

# Public access to scientific information

## Are 22,700 scientists wrong?

by Mary M. Case

**A**lmost 22,700 life scientists from 158 countries around the world have expressed their discontent with the current system of scholarly communication and have pledged to do something about it.<sup>1</sup> All of these scientists have signed an open letter stating that, as of September 1, 2001, they will publish in, review and edit for, and subscribe to only those journals that agree to make the contents of their titles available free of charge on a publicly accessible server, such as PubMed Central (PMC), within six months of publication. Known as the Public Library of Science (PLOS), this grassroots movement has the potential to effect significant change in access to the biomedical and life sciences literature.<sup>2</sup>

Proponents of PLOS are strong believers that the results of publicly funded research should be freely available to the public. They find no justification for private ownership and control of the work they produce. Although they acknowledge that publishers contribute to the final product by managing peer review and editing manuscripts, they point out that this contribution hardly matches the creative energy and time investment of researchers and the financial investment of funding agencies and home institutions.

As stated recently by two of the founders of PLOS, "Should the reward for the publish-

ers' small contributions be permanent, private ownership of the published record of scientific research, and monopoly control over how, when and by whom a paper can be read or used and how much this access will cost? No!"<sup>3</sup>

A second fundamental precept of PLOS is the call for centralized electronic archives of life sciences literature. Centralized archives in standardized formats provide the foundation for sophisticated full-text searching across the literature, linking among articles from disparate sources, and linking to related databases, encyclopedias, textbooks, and other resources.

### The beginnings of the initiative

The PLOS initiative was founded by a small group of leading biomedical scientists, several of whom had been involved in the development of PubMed Central (PMC). PMC itself was first proposed by Harold Varmus, then director of the National Institutes of Health (NIH) in the spring of 1999. First called E-biomed, the project was intended to "facilitate a community-based effort to establish an electronic publishing site." The essential feature of the plan was "simplified, instantaneous cost-free access by potential readers to E-biomed's entire content in a manner that permits each reader to pursue his or her own

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## Editors' note

We inaugurated this column in January 2000 with an article on PubMed Central (PMC), a groundbreaking proposal by the National Institutes of Health to create a publicly funded, freely accessible archive of biomedical research literature.

When our column launched, PMC was still an idea waiting to happen. Librarians and publishers eyed this challenge to their respective hegemonies—one of publication, the other of institutional intermediation—with apprehension, if not downright suspicion. Would it succeed? How would the scholarly community respond?

interests as productively as possible.<sup>4</sup> The early version of E-biomed called for support of both peer-reviewed and non-peer-reviewed articles and stipulated that copyright would remain with the authors. Criticism of E-biomed was instantaneous.

Among many complaints, critics charged that E-biomed would undermine peer-review and current journals, put the government in charge of an activity best left to the private sector, and erode the financial base of scientific societies. Varmus responded:

The system we propose is intended to make knowledge and ideas in life sciences widely and freely accessible to the scientific community and the public, in the tradition of free public libraries. In no sense should E-biomed be interpreted as a proposal to interfere with, control, or restrict the activities of existing journals or other vehicles for transmitting scientific information. Rather it is intended to develop new opportunities to improve the communication of science.<sup>5</sup>

Nevertheless, by the time E-biomed went online as PubMed Central in February 2000, a number of concessions to the critics, primarily publishers, had been made. Support

The scholarly community has, it appears, responded—some 22,700 strong—in the form of its own grassroots initiative, the Public Library of Science (PLOS). Now, D-Day is fast approaching. Mary Case, director of the Association of Research Libraries' Office of Scholarly Communication, brings us up to date with an insider's tour of how PLoS coalesced to lend substance and form to PMC's wobbling and uncertain nebula, and suggests what libraries can do to help the fledgling new system emerge.

Again, one is left to ask: will it succeed? We may soon find out. Read on.—*Ivy Anderson*

for a non-peer-reviewed system was put on hold; peer-reviewed content could be submitted by publishers at any time after being accepted for publication; and copyright ownership would be determined by the participating groups (i.e., publishers, societies, editorial boards). What had started out as a project with the potential to revolutionize access to scientific literature had been significantly altered in the face of publisher pressure. At launch, despite the concessions, only two journals had issues available on PMC: *Molecular Biology of the Cell* and *Proceedings of the National Academy of Sciences (PNAS)*. To date, only eight journals have issues available and another ten listed as forthcoming.

### The birth of PLoS

In the fall of 2000, frustrated by the unwillingness of publishers to contribute their content to PMC, the group of bioscientists decided that another strategy to achieve free access to the literature was necessary. If the publishers could not be persuaded by NIH acting on behalf of scientists, perhaps they could be persuaded by the scientists themselves who provide the papers and review and edit for the journals. Echoing Varmus's words, the group took the name Public Library of Science and developed an open let-

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ter that it began circulating via e-mail to scientists around the world.

