publisher,” Varmus et al., *PLoS Biology* 1, no. 1, October 2003; “Whose Copy? Whose Rights?” Gass et al., *PLoS Biology* 2, no. 7, July 2004; “A Medical Journal for the Internet Age,” Varmus et al., *PLoS Medicine* 1, no. 1, October 2004; “The Green and Gold Roads to Open Access,” Harnad and Brody, *Nature Web Focus: Access to the Literature*, May 17, 2004.