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## Necessity Is the Mother of Innovation

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In the debate about the National Institutes of Health (NIH) proposals, we have seen and heard much concern expressed for the health of the publishing industry and the health of societies with a publishing program. Most arguments seem to center on these issues. And they are very important, of course, especially to the publishing organizations concerned, be they scholarly societies or commercial publishers. They fear for the demise of their subscription-based model and the seemingly secure income streams it generates. Societies argue that they need the income from publishing to sustain the other important activities that they are engaged in, such as the awarding of scholarships, the organizing of conferences, public outreach, and educational programs. Commercial publishers cannot argue that losing revenue means having to stop charitable activities, but they gratefully regard societies as a convenient bulwark behind which they can safely shelter from the effects of any criticism. Societies, after all, are part of the scientific community and will, as such, be treated with much more care than commercial publishers by those who want to change the way of scientific publishing, or so the theory goes. And of course, there is some justification for that.

But curiously, there is something missing from the debate. We heard little about the health and effectiveness of science. Yet that has to be the prime concern. Publishers and scholarly societies derive their *raison d'être* from serving science. It is the obligation of all participants in this debate to put science first. That does not seem to happen, however.

If the concerns of science were put first, and the business of providing a service to the world of research were to follow rather than take pole position, we could take the discussion further, and debate as to how science is best served. There will be different ideas about that, of course. The vantage point of a scholarly society, including its perspective on business, is bound to be different from that of a commercial publisher. But a rich and frank exchange of those ideas can only benefit the outcome. Alas, an opportunity seems to have been missed by many in the furor surrounding the NIH proposals.

The NIH, as responsible financiers of research, have come to conclude that barrier free access — open access — to the published output of the projects that they fund is the proper and appropriate finishing touch to a research project, especially because open access, now that the Internet makes it possible, seems the

best way to “expand the knowledge base in medical and associated sciences in order to enhance the Nation’s economic well-being and ensure a continued high return on the public investment in research” (point 3 in the NIH mission statement). The intellectual property resulting from research, virtually all of it now exploited exclusively by publishers, is property that is heavily “mortgaged” with public investment, and what the NIH are proposing is, in essence, that the mortgage be paid back to the public in the form of full information about how and on what the money is spent, and the results of the scientific research work done with that money. Far from acquitting them of their obligations, the NIH’s stance must be good news for science and society alike.

The NIH are not closing their eyes to the existence of many organizations that have come to rely — be dependent, even — on the rich pickings that the need to publish research presented to them, when publishing still meant committing articles to paper and distributing them, neatly bound in journal issues, via the mail. But that model no longer exists. Certainly, printed journals are still with us, but they are now “convenience products” and no longer essential to the communication of science in most disciplines. Virtually all publishers have realized this, and now offer the scientific research literature on-line. What does still exist is the financial subscription model that came with publishing based on print — an anachronism comparable with having stokers on the earliest electric trains.

Nonetheless, and even though the financial health of publishers and scholarly societies can hardly be the responsibility of the NIH, they are accepting that organizations heavily dependent on subscriptions cannot be weaned from it overnight, and so they have been very understanding and lenient by allowing a delay of a year before the articles resulting from research that they fund can be openly available.

Scholarly societies do very good work with the funds that they raise from publishing, let there be no doubt about that. So the discovery that the mother lode is close to depletion fills them with grave concern for the future of their programs of good works. They have to find new fund-raising activities. That may not be easy.

But is the situation really that dire? The NIH proposal does not mean that there is no need for publishing anymore. The whole peer review process still needs to be organized, articles need to be made fit for publication, XML-coded or otherwise prepared, linked with the body of already existing literature, embedded in all manner of appropriate abstracting and indexing databases, and securely archived. BioMed Central is offering publishing services like this, and there is no reason why scholarly societies should not consider doing it as well, sharing, if they want to, the technological infrastructure that BioMed Central has developed, so that they can concentrate on the content itself.

It will be important for many societies to stay involved in publishing; consequently, the exploration of new options presenting themselves in open-

access publishing must be a high priority. The viability and sustainability of open-access publishing financially supported by article-processing charges is beyond doubt. After all, in the traditional system, each article generates a total revenue on the order of \$3000 or more (lower amounts are rarely mentioned), which generally covers costs and a “healthy” profit (or “surplus,” in the parlance of societies).

Given that virtually the whole of the publishing process in an open-access environment is exactly the same as in the traditional one, there is no reason that this amount of revenue should not cover costs and profits equally well. Add to that the potential for streamlining the publishing process due to the absence of an obligatory print edition, and it becomes clear that lower costs per article is a realistic prospect.

It seems that sustainability of the open-access model is only questioned in an attempt to discredit that system. In fact, sustainability is intrinsically more secure in an open-access model than in a traditional subscription model, simply because publishing activity is directly proportional to research activity and therefore eminently scaleable if the amount of research increases. In the subscription model, increased research and publishing activity has thus far led to a vicious cycle of higher costs, lower affordability of comprehensive journal collections, and the resulting subscription attrition (i.e., shrinking circulation), as we have already witnessed for at least a decade.

The NIH proposal is an important step forward for the open access to research results needed in modern science. Both scholarly societies and the NIH now have a further opportunity to come together in an effort to restructure scientific publishing on a deeper level than just that of providing access to published articles of a year old. Making articles published in subscription journals freely available after a time has all the makings of a highly unstable situation. Instead, the NIH, the societies, and willing commercial publishers might be persuaded to work together to address the root cause of the access problem. Depositing published material in an open repository is a short term solution to be compared with using painkillers to combat symptoms rather than carrying out the corrective surgery needed. Open-access journals address the issue in a long-term, sustainable way.

It is sometimes uncomfortable to experience challenges, but because necessity is the mother of innovation, to use a slightly modified cliché, such challenges may stimulate the sort of innovations that will make science communication as good as it can be given the state of the technology available, rather than the suboptimal compromise it currently still is.

The NIH proposal doubtless presents a challenge, but it is one to be welcomed, for the sake of science, society, and a high return on the public investment in research, instead of wished away or fought. Open access can be our reward.