Not surprisingly, when news of this effort was made public in early 2001, the debate was reignited. Although many publishers described the goal as laudable, and even desirable, they were not inclined to participate. Many publishers believe that there is no need for central repositories, especially any run by the government. Government control, it was argued, could lead to suppression of research results on controversial topics and to uncertainties in funding as congressional priorities change.

As *Science* and many HighWire publishers have demonstrated, publishers may be willing to make their articles available for free on their own sites, but they are not eager to turn their files over to another entity.<sup>6</sup> They worry that the transfer of files to a third party will result in the corruption of files and compromise the quality of articles. In addition, they argue that in the Internet environment, a central archive, such as PMC is not needed for access across publisher resources. Searching across distributed systems is currently possible and such services as CrossRef link citations among participating publishers. Moreover, access to their articles at a third-party site could undermine the publishers' ability to attract advertising dollars to their own Web sites.

Small society publishers are concerned that in disciplines where the drop-off in use over time is gradual, libraries will depend on the free access provided through the central archives rather than subscribe. In those cases, the journal may either have to cease publication or significantly increase the subscription price to its remaining subscribers.

The proponents of PLoS have always said that PMC is only one of a number of possible entities that could serve as an archive. In fact, some measure of duplication is desirable as a hedge against downtime, system crashes, and heavy network traffic.

PLoS has no intention of substituting one set of monopolies with another. They point to the example of GenBank, the public archive of DNA sequences, as a centralized repository in a single format that has generated a rich array of searching software and linked resources. But GenBank is also duplicated at two other sites, one in Europe and one in Japan. Sequences can be deposited at any of the three sites, and the sites are synchronized daily. GenBank is housed and managed at the National Center for Biotechnology Information (NCBI), a unit of the National Library of Medicine and NIH, and has never had a problem with funding. There is little reason to believe that if scientists support it, PMC would not also be fully supported.

Moreover, PMC is highly unlikely to have any influence on the editorial policies of archived journals. The role of the government in this case is to provide the technical infrastructure and financial support. Editorial boards will determine what is published in their journals and subsequently submitted to PMC. In terms of publishers' concerns about the integrity of the files when transferring them to a third party, NCBI Director David Lipman notes that PMC has actually detected data-tagging errors in some of the files contributed by publishers. The result has been enhanced quality of the papers at both the publisher's and the PMC site.<sup>7</sup>

In recognition of the possible effect that viewing an article on a third-party site could have on advertising revenues, PMC recently announced a new policy that would encourage publishers to submit their content but would protect their financial interests. The PMC would integrate the content into the PMC site for purposes of searching, linking, and archiving, but would pass the user on to the publisher's site for the full text of the article. PMC reserves the right to make the content available through PMC for free if the publisher does not do so on its own site within a year of publication, although six months is preferred.<sup>8</sup> According to the PLoS, "This proposal . . . provides a good test of the publishers' real intentions."<sup>9</sup>

### **How libraries can contribute to PLoS success**

To allay the financial fears of the societies, PLoS cites the examples of *PNAS* and *Mo-*

*lecular Biology of the Cell*, both of which make their articles available on PMC two months after publication. After a year, neither title has lost subscriptions.<sup>10</sup> However, this is an area in which librarians can make an important contribution to the success of the PLoS movement. Libraries could reduce the risk for societies by pledging to continue to subscribe to society titles that make their content available for free after six months and keep their prices at reasonable levels.

Libraries can also help in a number of other ways. First, find out who on your campus has already signed the open letter. Names and institutions are available on the PLoS Web site. Talk with these faculty, listen to their rationale, and encourage them to talk with others in their departments. Second, provide the entire biomedical and life sciences faculty with information on the PLoS and issues in scholarly communication. Provide the names of their colleagues who have signed the letter and may be willing to discuss it with them.

Third, be prepared to provide or suggest alternative venues for faculty to publish in as of September 1. If publishers believe faculty have no other options, they have no real incentive to change their practices. Publishers can wait until September 1 and see what happens when 22,700+ scientists suddenly have no where to submit their papers. Although you want to be sure to keep track of the publishers that have joined PMC, they may not be able to absorb all of the new submissions on their own. The leadership group of PLoS recognizes this dilemma and is in the process of seeking out alternative publishing vehicles.

In the meantime, it is important to explore with your faculty the possibility of setting up independent editorial boards. PMC will accept submissions from such groups as long as three members of the board are currently principal investigators on research grants from major funding agencies. The library could play an important role in supporting the formation of such new "journals" and providing technical support and infrastructure.

