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## AT THE HEART OF THE HIGHER EDUCATION DEBATE

### Crusaders for a truly free flow of ideas

2 January 2004

Authors make their research available to publishers for nothing only to have it offered back to them at a price. Geoff Watts reports on efforts to change this

Item: preparing this article, I log on to the *Nature* website, search for the phrase "open access" and select the first of 190 documents.

Its title: "Scientific publishing: Who will pay for open access?" A message appears on the screen. It tells me that the article is mine for \$18. Who will pay for open access? Well, not *Nature*, not at this stage anyway.

Item: speaking recently at a meeting in London organised by the Higher Education Funding Council for England's Joint Information Systems Committee, Mark Walport described trying to consult the online version of the *Journal of Infectious Disease*. The issue he wanted included a report on malaria research by the Medical Research Council laboratories in Gambia: work financed by the Wellcome Trust. On his office computer screen a message appeared: "Access denied". Walport is director of the Wellcome Trust.

To do away with such irritations and absurdities is one of the aims of the open-access movement in the publishing of academic research findings. There is a feeling that science has inherited a system that no one starting from scratch would dream of designing. This view is implicit in the way that Mark Patterson, a senior editor with the new open-access journal *PLoS Biology* [PLoS being the Public Library of Science], describes conventional publishing.

"Authors give publishers their content for nothing," he says. "Publishers put it out to the scientific community for quality control through peer review, again for nothing. Often the editors who edit the journals do it for nothing. And finally the publishers sell that same content back to the academics who provided it." Publishers do, of course, add value. Whether they add as much value as they make profit is disputed.

Southampton University cognitive neuroscientist Stevan Harnad thinks they do not. With the exception of peer review, the various editorial services that publishers arrange are forms of help that he feels he can do without.

But as the system works, would-be readers of new research findings are obliged to purchase the rest of the package as well. This inevitably raises the cost and restricts the number of readers with untrammelled access to those findings. Yet the whole point of publishing scientific papers is to ensure that as many people as possible see them, read them, cite them and build on them. It's how individuals establish their careers and how institutions create their reputations.

Every year, about 24,000 refereed science journals publish 2.5 million articles between them. Fewer than 600 of these journals operate on open access - so scientists aiming to read the literature must rely on their institutions' libraries or must pay to read a specific report in a specific issue. "Every day that we don't have open access, research impact is being lost," Harnad complains. "The authors of the research are losing the citations and the rewards of those citations."

It was thoughts of this kind that prompted Harnad and other like-minded crusaders to formulate some of the principles of open-access publishing.

That was ten years ago. Progress has been frustratingly slow.

The key difference between open access and conventional publishing is in payment. Conventionally, readers (or their libraries) pay the cost through a subscription. With open access, the authors pay the bill, normally out of their research grant. In his keynote address to the Jisc meeting, Jean-Claude Guedon of the University of Montreal pointed out that the advent of digital technology has made it possible to break the stranglehold of the commercial publishers and to develop a system designed to ensure free access by the greatest number of people.

PubMed Central, which was set up by the US National Library of Medicine, is a step in this direction. Its intention is to offer free access to all peer-reviewed literature in the life sciences. Its ambition has yet to be realised because too few publishers have chosen to go along with it.

Another scheme began in October 2000. Three US biologists, including Nobel prizewinner Harold Varmus, founded PLoS. As Patterson explains: "They circulated an open letter asking scientists to pledge not to work with journals that didn't make their content freely available within six months of publication. At close of play, they had about 30,000 signatures from nearly 200 countries."

Commercial publishers were, once again, disinclined to cooperate. Catriona MacCallum, also of *PLoS Biology*, is not surprised. "They make huge revenues from the current system, so changing it is not to their advantage." But, she adds, "even *Science* makes its contents freely available after a year, and it's not clear that they massively damage their profits by doing so.

Few scientists feel they can wait six months or a year to find out what their peers are doing. So they still buy a subscription just to get the information without delay."

Either way, recognising the failure of their first approach, the instigators of PLoS changed tack. Putting their money (or rather that of the Gordon and Betty Moore Foundation) where their mouths were, they created *PLoS Biology*. This will be joined in the spring by *PLoS Medicine*.

Patterson says: "The idea is to show that publishing can be done with a different business model whereby the literature is completely free as soon as it's published."

What about authors from poor countries, or funders that bar the use of research grants to pay for publication? "We waive the fee for authors who say they can't afford it." Currently, only about 5 per cent of authors get a free ride, and that's a cost the journal can cover.

*PLoS Biology* doesn't have to make a huge profit, but it must prove sustainable. "A mistake some people make is to say that open access is anti-commercial," Patterson says. "This isn't so. The other big open-access publisher, BioMed Central, is a commercial organisation. But their expectations of how much profit they expect to make are at the level of 5 or 10 per cent. Some of the biggest commercial subscription publishers are making 30 or 40 per cent."

Paradoxically, Harnad sees the hoopla surrounding the launch of *PLoS Biology* as a distraction from the goal of universal open access. "We never thought of an instant transition from 24,000 toll-access journals to 24,000 open-access journals," he says, recalling the time when he and others first began discussing the issue. "If that was the only way to open access, we'd be waiting till doomsday."

He argues that the (almost) instant route to universal access is through institutional self-archiving. Using software already in existence, every researcher who has published something should deposit the electronic equivalent of a journal reprint (and preferably also the pre-print or unrefereed version of the text) in a local archive. Harnad is not greatly bothered whether the journals that referee and publish findings are paid for or free, or whether they have paper as well as electronic versions. His main concern is that all their material is available online immediately and without access tolls.

Much of the physics community already operates like this. But although some of the world's largest and most important research institutions have already created suitable archives, few of them have a policy requiring staff to deposit their papers. As a result, many researchers still do not bother. Some, perhaps, are deterred by the fear that they are violating copyright law. Harnad says this is not the case, noting that many journals already support self-archiving - and even those that do not have a formal policy will often agree if asked.

The publishers of subscription journals claim to be unfazed by what might seem to be their imminent demise. As Harnad points out, self-archiving in physics has not seen a wholesale closure of subscription journals. In fact, one that was set up with open access has become a subscription publication.

Its material, however, continues to be self-archived - which shows, Harnad says, that publishers using conventional business models may still have a place.

The Wellcome Trust is the latest body to have come out in favour of open access. Even the United Nations is being pressed to support it. With most of the practical, technical and legal objections now resolved, the remaining hurdles are cultural and managerial. They could prove to be the most intractable of all.