

become more liberal over the past two years. Publishers that refuse a priori to publish articles that have been posted on e-print servers — such as the *New England Journal of Medicine* — appear increasingly isolated.

In contrast, over the past two years, *Nature*, the *Journal of Neuroscience* and several other journals have stated that posting on e-print servers does not a priori constitute prior publication, but is rather a legitimate means of communication between researchers (see *Nature* 390, 427; 1997).

The *British Medical Journal* joined their ranks this month. In an editorial, Richard Smith, its editor, argues that journals have nothing to fear from e-print servers. “Strong publication is associated with prestige, credibility, reliability, wide availability, news coverage and permanence... [scientists] want to publish both on e-print servers and in peer-reviewed journals. It’s not either/or but both.”

Brown wrote this month to major journal publishers asking them to publish “an explicit policy statement that distribution of a preprint, by means of a public electronic

preprint server or Internet site, will not influence the decision of your journal to publish a paper”. This would remove one of the major deterrents to wider use of e-print archives.

Virtual peer review

Several journals, including the *BMJ*, are experimenting with making manuscripts available on the web before they have been peer reviewed, and then subjecting them to open, online peer review.

A pilot test on one article prompted a large response from readers. Tony Delamothe, deputy editor, admits that the opinions expressed were of variable quality, but believes that they nonetheless allowed conclusions to be drawn as to whether the paper should be accepted for publication.

The stakes are high, points out Delamothe, given that, in contrast to physics, a change in publication practices could have public health consequences as information about potential treatments would be made public before being validated scientifically. But the journal is optimistic that labelling

non-peer-reviewed material may be sufficient to prevent abuse.

The journal intends to carry out further controlled experiments before changing its editorial policies. It wants especially to establish whether naming referees might affect the quality of reviewing — young referees might refrain from publicly criticizing their elders, for example, for fear of retaliation.

One idea that the *BMJ* may consider is a hybrid peer-review model that combines open online peer review and commissioned reviews. This strategy is being pursued by *Electronic Transactions in Artificial Intelligence*. It differs from conventional journals in that review and acceptance take place after the article has been published online.

The system is yielding better quality papers than conventional reviewing, claims Erik Sandewall, the journal’s editor. He adds that open online reviewing “broadens the concept of scientific publication so that the feedback and quality-control processes become integrated with the author-to-reader communication instead of being separated from it as at present”.

A less remarkable change, but one welcomed by researchers, is the practice of posting papers on the web upon acceptance, often many weeks before their appearance in print. “This is key for me; it is a tremendously good thing,” says Gregory Fu, a chemist at the Massachusetts Institute of Technology.

Electronic publishing is stimulating other innovations in the submission process. The entire editorial procedure of the *Journal of High Energy Physics* is managed by a software robot, which scans papers submitted by e-mail and assigns them to referees on the basis of key words. Authors, editors and referees have real-time access to papers throughout the editorial process.

Unfortunately for publishers and librarians, nobody has invented a software robot that can design winning strategies amid the Brownian motion of the electronic publishing business. Martin Blume of the American Physical Society sums up what many consider will be the only realistic web strategy for some time: “Experiment as much as possible, and be as fast on our feet as we can.” □

Roll over Gutenberg

Many scientists remain strongly attached to the ‘look and feel’ of the printed page, and doggedly continue to download and print web documents, rather than reading them on screen. In doing so, they are contributing to perhaps the largest, though inconspicuous, paradigm shift yet to have been brought about by electronic publishing — the shift from centralized printing to electronic distribution and local printing.

So much for visions of the paperless office. Over the past five years paper consumption has jumped 13 per cent in the United States, with 1,000 billion pages pouring out of computer printers annually.

Some publishers, such as the American Physical Society, are considering whether it might not be cheaper to stop printing low-circulation journals, and just let libraries, or whoever wants paper copies, download files and print whole issues themselves.

The US company Presspoint is already exploiting this idea to print short runs of foreign newspapers in hotels and airports. The digital printing presses required, which skip the conventional preparation of individual typeset pages on film, are becoming cheaper and more widely available. For short print runs they are as or more economical than traditional printing — and quality is the same.

But why do researchers download and print? One answer is that, although even the best monitors may look sharp, they are fuzzy, and their resolution is well below the 200 pixels per inch or so that would make reading as comfortable as on paper. Reading on screen is slower and more tiring.

The first of an expected wave of digital reading devices — or electronic books — Nuvomedia’s Rocket eBook, went on sale before Christmas at \$499. Each can hold the equivalent of a dozen novels, and offers touch sensitive, high-resolution screens.

The content of e-books will initially be restricted to special encrypted book titles downloaded from the web. But Nuvomedia, which has agreements with several major publishers, is looking at other markets. “We definitely have plans to pursue journals,” says Nuvomedia’s Robert Carter.

If Nuvomedia’s vision of scientists carrying their personal libraries around with them seems far fetched, that of E Ink, a company born at the Massachusetts Institute of Technology, appears almost science fiction. E Ink has invented an electrophoretic ink of microscopic coloured capsules that change colour when a tiny electric current is passed through them (see *Nature* 394, 253–255; 1998). Coat the ink onto paper, plug the sheet into a computer, and the sheet can produce high resolution images — black and white at present — that stay when the current is switched off.

Russ Wilcox, E Inks’ vice-president, claims the ink could be used to develop screens with four times the resolution of existing screens. The company plans to create paper books that could display any electronic text. Might researchers soon be able to download their copy of *Nature* and carry it with them on the train? “Absolutely,” says Wilcox. “Electronic ink’s light weight and low power draw make it ideal for such portable applications.”

