Publishing, perishing, and peer review

Could new kinds of electronic publishing rescue academia from its long-running "journals crisis"?

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AN OBSCURE academic journal with a few hundred subscribers may seem like no way to make a fast buck, or indeed any bucks at all. Nonetheless, thousands of the most off-beat and little-read serials—with such gripping titles as *Advances in Colloid and Interface Science*, *Solid State Ionics* and *Metal Powder Report*—are produced by commercial publishing houses at profit margins of 40% or more. It was, indeed, such riches that helped support the lifestyle of the late Robert Maxwell, a scoundrel who made his early fortune from the worthy business of publishing the scientific world's latest discoveries.

The reason such margins are possible is that the readership, though small, is almost guaranteed. Learned journals are not just fun to read—they are vital to academia. Publishing in them allows researchers to tell one another what they have discovered, to stake their claims to having discovered it first, and to show their bosses and grant-givers that they have not been idle.

However, journal prices have been rising steadily above the rate of inflation for years. The Association of Research Libraries, an organisation of 121 American academic libraries, estimates that its members were spending 124% more on journals in 1996 than in 1986, but getting 7% fewer titles for their money. Much of the reason has been a rise in the sheer volume of scholarship: journals are getting fatter. But researchers and librarians have long been complaining that the commercial publishers (as opposed to non-profit learned societies —though even those often run journals at a profit, to cover the costs of other services) are raising prices faster than they ought to.

The publishers, they say, benefit from a skewed market. Because journals are essential, because academics are slow to change their preferences (both for where to publish and for what to read), and because the big publishers own so many titles, in effect they have a captive audience. And if libraries cancel journal subscriptions they cannot afford, publishers just raise the prices of the remaining ones to compensate for the revenue they lose.

There is another argument for seeing the journal industry as quasi-monopolistic. Once an article has appeared in a journal, it can appear nowhere else. Although journals may jostle for pre-eminence in a scientific field, the contents of each are unique, so they never compete directly. This helps explain why journals published by learned societies rarely drive those from commercial publishers out of business, despite often costing a fraction of the price.

Until a few years ago, the cost of publishing things independently in print meant that an established journal was the only way for a scholar's work to be disseminated and recognised. With the advent of the Internet, however, there have been various proposals for using electronic publishing to break the big publishers' hegemony. Some of them are now being tried.

Ethereal knowledge

Electronic journals are nothing new. Ann Okerson, a librarian at Yale University, estimates that there are between 5,000 and 10,000 of them. Three years ago there were 325. Most are just electronic copies of print journals, and yet they are not much (and sometimes not at all) cheaper than the paper versions. In addition, almost all of them suffer just as much from the other great bugbear of academic publishing: the wait of months, occasionally years, for a journal to decide whether an article is fit to grace its exalted pages. Much of this delay is caused by the need to send such articles to outside experts for "peer review".

Stevan Harnad, a psychologist at the University of Southampton, has argued for many years that the Internet ought to be used to break the connection between publishing and peer review. To spread their words faster, scientists have traditionally sent out pre-prints of unpublished articles and, with the advent of the Internet, "e-prints" have now emerged. E-prints, however, tend to be posted in electronic archives—things which are, in effect, little less than independent web-based journals.

For this reason, e-prints are already depriving journals in certain fields of their traditional roles both as newspapers and as repositories of knowledge, leaving only the fact that a journal's contents are peer-reviewed to distinguish it from an archive. Other functions that publishers fulfil—such as typesetting and printing—are subsumed already, since scientists produce neatly formatted manuscripts, replete with mathematical symbols, themselves.

But even the peer-review role is being taken over, at least informally, by the archives. According to Paul Ginsparg, who runs one of the biggest—the physics and mathematics archive at the Los Alamos National Laboratory in New Mexico—scientific authors are meticulous about updating their articles with changes suggested by colleagues, since it is in their interests for the latest version to be available.

Journal publishers do not respond well to this threat to their role. Once an article has been printed in their pages, the law of copyright is often used to prevent its author from posting it on the Internet. Moreover, many journals treat posting to an archive before their periodical hits the presses as "prior publication", and threaten not to accept papers for that reason.

Some publishers, though, are more progressive. The American Physical Society (APS), a non-profit body, has started to make manuscripts sent to one of its journals publicly available before they are peer-reviewed, and is creating Internet links between its journals and the Los Alamos archive. And even commercial publishers may sometimes bend a little. Reed-Elsevier, a Dutch company that is the biggest commercial publisher of scientific journals (it acquired much of the Maxwell scientific empire), has agreed that it can work with licences from authors, rather than demanding that they transfer full copyright. Dr Harnad and his acolytes argue that it is therefore up to academics to change the way publishing companies work, by being more fussy about the terms they accept.

Given the extent to which physicists and mathematicians already use e-prints, collaborations

such as that between the APS and Los Alamos may have been inevitable. But sceptics doubt that e-prints will penetrate other scientific fields so easily.

One reason is that papers in “hard” disciplines such as physics are far less frequently rejected by journals than those in squishier subjects. That makes e-prints a reliable source for physicists. But in other fields, most scholars still require a formal system of anonymous peer-review (and the no-holds-barred honesty that it is supposed to bring) to filter the wheat from the chaff.

Separate journals could yet disappear, suggest the most utopian visionaries, if learned societies (which were once the only publishers of academic journals) simply provided peer-review services, with reviewed articles in the e-print archives carrying their (electronic) seals of approval.

Perhaps the best hope the established journals retain for long-term survival is that some of them have very strong brands. Both researchers and grant-and job-awarding committees get their first impression of the quality of a piece of research from the journal it is published in—the informal rank order of journals in a field being well known to all the practitioners.

But though journals may persist, publishing them electronically offers other innovations. One is being attempted by the Optical Society of America. This non-profit body recently announced that its new on-line journal, *Optics Express*, will be available for free. Its costs will be covered by authors, who will pay an initial $50 for peer-reviewing and $300 more if an article is accepted. This model (which at least one other electronic journal already uses) virtually guarantees a readership. The problem is the writership: scientists are reluctant to dig into their research grants to pay such fees, especially when they can publish for nothing elsewhere.

Could someone else pay? Since it costs so much less to produce a journal electronically, and the spread of such journals could relieve the pressure on library budgets, universities might be persuaded to cough up their researchers' publishing fees. A number of librarians are hoping to persuade academics that such moves would be in the common interest. The increased threat of desertion, they hope, will also allow them to negotiate cheaper contracts with commercial publishers who are becoming more electronically oriented themselves. The days of 40% profit margins may soon be as dead as Robert Maxwell.