Another important action the library can take is to cancel titles that do not agree to support the goals of the PLoS. If your faculty have signed the open letter and alternative journals are launched, it is time to

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cancel those that choose to ignore the interests of the scientists they are intended to serve.

For years, librarians have worked to engage faculty in discussing the issues of, and exploring possible solutions to, the scholarly communication crisis. Although there may be disagreements with the precepts of PLoS, the lifesciences community has clearly signaled what it desires in a system of scholarly communication: peer review, free public access, timeliness, flexible searching and extensive linking, and assured archiving. The PLoS is a challenging new approach to the crisis in scholarly communication and deserves the library community's attention and support.

## Notes

1. This statistic is accurate as of May 21, 2001.

2. Available online at <http://www.publiclibraryofscience.org>.

3. Michael Eisen and Pat Brown, "Should the Scientific Literature Be Privately Owned and Controlled?" *Nature Webdebates*. Available online at <http://www.nature.com/nature/debates/e-access/Articles/Eisen.htm>.

4. "E-BIOMED: A Proposal for Electronic Publications in the Biomedical Sciences," May 5, 1999 (DRAFT) and June 20, 1999 (ADDENDUM). Available online at <http://www.nih.gov/welcome/director/ebiomed/53ebio.htm>.

5. Ibid.

6. In a response to PLoS, the editors of *Science* stated that they would make original research reports published in *Science* available for free after a year on their own Web site. "Is a Government Archive the Best Option?" *Science*, March 23, 2001: 2319.

7. Julia Karow, "Publish Free or Perish: Life Scientists Are Urging Publishers to Grant Free Access to Archived Research Articles," *Scientific American*, April 23, 2001. Available

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is someone calling him- or herself "Count Fathom." "I can wait, I can fast, and I can think," Count Fathom tells us. No doubt.

- Knowpost (<http://www.knowpost.com>) calls itself a community. Rather than contact a particular expert, you post a question to a board, and someone may answer it. There are no expert listings as in some other services. However, in addition to random questions and answers in any particular category, Knowpost experts can offer "HowTos," which cost not money but points to view. "Points are the currency of KnowPost. You are given 25 points when you register at KnowPost and you can earn more points by answering questions and posting HowTos." For three points you can learn how to "Support the lunchmeat revolution," and for two points you can "Experience philanthropy firsthand and make the world a better place." It seems a small price to pay.

- WHQuestion (<http://WHQuestion.com>) claims it is "the ultimate tool for acquiring knowledge on the Internet." With this tool, you post random questions and sometimes get them answered by people browsing through the fresh questions page. They play up the fact that a lot of the answers you can get here are not available on the Web or in books, because they are in people's heads.

- Askme (<http://www.askme.com/>) allows you to post a question to a general topic bulletin board, or target a specific expert and ask that person a question. Like the other sites where you can ask questions of specific experts, the range of expertise varies. However, you can usually tell enough about the experts to determine their competence. I'm registered as an expert in politics (qualification: I read a lot), and every day I get an e-mail directing me to new questions on the politics board. The questions vary widely, including many that look as if they were taken from a political science exam, but often they receive good answers.

## Conclusion

The expert services are divided into pay and

free services, and the free services are further divided into sites that require some sort of qualification and those on which anyone can register as an expert. They also range from sites at which you target a specific expert to those where you randomly post a question and randomly receive a response. The qualifications of experts vary, but one can often sift through the chaff to get the wheat, and in my experience, many experts try to answer questions quickly and correctly.

From an academic librarian's perspective, it's hard not to laugh at some of the experts, but these services use the Web to do what it does best—connect people. The free expert services that allow anyone to register take advantage of the knowledge dispersed throughout the online community. Sure, it's hard sometimes to know which expert to turn to, or how to evaluate your information, but the same can be said of traditional library reference service.

We must remember how these services work and how to use them for our benefit. If we are to compete with and criticize them, we need to know what they do and don't do well. We should also try to figure out what librarians can learn from these services. What do we like? What should we imitate? What do we definitely want to avoid? And if we direct library users to them, we should be ready to discuss whether they are pay or free, how they identify their experts, how we can evaluate the experts and their information, and what sorts of questions they may answer.

These sites are sometimes seen as competition for reference librarians, but they need not be. However, we have to know what they do to know what we do better. ■

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*("Public access . . ." cont. from page 709)*

online at <http://www.scientificamerican.com/explorations/2001/042301publish/>.

8. "New Option to Display Full Text at a Journal Site Only." Available online at <http://www.pubmedcentral.nih.gov/about/newoption.html>.

9. Public Library of Science, "Response to Science Magazine's Statement Regarding this Initiative." Available online at <http://www.publiclibraryofscience.org/plosScienceRep.htm>.

10. Ibid. ■