

reduction. What about when demand shifts towards on-line only? It is a truism in publishing that expenses must be reckoned in terms of 'first-page' costs: it is all the work (writing, refereeing, editing, composition, mark-up) that goes into the first page that represents the lion's share of the expense. Printing and distributing multiple copies of that first page represents at the very most 30 per cent of the page cost, and if and when that 30 per cent saving can be made, publishers will be happy to pass it on to subscribers; for now, though, costs are up, not down.

The other side of the story comes from the minority of journals that have started as on-line only. There are as yet no exactly comparable pairs of paper-only and on-line-only journals, in terms of submission/acceptance rates, page counts, subject matter, readership, authorship, impact factor (citation ratio), and the all-important 'prestige' factor, but such comparisons as have been made suggest that on-line journals are managing for at least 70 per cent less, and that these economies could even be improved on as global archives come into the picture, scaling down the first-page costs to those of implementing (not performing) peer review (just as authors write gratis, referees referee gratis, and always have), plus editing/copy-editing and mark-up (much of that becoming increasingly off-loadable to authors too, as friendly HTML and eventually SGML authoring tools appear and pressure for their disciplined use by all authors grows).

Who pays the piper?

A great deal rides on this discrepancy in estimates of the true cost difference between paper and on-line-only pages. If the saving is really only 30 per cent or less, then S/SL/PPV is indeed the only way to recover costs, and free access, though still optimal, becomes unattainable instead of inevitable — absent a massive subsidy (from whom? to whom?).

But if the savings are the 70 per cent or more that the new e-only journal publishers are experiencing, then the optimal is not only inevitable, but within reach: currently, that 70 per cent is paid in large part by library subscriptions. Simple arithmetic shows that if the page charges for the remaining 30 per cent were paid in advance, at the author's end, out of (and for the sake of) those savings, not only would institutional libraries be much better off, but the world learned community — authors and readers alike — would be fast-forwarded straight into the optimal.

Unfortunately, the world learned community (as our earlier 'from whom?/to whom?' question suggests) is not a collective with any coherence or clout. Moreover, even if universities re-channelled all savings from library serials cancellations to faculty publication budgets, there would not be a balanced quid pro quo, because highly research-active universities (the net page-providers,

currently) would then face the biggest costs, whereas less research-active universities (the net page-consumers, currently) would get a free ride (although there might well be enough funds to keep it all aloft, because the research-active universities also tend to have the biggest serials collections; the 70 per cent savings still leave considerable room for manoeuvring; and, research productivity being the lifeblood of learned inquiry, and publication being its most measurable life-sign, other sources of research support, university as well as governmental, would find it natural to wrap into the funds for conducting the all-important research the relatively minor marginal cost of reporting it).

But, as long as restructuring depends on a collective — and an interdisciplinary, interinstitutional and international one at that — the optimal and inevitable may have a long wait. What is needed is some incentive to take matters into one's own hands as individual members of the learned community. There is a way, and it would allow individual scholars to have their cake and eat it too. The proposal is simple, and subversive. All authors should continue to entrust their work to the paper journals of their choice. But if, in addition, they were to publicly archive their pre-refereeing preprints and then their post-refereeing reprints on-line on their home servers, for free for all, then the de facto practices of the reader community would take care of the rest (irrespective of their reservations about bed/bath/beach reading); library serial cancellations, the collapse of the paper cardhouse, publisher perestroika, and a free for all, e-only serial corpus financed by author-end page charges would soon follow suit.

A centralized variant of this subversion scenario, xxx.lanl.gov, has already passed the point of no return in physics and some allied disciplines in the form of Paul Ginsparg's Physics Eprint Archive at Los Alamos National Laboratory, supported by the US National Science Foundation (NSF) and Department of Energy (DOE). As history will confirm, Ginsparg single-handedly set the world learned community on its inexorable course towards the optimal and the inevitable in August 1991. Hence 1998 e-

journals are not the right beans to count for e-future-casting: the number of new papers being deposited by authors at xxx (that subversive sapphire among the look-alike cyber-smut sites) is now 100 per weekday, with the number of 'hits' by readers now 65,000 daily and both figures still growing steadily. The real measures of the radical new way the world physics community is accessing its research literature are these, not the rate at which the fee-based on-line *doppelgängers* are being put on the market.

xxx marks the spot

In response to this reality, the forward-looking American Physical Society, publisher of some of the most prestigious physics journals in the world, has agreed to collaborate with xxx, which is already the de facto *locus classicus* for much of the physics literature. Manuscripts can be submitted to APS journals through xxx for refereeing; the final, refereed, edited version can then also appear through xxx, but with APS certification. These are the advantages of centralization. Backed by APS and NSF/DOE (and backed up at numerous mirror sites the world over), the preservation of this collective corpus is assured.

But the nature of cyberspace is such that there is always room for more. Mathematics, computer science and cognitive science (cogprints.soton.ac.uk) are already joining the disciplines served by xxx; there is no reason whatever why xxx should not go on to subsume (or subserve, rather) all the rest of the learned serial literature too; economies of scale suggest that this may even be the most efficient and direct path to the optimal; and a transition to page-charge-based cost-recovery and free distribution in place of S/SL/PPV will mean that journals — competing for authors' papers rather than readers' payments — are free from the need for fire walls to segregate papers from readers, and can instead collaborate in implementing the optimal and the inevitable for learned inquiry. □

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