

September 2005

News and Views

Material witness: Taking lessons from the book

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doi:10.1038/nmat1474

When the bicycle was voted by Britons last year as the greatest invention, some technology experts were dismayed. As a keen cyclist, I was reluctant to complain myself; more frustrating, however, was the time span considered: the past 250 years, perhaps on the basis that older inventions would be mere historical curiosities by now. On the contrary, this eliminated some of the most worthy candidates, of which the foremost is surely the book.

Just as literary critics love to discuss the ‘death of the novel’, so publishers obsess about the ‘death of the book’, if only to debunk the notion. In part this is a question about the future of 100,000-word theses in the era of the word-bite and web page; but also at issue is the fate of the book as physical object, a series of printed paper sheets between covers.

This invention has its drawbacks. Libraries consume space. Books are heavy, combustible, (to some species) edible, and they fall apart. Electronic media would eliminate these problems at a stroke.

And yet they have not done so. The impact of electronics on reading and writing has been hugely asymmetric. These words will not encounter paper until they are ready for the pages of *Nature Materials*. Many people barely pick up a pen now except to sign their name; but some newspapers can put virtually their entire content online without fear of losing paper sales.

Some commentators are convinced that this is only a matter of time; and they may be right. Electronic paper has improved with remarkable speed, and will surely hit the mass market in some form within a decade. Power sources for such low-power devices are getting lighter and longer-lived; manufacturing of high-resolution screens becomes ever cheaper, largely as a result of inventive materials solutions.

In his new book *The Singularity is Near* (Viking, 2005), inventor Ray Kurzweil suggests that technologies evolve in series of S-shaped curves – slow initial growth followed by rapid expansion that eventually levels off – with exponentially decreasing ‘cycle’ times. He suggests that the false starts and fundamental shortcomings of early ‘electronic books’ are mirrored by those of electronic pianos (a technology Kurzweil pioneered), and that once these problems are overcome, books will be seen as no less susceptible to ‘digital’ replacement than the acoustic piano.

But even if this is true, the extraordinary resilience of the book has something to teach us about the nature of technology. The reasons for the book’s current dominance over

electronic alternatives are not purely technical but are bound up with the human interface. What seems like imperceptible flicker on a standard computer screen confuses the eye and slows reading speed, so that we still prefer to print out long texts. Electronic books are wonderful for text searches, but don't yet have a browse facility that compares with flicking through paper pages. And even if books are biodegradable, do we still trust that words are as safe in an electronic memory as they are in paper and ink?